

RFP #R0911

Periodic Assessment Program RFP Section 3 Appendices

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Appendix H: LIQUIDATED DAMAGES

1.0. ASSESSMENT OF LIQUIDATED DAMAGES AS A REMEDY FOR NON-COMPLIANCE.

1.1. If the Contractor’s provision of any Services shall not comply with the terms, conditions and specifications of this Agreement as a result of any intentional, negligent and/or other act(s) of commission and/or omission of the Contractor and/or its agents, servants, employees, subcontractors, affiliates, partners (including, without limitation, general, limited, silent and apparent partners), directors, officers, volunteers, invitees, licensees, designees, assigns or any other representatives (expressed in this Appendix H jointly and severally as “Contractor Group”), the Contractor hereby stipulate and agree that the Board shall suffer losses and damages by reason of the inconvenience and impacts upon Board interests, operations and activities that shall result from any such act(s) of commission and/or omission. In view of the difficulty to ascertain exact amounts of losses and damages that the Board shall suffer as a result of each such act(s) of commission and/or omission by the Contractor Group that shall cause and/or permit a failure to meet the Services Levels, a sum equal those described per incident is hereby agreed upon, fixed and determined by the Parties as the liquidated damages that the Board shall suffer by reason of said failure and/or refusal by the Contractor Group to comply with the terms, conditions and specifications of this Requirements Agreement, and not as a penalty. In addition, all liquidated damages amounts expressed in the Statement of Work (SOW) shall apply to this Agreement. The Board may deduct and retain said liquidated damages from any compensation and/or other money that shall or may become due to the Contractor under this Agreement. The Board shall afford any procedural due process that may be required by law prior to each instance of the deduction of liquidated damages.

1.2. ASSESSED LIQUIDATED DAMAGES LIMITS

Deliverable	Liquidated Damage Per Day of Non-Performance or Per Student Impacted
Assessment development	1% of assessment fee* per impacted assessment for each day scheduled deliverable is delayed
Online administration	At no cost to DOE for the impacted administration
Implementation, project management, and ongoing support	1% of assessment fee* per impacted assessment for each day scheduled deliverable is delayed
Assessment administration materials	At no cost to DOE for the impacted administration
Vendor scanning and scoring	1% of scanning and scoring fee per impacted assessment (per assessment)
Customized reports	1% of report fee per impacted report for each day scheduled deliverable is delayed
Customized functionality	1% of functionality fee per impacted function for each day scheduled deliverable is delayed
Professional development	At no cost to DOE for the impacted professional development session

*per unique assessment

1.3. LIMITATIONS UPON ASSESSMENTS OF LIQUIDATED DAMAGES

The Board may not deduct and retain liquidated damages in any case where the Contractor Group's failure (but not refusal) to comply with the terms, conditions and specification of this Agreement shall have resulted from any material contributory act(s) of commission and/or omission of the Board and/or its officers, employees or agents.

1.4. LIQUIDATED DAMAGES ARE NOT AN EXCLUSIVE REMEDY

For all violations, breaches, disputes and other issues not covered by the provisions expressed in this Appendix I, the Contractor stipulates and agrees that the Board may seek any and all remedies and redress available elsewhere under this Agreement and/or at law and equity. The provisions of this Appendix H shall not act or be construed in derogation of the Board's other rights and remedies under this Agreement including, but not limited to, the Board's right to terminate this Agreement under provisions expressed elsewhere in this RFP and/or Agreement. However, in isolated instances of the contractual violations covered by this Appendix H, in which the Contractor shall have cured noncompliance and/or where the Board shall have assessed liquidated damages as an intermediate remedy, the Board shall refrain from terminating the Agreement pursuant to RFP R0911, Appendix B, Section 32 entitled, "Cancellation," supra. For repeated violations covered by this Appendix H and/or violations affecting the health, safety and/or welfare of the Board's employees, students and/or student family members, nothing herein shall limit the Board's right to declare the Contractor in default of the Agreement in advance of, in lieu of, or in addition to the assessment of liquidated damages.

Appendix J-1: LINKS TO EDUCATION STANDARDS

For detailed information about the NYS CCLS, please go to:

http://www.p12.nysed.gov/ciai/common_core_standards/

For detailed information about pre-K skills including those domains not included in the Pre-K Common Core Learning Standards, please go to:

http://www.p12.nysed.gov/ciai/common_core_standards/pdfdocs/prekindergarten_learning_standards_jan_10_2011.pdf

For detailed information about the Literacy skills within each standard, please go to:

http://www.p12.nysed.gov/ciai/common_core_standards/pdfdocs/p-12_common_core_learning_standards_ela_final.pdf

For detailed information about the Mathematics skills within each standard, please go to:

http://www.p12.nysed.gov/ciai/common_core_standards/pdfdocs/p_12_common_core_learning_standards_mathematics_final_.pdf

For detailed information about the Science skills within each standard, please go to:

<http://www.p12.nysed.gov/ciai/mst/scirg.html>

For detailed information about the Social Studies skills within each standard, please go to:

<http://www.p12.nysed.gov/ciai/socst/ssrg.html>

For detailed information about the types of items on the new New York State Test design (PARCC), please go to:

<http://www.parcconline.org/parcc-assessment-design>

Appendix J-2: SAMPLE TASK COVER SHEET

GRADE 4 LITERACY: JOHN MUIR

UNIT OVERVIEW

This task is embedded in a 2-3 week unit that uses the topic of human impact on environment as a means to teach students how to analyze and navigate informational texts. Students will write an essay at the end of the unit demonstrating their mastery of the content and their ability to make inferences within a specific text.

TASK DETAILS

Task Name: John Muir: The Conservationist on the Quarter

Grade: 4

Subject: Literacy

Task Description: Students write an essay using key details from the text to explain why John Muir devoted his life to conservation efforts and describe the effect that his work had on preserving the beauty of nature.

Standards:

RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.4.10 By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.

Materials Needed:

"John Muir: The Conservationist on the Quarter" (<http://www.superteacherworksheets.com/readingcomp/5th-muir.pdf>)

GRADES 9-10 LITERACY: THE POWER OF NEW MEDIA

UNIT OVERVIEW

The Power of New Media is the culminating task in a 2-3 week unit that uses the topic of new media and its impact on youth to and on the world as a means to teach students how to analyze and investigate informational texts. Students demonstrate their mastery of the content and their ability to synthesize informational across texts by writing an essay on the effects of media use on young people.

TASK DETAILS

Task Name: The Power of New Media

Grade: 9-10

Subject: Literacy

Task Description: This task asks students to write an argumentative essay in which they state and defend a position on the effects of media use on young people, using evidence and reasoning from texts and other sources.

Standards:

RI.9-10.1 Cite strong and thorough evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

RI.9-10.10 By the end of grade 9, read and comprehend literary nonfiction in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literary nonfiction at the high end of the grades 9–10 text complexity band independently and proficiently.

W.9-10.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. Explore and inquire into areas of interest to formulate an argument.

Materials Needed: See the Teaching and Learning Version on page 5 for a full list of texts needed for this unit.

Appendix J-3: NYCDOE STYLE GUIDE

English Language Arts & Literacy Introduction

This Guide should not be considered to be all-inclusive or complete. It is a working document intended to be used as a handbook during ELA test development. Users of the Guide should rely on their expertise and professional judgment on points not specifically addressed in this guide. Guidelines may be modified and expanded during the course of on-going test development and suggestions and recommendations from the users are welcome.

Passages

Type

Narrative: Narrative passages include fictional text, such as stories, poetry, myths, and fables.

Informational: Informational passages include literary nonfiction, such as expository text, argumentative and persuasive text, biographies, essays, reports, and speeches. The information should be interesting and appropriate to students at the grade level being tested.

Functional: Functional passages include both procedural text that provides directions for accomplishing a task (e.g., directions for art activities, experiments, recipes, or hobbies) and documental text (e.g., fliers, advertisements, school letters, and applications). The concepts and vocabulary should be appropriate for students at the grade level being tested.

Length

All grades	Each passage should fit on one page.
Grades 3 and 4	Passages should be no more than 350 words in length.
Grades 5 and 6	Passages should be no more than 475 words in length.
Grades 7 and 8	Passages should be no more than 600 words in length.

Tense

Present tense is generally used for functional passages and informational passages that describe a current subject (e.g., how coins are minted), a natural phenomenon (e.g., snow storms, animal behavior, etc.). If an informational passage is biographical or about historical events, then the passage should be written in past tense.

Narrative passages that are fictional are generally written in past tense. Poetry may be written in past or present tense.

Guidelines for passage tense are general. In cases where the recommended tense makes the passage difficult or awkward to read, judgment should be applied in using whatever tense is appropriate for best reading of the content.

Readability level

A variety of readability levels should be included, from somewhat above to somewhat below the grade level.

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Readability can vary due to:

Difficulty of vocabulary
Difficulty of sentence structure
Unusual or difficult terms or names

Test forms should allow for some flexibility of readability, and have a balance of passages that are easy to read with difficult concepts and vice versa. See References for recognized source books on passage readability level.

Vocabulary

As a general rule, vocabulary words should be at least two grade levels above readability for the grade being tested. The passage must always contain sufficient context for the student to determine the meaning of the word. As noted in the entry above, see References for source books on readability level.

Contractions

Contractions can be used in dialogue in reading passages for Grades 3-8. In Grade 3, contractions should not be used otherwise. In Grades 4–8, contractions may be used occasionally in the text where it seems appropriate.

Variety and balance

A range of content matter and major demographic variables should be represented in each test form. The following aspects are among those that should be balanced: gender, ethnicity, location, family composition, and season. People with physical disabilities should occasionally appear in passages. They should be portrayed in a positive and dignified way.

Variety in style and tone should be used. The passages within one grade should not all have the same “feel,” topic, theme, or author.

Characters’ names should reflect ethnicity, but should not be so unusual as to require elaborate decoding. Use more common, easy-to-decipher names.

Sequencing

The sequence of passages in a form should be by genre: narrative first (but not a poem first), then informational or functional. Do not put two passages of the same genre consecutively. It is suggested that forms be constructed so that the tests begin and end with passages that are easily comprehensible.

Content

The content must be grade appropriate and of interest to students. It should be familiar and common in the lives of NYC students. Occasional use of unfamiliar elements to represent a variety and mixture of themes is acceptable.

Facts in informational passages should be checked for correctness.

Passage content should provide sufficient information for students to answer the questions.

See Appendix J-3-B for a list of topics generally considered to be inappropriate for use in NYC ELA testing.

Structure

Passages should flow from sentence to sentence, paragraph to paragraph, with transitions between paragraphs. Passages should be clearly written at the appropriate grade level so as to be understandable and unambiguous. Facts should be supported by explanatory information. Creative stories should have interesting, definable plots and reflect a wide range of experiences.

Passages should not take the form of: fact 1, then fact 2, finally fact 3 (such as a series of events; e.g. in a creative passage, “Jaime woke up, got out of bed, washed up and went to the kitchen for breakfast. When he was ready for school he...”). The author should include information about the facts so the reader knows why they are important in the passage. In this example, there should be reference to a character’s thinking, mood, intended actions, etc. – e.g., “Jaime woke up and remembered that this was Friday, the day he was going to star in the school play...He couldn’t think of anything else as he sat down to have breakfast...”). While keeping content at the appropriate grade level, it should include one or more of the following:

- Contrast (e.g., At home, Lisa loves to sing. In school, she is always quiet.)
- Conflict (e.g., Sari loves cats. Her father dislikes pets.)
- Descriptive modifiers
- Surprise and/or humor

Passages should have well-crafted endings. Nonfiction endings may take the form of a summary of the theme(s), or conclusion(s), or linking the topic to a larger context. Fictional endings should resolve the plot line, or offer commentary on the character’s thoughts, actions, or how the character was affected by the events of the story.

Introductory material

Introductory sentences placed before the title and text can contain a brief summary of the passage, setting, or characters. They may also have explanatory facts that aid passage comprehension but are not central to the passage. For example, in a passage that describes the customs of an indigenous group of people living in the Amazon rainforest, the introductory sentence might say, “The Amazon Rainforest is a tropical rainforest of about 1.2 billion acres located in the Amazon Basin in South America. It is home to hundreds of indigenous tribes.” Although an item might be written to assess understanding of the specific fact in the introductory sentence(s), care must be taken to ensure that this material cannot be used to answer any item when the purpose of the item is to assess comprehension of the passage.

Items

Tense

Present tense is generally used in items for most types of passages. However, items referring to passages containing biographical or historical information should be in past tense. Items referring to narrative passages should be in present tense even when the story or poem is in the past tense (e.g., “Why is Alex looking for his dog?”). In cases where present tense cannot be used or is awkward (e.g., “The author writes this story in order to —”), another tense should be used (“The author wrote this story in order to —”; “The poet will see the moon after he —”).

Format and punctuation

1. If the stem is open (that is, if it ends in an em dash), the options (i.e., answer choices) begin in lowercase unless the first word is a proper noun. There should be no end punctuation even if the option completes the sentence.
2. If the stem is closed (that is, if it ends in a question mark), options begin in uppercase. The options have end punctuation only if they are complete sentences.
3. Command-type options do not have end punctuation when they follow a stem that ends in a question mark.

Ex.: According to the recipe, what should be done first?

- A. Close the lid
- B. Rinse the lettuce
- C. Find a bowl
- D. Add the olives

Contractions

Contractions should not be used in passage comprehension items unless dialogue is being quoted.

Repeated words

If a word is repeated in all options, include that word in the stem.

Ex.: If the stem reads: “In the story the boys —” and the options include:

are running
are jumping
are skating
are walking

the stem should include “are,” as in: “In the story the boys are —”

Articles

In options that all begin with articles such as “a,” “an,” or “the” following an open-ended stem, leave “a,” “an,” and “the” in the options. Do not move the article to the end of the stem.

To avoid clueing, articles at the beginning of the options must be balanced. That is, for example, two “a” and two “an,” not three “a” and one “an”.

“Probably” and “most likely”

If a stem contains these terms, they should be placed at or close to the end of the stem, rather than at the beginning.

Correct: “The author wrote this story most likely to —”

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Incorrect: “Most likely, the author wrote this story to —”

These terms should also be placed in the proper position in the sentence so that they modify the correct word.

Correct: “The reason Rosie wants to go home is probably—“

Incorrect: “Rosie probably wants to go home because —“

Item sets

Independence

In the set of items for a passage, each item must be entirely independent of the other items. The response to one item should not be required as a condition to answer another item.

Repetition of words in stems

Stems containing terms such as “most likely”, “probably”, “according to the passage”, “based on the information in the passage”, etc. should be placed appropriately within the sequence of items in the set. That is, two stems that use the same terms should be placed separately on the page – not one following the other. It is suggested that, if possible, the set of items for an individual passage contain no more than one each of these terms.

Sequencing

Place easier items before more difficult items. The easiest categories of items are about details in the passage, followed by vocabulary questions. Items about characterization are more difficult, inference items are more difficult still, and items involving the author’s opinion and critical analysis are the most difficult.

Balancing

The spread of correct option responses (the total of correct answers that are A, B, C, and D) should be balanced within the items for the passage as well as throughout the test.

Repetition of option letters in correct answers

The options for correct answers in a set of items should vary within the set. There should be no more than three of the same option letter that follow each other for correct answers (i.e., there should be no more than three C options in a row within a set that contain the correct answer). The test as a whole should have about the same numbers of options A, B, C, D as correct answers.

Items that test vocabulary

Grade 3: If an item asks for the meaning of a word or words from a passage, the word or words should be underlined in both the stem and the passage.

Grades 4–8: If an item asks for the meaning of a word or words from a passage, the word or words should be italicized in both the stem and the passage.

Synonyms and distractors in answer choices should be plausible and fit grammatically into the sentence in which the vocabulary word appears.

References to text from the passage

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References in an item to text from a passage should match the text in the passage exactly and should include quotation marks only if the text referred to is dialogue. Any punctuation included in the passage must also appear in the item.

If an option quotes only part of a sentence from a passage, use ellipses.

Ex. "You will feel better than ever . . ."

For research-based rules on writing test items, see Appendix J-3-B: Guidelines for Constructing Multiple Choice Items

Conventions

Abbreviations

Use periods with the abbreviation U.S. Do not use periods with other abbreviations, such as NYS, ID, DC, etc.

In measurement

The abbreviation for teaspoon is tsp. The abbreviation for tablespoon is Tbsp. Cup is written out; it is not abbreviated.

Animals

References to animals should be "it" on the second reference, not "him" or "her."
An exception is if the animal has a name (i.e., if it is a character's pet, or if the animal is a character in a story). In these cases, the male/female pronoun is acceptable.

Book titles

Book titles should appear in italics.

Capitalization of Proper names

Capitalize "Earth" when used as the name of the planet.

Ex.: "We all live on Earth."

Lowercase "earth" when used in reference to soil.

Ex.: "Farmers use tractors to move earth."

See The Chicago Manual of Style, 8.149, for specific information regarding the use of "Earth."

Titles

Titles are capitalized only when they precede a personal name. Titles are usually lowercased when they follow a name.

Ex.: "President George Bush"

Ex.: "George Bush, the current president of the United States"

See The Chicago Manual of Style, 8.21–8.39, for specific information regarding titles.

Emphasis techniques

Emphasis words in Grade 3 items should be underlined.

Ex.: best, except, fact, main, mainly, most, mostly, most nearly, not, opinion, probably, least, first, after, vocabulary words

For Grades 4–8, emphasis words in items should be italicized.

Ex.: best, except, fact, main, mainly, most, mostly, most nearly, not, opinion, probably, most probably, least, first, after, vocabulary words

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Note for all grades: To avoid confusion, if an emphasis word appears in an item that tests vocabulary, do not emphasize (underline or italicize) the emphasis word(s).

Correct: "The word pest most nearly means —"

Incorrect: "The word pest most nearly means —"

Eras and time

Use "ce" ("of common era") and "BCE" ("before the common era") instead of "ad" and "bc." When ce and bce appear in the passage, they should be followed by an asterisk (e.g., bc*) the first time they appear. An asterisked notation at the bottom of the page should explain the abbreviation.

References to eras/time should not include periods and should be in small caps.

Ex.: 1000 BCE, 3:00 AM

Words or phrases in another language

Occasionally a reading passage will contain word or phrase in a language other than English (e.g., e pluribus unum, tia, abuelo, en route, etc.), which may be confusing to some students. In order to signal that these words or phrases are not meant to be decoded or read in English, they should be italicized.

Instructions in functional passages

When referring in an item to a recipe or set of instructions, the recipe or set of instructions should be referred to as a "passage" if it includes introductory text that explains more than just what is being made (for example, if it includes the history of the subject). If an item refers to information within the recipe or set of instructions and does not refer to the introductory text (or if there is no introductory text), then the wording in the item should refer to "recipe" or "instructions" or "directions".

Examples:

The author of this passage tells the history of scuba diving in order to —

According to the instructions, before going into the water the diver must —

Line numbers

Lines and paragraphs are not numbered except in poetry. Every 5th line of a poem should be numbered, beginning with line 5.

Phone numbers and websites

Phone numbers used in passages should be authorized phone numbers of the test publisher. These numbers should be checked before inclusion in each test.

When referring to websites in passages, ensure that they are the test publisher's websites. Variations of website addresses may be used to make them invalid, such as leaving off "[www.](http://www)", adding "<http://>" before addresses, or adding the suffix ".biz". However, it is necessary that all websites appearing in passages be checked prior to each testing to ensure that they are not valid, active websites.

Superscripts

The following superscripts should be used: st, rd, th.

Ex.: "I am 5th in line."

Terminology for writers and passages

The terms, "writer," "author," and "narrator" are used as follows. The writer of a poem is a poet

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story is an author
section of prose is an author
flier is a writer

A narrator is the character in a story or poem who is telling the story and refers to himself or herself as "I."

In all grades, refer to the passage as
directions, flier, or recipe (functional)
passage (informational) (functional, if reference includes introductory text)
story, poem (narrative)

Spelling, Punctuation, and Usage

Colons

A heading is followed by a colon if the text after the heading contains a list.

Commas and conjunctions

A comma is used before "and" and "but" when the word separates two independent clauses.

Commas following introductory phrases

A comma is used following an introductory phrase.

Commas in a series

Commas are used after every item in a series and before the final "and." A comma used in this way is called a serial comma, or Oxford comma.

Conjunctions

It is preferable not to start sentences with "and," "but," "or," and "because."

Ellipses

There should be one space before and after each point in ellipses. Place another space and a period after the last point in ellipses if the words omitted are at the end of the sentence.

Ex.: "You will feel better than ever"

Flier vs. flyer

Both spellings are correct. "Flier" is the spelling New York City uses to mean a piece of paper that is handed out to people.

Grade

When referencing grade, the term should be capitalized in instances such as "Grade 5". However, in instances such as "5th grade", it should be lowercase.

Hyphens

When used in running text, there should be no space before or after hyphens, en dashes, and em dashes.

1. Hyphen: A hyphen (-) is used "in compound words and names and in word divisions" (The Chicago Manual of Style, 6.81).

Include hyphens in compound adjectives.

Ex.: "a right-handed child" (Do not hyphenate "a child who is right handed")

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See The Chicago Manual of Style, 7.90, for a hyphenation guide for compound words, combining forms, and prefixes.

2. Hyphen: A hyphen is used to separate numbers that are not inclusive, such as telephone numbers, social security numbers, and ISBNs” (The Chicago Manual of Style, 6.82).

Ex.: “1-888-123-4567”

3. En dash: An en dash (–) is used when showing inclusive numbers. “In this use it signifies up to and including (or through)” (The Chicago Manual of Style, 6.83).

Ex.: “Please read pages 5–10.”

See The Chicago Manual of Style 6.83, 9.38, and 9.43 for more information regarding use of en dashes.

4. Em dash: Em dashes (—) are used to amplify or explain some element in a sentence. “An em dash or a pair of dashes sets off an amplifying or explanatory element” (The Chicago Manual of Style, 6.88).

Ex.: “Three of my friends—John, David, and Scott—all got married this year.”

See The Chicago Manual of Style, 6.88–93, for more information regarding the use of em dashes.

Possessives

The possessive of a name ending in “s” is always indicated by an apostrophe plus “s” after the name. For example: “Luis’s books.”

Quoted text

If words, phrases, or sentences are taken from the text and used in item stems, quotation marks are used around the quoted text and its accompanying punctuation.

Ex.: After Dave asked, “Mark, have you seen my cat?”, Mark decided to—

If words, phrases, or sentences are taken from the text and used in options: no quotation marks are used except when dialogue is being quoted; and the stem must indicate that the options contain phrases taken from the passage

Ex.: Which sentence from the story tells you that Grandfather plans to give Andrew his guitar?

Website and Internet

The term “website” should be one word and lowercase. “Internet” always appears with an initial cap.

Formatting

Title

The title of a reading passage is centered at the top of the passage and in bold font.

Directions and introductions

In general, directions for reading passages may be placed at the beginning of the test above the sample. The directions should be in bold font.

Sometimes it is preferable to arrange an assessment so that the directions are accompanied by one or two sentences introducing the reading passages. In this case, directions with introductions are placed above passage titles rather than at the beginning of the test.

In certain instances, a set of items may assess specific skills but do not ask the student to use the context from the reading passage to answer the questions; for example, a set of items assessing

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phonetic skills or writing conventions. Depending on the skill and type of items assessing that skill, it is necessary to place directions directly above the set of items if the items.

Bylines

Bylines should appear centered under the title, in italics (not bold). The “by” of the byline should be lower case.

Layout

Passages should be placed on the left-hand side of the test booklet. All related items should appear on the opposite page so that students will not need to turn the page in order to review the text when responding to items.

The first line of all paragraphs in a passage should be indented.

If interview passages are used, the name of each speaker is indicated in bold font. The name or title should be followed by a colon.

Columns

In passages that are formatted in two columns, try to keep the paragraph at the bottom of the first column whole. In the case where the correct answer to an item is dependent on the information in the paragraph, it is imperative that the paragraph be kept whole. Do not break it up between columns. If there is no direct reference to an item, judgment should be used to decide on the best composition if the entire paragraph does not fit in the column.

In a two column passage with art that is one-column wide, do not place the art at the top of the left column. Place the art elsewhere for best composition.

Art

Art size and placement should vary throughout each test form. Art should be appropriately sized in proportion to the passage and available space on the page.

Art should be accurate and reflective of the passage but not so detailed as to provide a complete visual representation of the passage. This will prevent clueing the student about the content of the passage.

Art should be rendered so that there is no ambiguity about what is being portrayed. Overly complex/busy art should be avoided as it may be distracting to the student.

People of various genders and ethnicities should be portrayed and the work of different artists should be used to ensure variety.

A mix of commissioned art and authentic art, including photographs, is the goal. Care should be taken to ensure that there are accurate proportions among characters, animals, background, and scale.

Orphans

Orphans should be avoided in passages and items, especially small words of four characters or less.

Font

Either Arial or Optima font should be used for all passages and items.

Print specifications

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Grades 3 and 4	Passages: 13-point font on 15 leading in Optima Prompts (stems):12-point font on 15 leading in stone serif, semi-bold Options: 12-point font on 12 leading in stone serif with hard returns
Grades 5–8	Passages: 11.5-point font on 14.5 leading in Optima Prompts (stems): 11-point font on 14.5 leading stone serif, semi-bold Options:11-point font on 15 leading in stone serif with hard returns

Color

Final lasers should be printed in duotone.

References

Reference books used for the test should be in print to ensure that they reflect current usage of the language.

Primary grammar: The Chicago Manual of Style, 15th Ed.

Secondary grammar: The Gregg Reference Manual, 9th Ed.

The Blue Book of Grammar and Punctuation, 8th Ed.

Primary dictionary: Merriam Webster's Collegiate Dictionary, 11th Ed.

Secondary dictionary: The American Heritage College Dictionary, 4th Ed.

Passage readability level

Two sources are preferred to determine the readability of words used in passages:

EDL Reading Core Vocabularies is a recommended source.

The Living Word is also used by NYCDOE to assess readability of vocabulary words.

The Living Word is out of print and unavailable to test publishers and writers. NYCDOE consults this source for word information that is lacking in the EDL – i.e., definitions and synonyms of multiple-meaning words, different forms of words, and information about different grade level readabilities for the various forms and definitions. When there is a discrepancy between the two sources, NYCDOE will accept the readability level specified in the EDL.

List of Topics to Avoid

The following list is a guide to assist writers in avoiding subject matter that would probably cause a selection to be deemed unacceptable by the New York City Department of Education. In general, a topic might be unacceptable for any of the following reasons:

The topic could evoke unpleasant emotions in the students that might hamper their ability to take the remainder of the test in the optimal frame of mind.

The topic is controversial among the adult population and might not be acceptable in a state-mandated testing situation.

The topic has been “done to death” in standardized tests or textbooks and is thus overly familiar and/or boring to students.

The topic will appear biased against (or toward) some group of people.

Some of these topics may be perfectly acceptable in other contexts, but do not belong in a city- or state-wide assessment. A basal reader may contain a story about a child dealing with death; but in such an instance, the teacher has a chance to prepare students before they read the selection, and students have the opportunity to talk through their reactions. No such opportunities are available in a testing situation, so we must be more circumspect in our topic selection. As a guide, the following topics are to be avoided:

- | | |
|--|------------------------------|
| Abuse | Pornography |
| Alcohol (beer and liquor), tobacco, or drugs | Poverty |
| Birthdays | Rap music |
| Bodily functions | Religion |
| Cancer (and other diseases) | Religious holidays |
| Catastrophes/disasters (tsunamis and hurricanes) | Rock-and-Roll music |
| Children dealing with serious issues | Running away |
| Computers in the home (acceptable in a school or public library setting) | Sex |
| Creatures from outer space | Slavery |
| Dancing (ballet is acceptable) | Terrorism |
| Death and disease | Vermin (rats and roaches) |
| Dinosaurs and prehistoric times | Violence |
| Divorce | War and bloodshed |
| Geological history | Weapons (guns, knives, etc.) |
| Evolution | Witchcraft, sorcery, etc. |
| Expensive gifts, vacations, and prizes | |
| Gambling | |
| Halloween | |
| Holidays | |
| Homes with swimming pools | |
| In-depth discussions of sports that require prior knowledge | |
| Junk food | |
| Loss of employment | |
| Movies | |
| Nuclear weapons | |
| Parapsychology | |
| Politics | |

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Avoid anything that may be interpreted as:

Anthropomorphism (attribution of human characteristics to inanimate objects, animals, or natural phenomena) (Anthropomorphism is allowed in retellings of fables.)

Biased towards or against any particular form or system of government

Dangerous for children (alone at home, swimming without adult supervision, etc.)

Demeaning to any group

Disrespectful to authority or authority figures

Highly controversial

Middle-class amenities that may be unfamiliar to some children

Regionalism

Smug, moralistic, preachy

Stereotyping of any group

Stridently feminist or chauvinistic

Avoid using trade names.

Guidelines for Constructing Multiple Choice Items

These guidelines are based on research in item construction that identifies the most effective methods for writing test items. Items must follow the guidelines listed in order to be accepted for NYC ELA testing.

Items should contain:

Simple and clear language

Only the information necessary in the stem to clearly state the question

One single central theme or independent problem stated completely in the stem

A question or an incomplete statement presented in the stem

Positively-phrased stem

Four responses (unless a different number of responses have been specified prior to test development)

Only one correct answer

Plausible distractors (correct answer and the 3 distractors are similar in sense and grammatical structure)

Balanced affect, when applicable: e.g., two choices with positive wording, and two with negative wording

Response options that are:
independent and mutually exclusive
in logical or numerical order
about the same length (or two long and two short, or ascending or descending order)
grammatically parallel with one another
homogeneous in content

Avoid:

Various clues to the right answer:
responses that contain the same words as the stem or passage
specific determiners (absolutes such as “always” and “never”); if used, the terms must appear in either two or four of the options
key words (clangs); if key words cannot be avoided, they must appear in either two or four of the options
grammatical inconsistencies
clearly inappropriate distractors
information in one question that clues the answer to another
contradictory statements
responses irrelevant to the passage

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“All of the above” or “none of the above” responses

Negative wording in stems: these stems test cognitive processes that students do not normally use by instructing them to choose the answer that is incorrect, (e.g., “Which of the following activities does the Center not offer?”).

“Except”: stems in which the student is asked to find the exception can be used occasionally (e.g., when knowing an exception is as important as knowing the rule, as in the example, “All of the following are safe practices when riding a bicycle except —”). “Except” stems should not be overused

“Window dressing” (excessive wording with useless information)

Use of humor

Questions that are answerable without reading the passage or are dependent on prior knowledge

Correct answer that is much longer or much shorter than the distractors

Bias or stereotyping of any group, insensitivity to special needs groups, for example:

Gender bias – use plural nouns or pronouns (e.g., students, they, their)

Extreme reverse bias that shows all girls doing “male” stereotyped activities, all boys doing “female” stereotyped activities

Bias against age or disabilities (e.g., referring to eighth-graders as “children”; showing older people or people with disabilities as deficient or physically/mentally weak)

**Regents- Specific Style
Guide for Mathematics Test Development**

Introduction

The NYCDOE has compiled this Guide for Test Development to share with test developers and item writers as a reference to be used during the test development process.

The Style Guide is organized into four topics. Some points presented within each topic are general and others are more specific. The section on Language Usage focuses on readability, vocabulary, spelling, punctuation, and grammar, including tense and sentence structure. The section on Item Characteristics discusses the mechanics of an item, the relationship of an item to other items, the grouping of answer choices, and the sequencing of items according to difficulty level. The Conventions section specifies what has been adopted by the testing program at NYCDOE in terms of abbreviations and emphasis. The section on Art and Graphics addresses the use of artwork, charts, and graphs, their appearance on the printed page, and text fonts.

The Guide should not be considered to be all-inclusive or complete. Rather, it is a working document intended to serve as a handbook for item writers and reviewers. Users of the Guide should rely on their expertise and professional judgment on points not specifically addressed in this guide. The Guide may be modified and expanded during the course of on-going test development, and suggestions and recommendations from the users are welcome.

Appendix C contains a glossary of terms and applicable examples. It can be referenced for additional guidance.

1) Language Usage

a) Content and Facts

- i) The content must be grade appropriate and of interest to students. It should be familiar to and common in the lives of NYC students. That is, questions about a baseball game would be preferable to ones about fishing in a stream.
- ii) Facts presented in items (e.g., typical weights of various species of animals, distances between cities, heights of mountains) must be checked for correctness. Should the exactness of the fact be in question, or should the fact be too precise for the given item, be sure to include a disclaimer. For example, the Hudson River is 506 km long. A potential item might read “The Hudson River is about 500 km long . . . “ and be acceptable.
- iii) Stem content should provide sufficient information for students to answer the questions. Assume that students possess a general, non exhaustive knowledge base. Avoid items that require specific knowledge obtained from courses outside of math.
- iv) Some item contexts might be upsetting to some students or unacceptable to their parents. Avoid anything that may be interpreted as disrespectful or demeaning to any group. See Appendix J-3-A for a list of topics generally considered to be inappropriate for use in NYCDOE Mathematics testing.

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- v) Do not use trade names. This includes brand names of foods and beverages as well as of sports teams. Use generic names instead. Do not use names of popular celebrities, athletes, etc.
- vi) Characters' names should be approximately balanced by gender and should suggest ethnic variety. Use common, easy-to-decipher names. Characters' names should also avoid potential stereotyping concerns, as per Appendix J-3-A.

b) Readability Level

- i) Readability should be at or somewhat below grade level with few exceptions. It is important that mathematics assessments test mathematics ability as independently from ELA skills as possible, and readability makes this achievable. Math-specific readability should be appropriate for the grade level and course being assessed (see section I. E).
- ii) Two sources are preferred to determine the readability of words used in passages:
 - (1) EDL Reading Core Vocabularies is a recommended source.
 - (2) The Living Word is also used by NYCDOE to assess readability of vocabulary.

c) Sentence Structure

- i) Sentences should only contain relevant material. (Extraneous material presented as distracting information not necessary to solving the mathematical problem is acceptable if reasonable within the context of the particular problem.)
- ii) Positive rather than negative statements are generally preferred.

d) Tense

- i) The appropriate tense should be used for items.
- ii) Tense should be consistent throughout an item.

e) E. Vocabulary and Spelling

- i) Vocabulary should be appropriate for the grade. (See I.B.1. for further comments.) Furthermore, vocabulary and spelling used in item writing should be drawn from standard American English.
- ii) Mathematical terminology must be correct and in agreement with the textbooks in use in the NYC classrooms.
 - (1) Mathematical symbols and formulas must be the same as those used in textbooks currently used in NYC classrooms.
- iii) Spelling Specifics – Follow the guidelines below.

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- (a) Grade - When referencing grade, the term should be capitalized in instances such as “Grade 5”. However, in instances such as “5th grade”, it should be lowercase.
- (b) Hyphens - When used in running text, there should be no space before or after dashes and em dashes.
- iv) Avoid hyphenation of words that come at the end of a line of text. A hyphen (-) should be reserved for “compound words and names and in word divisions” (*The Chicago Manual of Style*, 6.81).
 - (a) Ex.: “a right-handed child” (Do not hyphenate “a child who is right handed”)
 - (b) See *The Chicago Manual of Style*, 7.90, for a hyphenation guide for compound words, combining forms, and prefixes.
- v) A hyphen is also used to separate numbers that are not inclusive, such as telephone numbers, social security numbers, and ISBNs” (*The Chicago Manual of Style*, 6.82).
Ex.: “1-888-123-4567”
- vi) An en dash (–) is used when showing inclusive numbers. “In this use it signifies up to and including (or through)” (*The Chicago Manual of Style*, 6.83).
 - (a) Ex.: “Please read pages 5–10”.
 - (b) See *The Chicago Manual of Style* 6.83, 9.38, and 9.43 for information regarding use of en dashes.
- vii) Em dashes (—) are used to amplify or explain some element in a sentence. “An em dash or a pair of dashes sets off an amplifying or explanatory element” (*The Chicago Manual of Style*. 6.88).
 - (a) Ex.: “Three of my friends—John, David, and Scott—all got married this year.”
 - (b) See *The Chicago Manual of Style*, 6.88-93, for more information regarding the use of em dashes.
- viii) Possessives - The possessive of a name ending in “s” is always indicated by an apostrophe plus “s” after the name. For example: “Luis’s books”.
- ix) Superscripts - Superscripts should be used for the characters st, rd, and th in ordinal numbers.
- x) Ex.: “I am 5th in line.”

f) Punctuation and Usage

- i) Punctuation must be correct and follow NYCDOE conventions in all categories:

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- (1) Capitalization - Use initial caps for titles, names, and proper nouns. Use small caps for a.m. and p.m.
 - (2) Abbreviations - Spell words out in item text, such as inches, feet, etc. Abbreviations may be used in art and answer choices. Abbreviations of standard units should have a period, as in "in." or "oz."
 - (3) c. Contractions - Contractions should rarely be used.
- ii) Specifics - Follow the punctuation guidelines below:
- (1) Colons - A heading is followed by a colon if the text after the heading contains a list.
 - (2) Commas and Conjunctions - A comma is usually used before "and" or "but" when the word separates two independent clauses.
 - (3) Commas following introductory phrases - A comma is used following an introductory phrase.
 - (4) Commas in a series - Commas are used after every item in a series and before the final "and". A comma used in this way is called a serial or Oxford comma.
 - (5) Ellipses - There should be one space before and after each point in ellipses. Place another space and a period after the last point in ellipses if the words omitted are at the end of the sentence.

g) Italics

- i) Variables should be italicized, as per the conventions used in mathematics textbooks in use throughout the NYC public school system.
- ii) Italics may also be used, if absolutely necessary, for emphasis. See III B for more details.

h) Boldface

- i) The New York State Regents does not currently use boldface for emphasis. Therefore, boldface for emphasis is not appropriate for the NYC High School assessments intended to mirror the content as well as the look and feel of the State Regents.
- ii) Boldface is acceptable as axis labels in diagrams.

2) Item Characteristics

a) Independence

- i) In a set of items, each item must be entirely independent.
- ii) The response to one item should not be required as a condition to answer another item.

b) Format

- i) Stem
 - (1) The problem must be stated completely and clearly in the stem.

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- (2) Stem should be of appropriate reading difficulty for the target grade in terms of vocabulary level, sentence structure, and sentence length.
 - (3) Be careful about distracting information. Extraneous information which the student must disregard in order to solve the problem is acceptable within reason.
 - (4) Minimize the number of “not” and “never” questions.
 - (5) When answers are units of measurement, include the unit in the stem and in geometric diagrams.
 - (6) Numbers 1–10 should be spelled out unless they are necessary to solve the problem. Numbers greater than 10 should be in numerical form. Never begin a sentence with a numeral/figure. If a number begins a sentence, it should be spelled out, or the sentence should be recast. When two numbers appear together, use a digit for the first one and spell out the second one. If the first of two numbers is a one, simply drop it or replace it with an article.
 - (7) If a stem ends with an equation or a number expression, do not use a question mark or any other form of punctuation at the end of the stem. (i.e. “Solve for x: $2x = 30$ ”)
- ii) Answer Choices
- (1) There must be one and only one correct answer or defensible choice to the question posed in the stem.
 - (2) The Regents does not use answer choices of A, B, C, and D. The Regents always uses answer choices of 1, 2, 3, and 4.
 - (3) When an item has numerical options, they should be arranged in ascending or descending sequence, except when doing so “gives away” the answer (e.g., to the question “Which of the following is the greatest number?”)
 - (4) Avoid “all of the above”, “none of the above”, and “cannot be determined.” Also avoid options like “Both A and B” and “Neither A nor B.”
 - (5) Numbers in a column of answer choices should be right-aligned, except when aligned by decimals. In the case of fractions, numbers in a column of answer choices should be centered.
 - (6) When an item has numerical options, each distractor should reflect some rationale and appear at least minimally plausible.
 - (7) Options should usually be parallel in style. For example, avoid such groupings as this:
 - (a) The sides of the triangle are all of the same length.

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- (b) The sides of the triangle are of different lengths.
- (c) Angle A is less than 90° .
- (d) Angle A is equal to 90°

- (8) Non-numerical options must be similar in construction (i.e., all sentences, all incomplete sentences, etc.)
- (9) If the stem is open (i.e., if it ends in an em dash) and the options are non-numerical, the options (i.e., answer choices) begin in lowercase unless the first word is a proper noun. There should be no end punctuation unless the options are complete sentences.
- (10) If the stem is closed (i.e., if it ends in a question mark) and the options are non-numerical, options begin in lowercase. The options begin in upper case and have end punctuation if they are complete sentences.
- (11) Command-type options do not have end punctuation when they follow a stem that ends in a question mark unless they are complete sentences.
- (12) Be sure to include the units of measurement referenced in the stem within the answer options.

iii) Page layout

- (1) The Regents exams currently have a two column layout for all pages containing multiple choice items.

iv) The left-hand column contains the actual stem and answer choices.

v) The right-hand column contains space for the student to show their computations.

vi) The left-hand column has no title at its head. The right-hand column says, in **boldface**, "Use this space for computations."

- (1) The Regents currently has a prescribed layout for all pages containing extended-response or constructed-response items.
- (2) A large box with boldfaced borders will appear in the center of the page, leaving approximately one inch margins at the top, bottom, and both sides of the page.
- (3) The item's stem must be included within the box, and be located at the top of the box.

vii) The item's stem must be left-justified and honor the space limit established in the left-hand columns of the multiple choice items. There may be no more than two such items per page.

c) Sequencing of Items

- i) Place easier items before more difficult items.

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- ii) Questions that measure the same skill in the same manner are usually placed well apart on a test form. This may vary depending upon the nature of the assessment.
- iii) When two or more items are related (such as questions regarding a single situation or graph), the questions must be independent. That is, knowing the answer to one must not help students answer the other, and solving one question must not be required for answering the other.
- iv) The correct, keyed choices on a form should be distributed about equally among the four answer positions.
- v) There should not be a string of more than three of the same answer positions keyed as the correct answer, nor more than four of the same answer positions keyed as the correct answer for items appearing on the same page.

d) Sequencing of Answer Choices within an Item

- i) Options should be in ascending or descending numerical order.
- ii) For general rules on writing test items, see **Appendix J-3-B: Guidelines for Constructing Multiple Choice Items.**

3) Conventions

a) Abbreviations

i) General

- (1) Use periods with the abbreviation U.S.
- (2) Do not use periods with other abbreviations, such as NYS, ID, DC, etc.
- (3) In measurement
- (4) Appropriate measurement abbreviations must be used (e.g. tsp. for teaspoon, Tbsp. for tablespoon, m for meter, yd. for yard). Cup is always written out. Use only those abbreviations with which students are familiar from grade-appropriate textbooks currently used in the NYC public school system.

b) Emphasis

Italics are reserved for variables and for words that require emphasis, as per the current New York State Regents Examinations.

4) Art and Graphics

a) Content of items

i) Graphs

- (1) All graphs need a title. Titles should be both brief and functional.
- (2) For bar and line graphs, both axes need a label. Labels should be both brief and functional. Axes should be in boldface.
- (3) Use line graphs only for representing functional continuous relationships, such as between time and distance, or temperature and volume. If in doubt, use a different type of graph.
- (4) Pictographs must include a “key” to show the meaning of the symbols used.
- (5) All labeling must be set in a type size that is easily legible to students.
- (6) Zero-points must be shown, or clearly implied, for both axes of line graphs and for the quantitative axis of a bar graph.
- (7) The scale of the axes must be given. Students cannot assume that a single square on a graph drawn on graph paper automatically corresponds to a single unit of the scale.

ii) Charts, Tables, and Price Lists

- (1) In general, do not clutter these displays with information that is unnecessary to answer the question.
- (2) For “fill in the table” questions, include a ? to indicate the missing information. Make sure the ? does not look like a 7.
- (3) All information contained within the chart should reasonably and accurately reflect current facts.
- (4) The order in which information is represented in a table should exactly match the order in which that information is represented among the answer choices. For

example, if a chart appears in which the states of Arizona, Maine, New York, and Wyoming are listed in sequence, then the answer options should duplicate the same order.

- (5) Avoid including similar-looking or similar sounding names in charts, as these have the potential to confuse children and confound the item. For example, if creating a chart detailing the number of baseball cards collected by four children, using the names “Peter, Mark, Hector, and Jonathan” is preferable to using “Peter, Paul, Pablo, and Pedro.”

iii) **Geometric Drawings**

- (1) Draw geometric figures accurately.
- (2) Angles should be correct or nearly correct.
- (3) All labeling and associated punctuation (dimensions, degree signs, and the like) in the final, reduced-size figure must be easily legible to students.
- (4) If a given geometric figure is regular or irregular, and this material is salient to obtaining the correct solution, then please include this information in the stem (i.e., “Look at the regular hexagon.”).
- (5) Three-dimensional figures should be drawn with solid lines closest to the reader and dashed lines to indicate sides away from the reader. This will prevent reversible figures appearing in item art.

iv) **Additional Concerns with Art**

- (1) Art and other graphics should be included where necessary. Refrain from unnecessary or gratuitous use of art when the item does not require it.
- (2) Given printing requirements, clean and crisp line art is preferred to art or photos.
- (3) When representing money in artwork (including but not limited to coins), special care must be taken so that the money is large enough to be easily read and distinguished by students. This is more easily achievable through line art rather than photographed art.
- (4) Art is subject to all the limitations of subject matter as elaborated upon in Appendix J-3-A.

b) Format Layout

- i) When a group of Items have directions that apply to the set, then all related items should appear on the same page or facing pages so that students will not have to turn the page in order to refer to the earlier or later part of the question set.
- ii) Art size and placement should vary throughout each test form. Art should be appropriately sized in proportion to the item and available space on the page.
- iii) Measurement items should be checked for accuracy and show clear indicators of what should be measured.
- iv) Art should be rendered so that there is no ambiguity about what is being portrayed. Overly complex/crowded art should be avoided as it may be distracting students. Clear and crisp line art is preferred.
- v) People of different genders and ethnicities should be portrayed in art work to reflect diversity.

c) Font

- i) Times New Roman should be used for all passages and items on High School Assessments intended to mirror the Regents.

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- ii) Each printed character must be easily legible to students. Characters here include degree signs in diagrams as well as in text, superscripts and subscripts, and all labels of graphs and diagrams. The font chosen should provide division symbols (\div) that cannot be confused with minus signs, and the lower-case "i" should not resemble the lower-case "l".
- iii) When constructing equations with missing information indicated by a box, make the box a reasonable size to accommodate placing a written answer in the box.
- iv) Appropriate fonts should be used for mathematical symbols derived from the Greek alphabet.
- v) Exponents and fractions should be large enough to be easily legible but must not be printed at an equivalent size to the standard font used.

Appendix J-3-A: LIST OF TOPICS TO AVOID

The following list is a guide to assist writers in avoiding subject matter that would probably cause a selection to be deemed unacceptable by the New York City Department of Education. In general, a topic might be unacceptable for any of the following reasons:

The topic could evoke unpleasant emotions in the students that might hamper their ability to take the remainder of the test in the optimal frame of mind; the topic is controversial among the adult population and might not be acceptable in a state-mandated testing situation; the topic has been overused in standardized tests or textbooks and is thus overly familiar and/or boring to students; the topic appears biased against (or toward) some group of people.

Some of these topics may be perfectly acceptable in other contexts, but do not belong in a city- or statewide assessment. A basal reader may contain a story about a child dealing with death; but in such an instance, the teacher has a chance to prepare students before they read the selection, and students have the opportunity to talk through their reactions. No such opportunities are available in a testing situation, so we must be more circumspect in our topic selection. As a guide, the following topics are to be avoided:

- Abuse (physical, sexual, emotional, or psychological)
- Alcohol (beer and liquor), tobacco, or drugs
- Birthday celebrations (and birthdays)
- Bodily functions
- Cancer (and other diseases)
- Catastrophes/disasters (tsunamis and hurricanes)
- Celebrities
- Children dealing with serious issues
- Cigarettes (and other smoking paraphernalia)
- Computers in the home (acceptable in a school or library setting)
- Crime
- Death and disease
- Divorce
- Evolution
- Expensive gifts, vacations, and prizes
- Gambling involving money
- Halloween
- Homelessness
- Homes with swimming pools
- Hunting
- Junk food
- In-depth discussions of sports that require prior knowledge
- Loss of employment
- Nuclear weapons
- Occult topics (i.e. fortune-telling)
- Parapsychology
- Politics
- Pornography
- Poverty
- Rap Music
- Religion
- Religious holidays and festivals (including but not limited to Christmas, Yom Kippur, and Ramadan)

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Rock-and-Roll music
Running away
Sex
Slavery
Terrorism
Television and video games (excessive use)
Traumatic material (including material that may be particularly upsetting such as animal shelters)
Vermin (rats and roaches)
Violence
War and bloodshed
Weapons (guns, knives, etc.)
Witchcraft, sorcery, etc.

Avoid anything that may be interpreted as disrespectful or demeaning to any group. This includes having characters with stereotypical names engaging in stereotypical activities based on ethnicity or race.

Avoid reference to types of foods (i.e. pepperoni, pork products) that persons of some religions or cultures may not indulge in.

This list is non-exhaustive. All topics and content provided are subject to review and revision.

Appendix J-3-B: GUIDELINES FOR CONSTRUCTING MULTIPLE CHOICE ITEMS

Items should contain:

- Alignment to only one New York State performance indicator
- Simple and clear language
- Only the information necessary in the stem to clearly state the question or a reasonable amount of distracting irrelevant information
- One independent problem stated completely in the stem
- A question or an incomplete statement presented in the stem
- Positively-phrased stem
- Four responses (unless a different number of responses have been agreed upon prior to test development)
- One and only one correct answer
- Plausible distractors (distractors which could be arrived at by some anticipated computational or reasoning error)
- Response options that are:
 - independent and mutually exclusive
 - in logical or numerical order
 - about the same length (or two long and two short)
 - in ascending or descending order if appropriate
 - grammatically parallel
 - homogeneous in content

Avoid:

- Various clues to the right answer:
 - Responses that contain the same word or “clang” with the stem
 - Grammatical inconsistencies
 - Clearly inappropriate distractors
 - Information in one question that clues the answer to another
 - Contradictory statements
 - Responses irrelevant to the item
- “All of the above” or “none of the above” responses
- The phrase “which of the following” or “which of these” in the stem
- Negative wording (except when knowing the exception is as important as knowing the rule) and double negatives
- Stems in which the student is asked a question posed in the negative, or to find the exception. These types of stems can be used occasionally, but should not be overused. For example: “Which statement about a quadrilateral is not true?”
- Bias or stereotyping
- “Window dressing” (excessive wording with useless information). The exception is extraneous information not necessary to solve a problem which tests the students’ ability

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to attend to the relevant information. The distracting information should be reasonable within the context of the problem.

- Use of humor that may cause confusion
- Questions that are answerable without reading the stem or are dependent on prior knowledge
- Correct answers that are much longer or much shorter than the distractors

Appendix J-3-C: NEW YORK CITY ASSESSMENT GLOSSARY

abbreviations	<p>Words must be spelled out in item text. Example: inches, feet, centimeters, etc.</p> <p>Abbreviations may be used in art. Abbreviations for standard units should be followed by a period. Example: <i>in.</i> or <i>oz.</i></p>
according to	<p>This compound preposition means “as stated or indicated by.” If a student is being asked to refer to a passage or a stimulus in order to determine a response, the correct wording for the stem is almost always “according to the passage, ...”</p> <p>Incorrect: “Based on the table, what is the value of y when x equals . . .?” (Meaning: The value of y exists because of the table. [It actually is established by the rule that was applied to create the table].)</p> <p>Correct: “According to the relationship shown in the table, what is the value . . .?” (The implication is that the relationship has been established by a rule; the table merely displays numbers that follow the rule.)</p>
alignment	<p>Numbers in a chart, table, or graph can either be aligned by the one’s place or be centered, but must be consistent. Words in the first column of a table are usually left-aligned. See appropriate specs for further information.</p>
a.m/p.m.	<p>Should always be small caps with periods in Mathematics and Science.</p>
answer	<p>An appropriate amount of space should be given to allow the student to answer the question according to the directions.</p> <p>Example: In questions that ask students to explain, write a clue, or give reasons why, enough blank lines should be given for the correct answer. (In some cases, answer lines are preceded by bullets or numbers.)</p> <p>In questions that ask the students to show their work, enough blank space should be given</p> <p>Where shorter answers are required in constructed-response items, a short blank line should be included. Directly after, not right-aligned?</p>
answer choices	<p>1) Answer choices are set vertically, preceded by</p>

	<p>bubbles in scannable test books and by letters in reusable books. 2) “All of the above” and “None of the above” should not be used as ACs. 3) Labels/names on charts or graphs should be in same order as introduced in item. 4) Numbers should be right-aligned in answer choice column, except when aligned by decimals or operation signs. 5) Answer choices should always be immediately preceded by the question to be answered (i.e., not separated by art).</p>
apostrophe	<p>Use smart/curly apostrophe (can be used with most fonts). No apostrophe is used in plurals of years, numbers, capital letters, or acronyms.</p> <p>Examples: the 1900s, 8s, DVDs</p> <p>Use an apostrophe with lowercase letters and abbreviations with two or more interior periods or with both capital and lowercase letters.</p> <p>Examples: x’s and y’s, M.A.’s and Ph.D.’s</p> <p>In singular and plural possessives: child’s toy, students’ toys / the book’s cover, the books’ covers / a year’s time, 3 years’ time.</p>
based on	<p>Often this phrase should be changed to “according to.” If the student is asked to refer to information stated in a graphic or stimulus to determine the response, almost always the correct wording is “According to the graphic. . .” It is incorrect to say “Based on the chart, how many cookies did Catherine eat?”</p>
below	<p>When using the term “below” in an item, use an active voice verb: The graph below shows the results . . . Not: “Below is a graph of” or even “Below the graph shows.”</p>
best	<p>Use in stem if there is at least one incomplete distractor, or if other reasonable correct answers could exist but are not presented.</p> <p>Example: Which is the best estimate . . . ?</p> <p>The word best in a stem does not always have to be emphasized. It can be determined on a case-by-case basis. If there is only one factually correct answer (and no partially plausible distractors are involved), eliminate best.</p>
bias	<p>Items should be free of racial, ethnic, gender, regional, religious, and cultural bias. Review the use of names: include a variety of ethnic backgrounds</p>

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	<p>and cultures, and avoid names that convey stereotypical connotations or are so difficult to pronounce that they are distracting. Review both art and text for gender equity to ensure that males and females are not necessarily assigned traditional, stereotypical roles; but avoid extreme reverse bias that shows all girls building birdhouses, all boys baking cakes, etc. Watch for age bias against the young or elderly, such as referring to eighth-graders as “children.”</p> <p>See gender bias.</p>
blank pages	<p>Add blank pages between Parts, if needed, so that each Part starts on a right-hand page. Blanks may also be added to complete a signature. All blank pages within machine-scorable test books should say “DO NOT MARK ON THIS PAGE” (all caps, no punctuation). Refer to art specs for font style and type size.</p>
board	<p>Preferred over chalkboard.</p>
boldface	<p>Use for emphasis in stem, and use in graph labels and in table and chart headings.</p> <p>See emphasis.</p>
bounding bars	<p>These are the “Do Not Write Here” strips that should appear along the outside edge of each page of the scannable or machine-scorable test books. They are included in an effort to curb students’ tendency to write over the timing tracks.</p>
brackets	<p>For clarity, to insert explanatory words or phrases within quoted material.</p> <p>Example: The first lawsuit [1992] was not widely publicized.</p>
brand names	<p>Avoid using brand names in test items.</p>
bullets	<p>Bullets may be used on a case-by-case basis. Refer to grade-appropriate art specifications if available, or previously printed books.</p>
call-out box	<p>Used to define a word or offer additional information, such as a formula needed to solve a mathematics problem. It is set in a screened, drop-shadowed box and placed as close as possible to the corresponding text or art. Refer to grade-appropriate art specs.</p>
capitalization	<p>Capitalize the following terms:</p> <p>Punnet square Venn diagram Pythagorean theorem Celsius Fahrenheit</p>

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chalkboard	Use board instead, to accommodate any type of board used in any classroom.
charts/tables	<p>Refer to grade-appropriate art specs.</p> <p>In directions or other text, words such as chart, table, and graph should be lowercase unless the specific word actually appears in the title of the graphic.</p> <p>Examples: Look at the table below. Look at the “Temperatures” chart below. Look at the “Temperatures Chart” below.</p> <p>To avoid confusion when 2 or more similar graphics are “below,” state the title in the directions, as in the last two examples above.</p> <p>Within a chart, numbers are aligned by decimal or centered. If a heading or an entry is a long phrase, it should be initial cap, ending without a period—only complete sentences should end with periods. See also graphs/grids.</p>
columns	For readability, items should be set in a single column, with text running the full width of the page (13 words across). If it is necessary to fit more items on a page, two-column format may be used.
commas	<p>In directions, test items, and prompts, use a comma for all of the following:</p> <p>To separate three or more items in a series with the last item preceded by and, or, or nor.</p> <p>Example: A, B, C, and D (not A, B, C and D)</p> <p>To separate digits in numbers equal to or greater than 1,000</p> <p>Example: 7,632 (no space after comma) There should be no comma after Now, Today, or Yesterday when used at the beginning of sentences.</p> <p>Example: Today you will take a test. Use commas, not parentheses, to set apart phrases such as in miles, in square units, in degrees, etc.</p> <p>Example: What is the area, in square feet, of the parking lot?</p>
commodity codes	This distinct numerical code should appear on the front cover of every printed component. It is used by Manufacturing for tracking purposes.

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contractions	Do not use contractions in item stems.
coordinates	Use a space between coordinates. Example: (5, 3) (4, 3) not (5,3) (4,3)
copyright line	The inside front cover of all products include the CTB copyright line. Since copyright lines may be changed at any time, they are applied for and obtained from the Legal Department by Development for each new printing.
count	Use the word “count” not “count up”; also “add,” not “add up.”
dash	An en dash is used to indicate a range, continuation, or inclusion. Examples: quasi-public–quasi-judicial body (note the difference between the hyphen and the en dash), New York–London flight, the years 1900–1950, Grades 5–8, pages 87–95 An em dash may be used for any of the purposes defined in Chicago Manual of Style, 15th Edition, 6.87–6.94. Example: Words, phrases, and clauses—these are elements of sentences. Both types of dashes should be closed up with the text on either side. A hyphen (or hyphens) may not be substituted for an en dash or an em dash. See hyphens.
data	This word is generally a plural noun and takes a plural verb. Rewrites are recommended in those cases where there may be some confusion with the singular usage. Example: Be sure the data are recorded in the table. Rewrite: Be sure to complete the table using the data shown below.
day	Use Monday, Tuesday, etc. Do not refer to Day 1, Day 2, etc., in items and/or art.
decimals	In any column, should be aligned by decimal point.
degree sign	There should be no space between the number, the degree mark, and the F or C. Example: “15°C”
dictionary entries	Refer to grade-appropriate art specifications.
directions	When directions are given in a test, the word directions should be initial capped in a shaded box to the left of the directions.
ellipsis	A mark of three periods is used in number patterns, after the last comma, with a space before and after each period. Example: What is the next number in the pattern?

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	7, 6, 5, . . .
emphasis	<p>In mathematics, use boldface type to emphasize key words when appropriate (best, not, except, least, at least, one, most likely).</p> <p>Example: Find the probability that Carmen does not choose the black cube.</p> <p>Italics and quotation marks are generally not used for emphasis. See italics and quotation marks for more information.</p>
end punctuation	<p>Avoid ending a question or word problem with a number.</p> <p>Example: “Shelley paid \$17.99 for a sweater” not “Shelley bought a sweater for \$17.99.”</p>
explain	See answer.
expression	Use the term “expression” to identify a “number sentence” without an equal sign.
extra space	Always add an extra (thin) space between a digit and a question mark.
facing-page issues	Pages should be arranged so that stimulus and related items are on facing pages. Student should not have to turn the page to reference either.
Fahrenheit	Always capitalized.
farther/further	Use farther for physical distance and further for time or figurative
distance	<p>(extent).</p> <p>Example: Sam ran farther than David. They will discuss the plan further.</p>
figures	<p>All figures should be drawn to scale unless doing so would clue the student to the correct response. Figures that are not drawn to scale should be accompanied by the following: “Note: The figure is not drawn to scale.”</p>
footers	Footers appear in a shaded bar across every page and include the content area, a short vertical rule, and the page number. The text in footers is set at the outside edge of each page. The directions Go On and STOP appear just above the footer. See Go On/Stop.
fonts	Stems and Answer Choices are set in 12-point Times New Roman.
fractions	<p>Should be stacked.</p> <p>Use full-size digits for standalone fractions. For mixed numbers only, use 11-point digits. In a case where both are used, make all 11 pt.</p>
front cover	Includes title, form, level, logo, commodity code, etc

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gender bias	<p>Use plurals when necessary to eliminate gender bias.</p> <p>Example: “The students grade their homework daily,” rather than “The student grades his homework daily.”</p>
geographic areas	<p>Capitalize names for specific places.</p> <p>Examples: He’s from the South; the West, Western civilization, the Northern vote. Note: Directions are not capitalized: The birds flew south for the winter. Go On The words Go On with an arrow icon should appear just above the footer on every right-hand page that does not have a STOP.</p>
graphs/grids	<p>There should be only 1 zero at the bottom left corner of a graph (not 1 for each axis).</p> <p>See also charts/tables.</p>
headers	<p>Headers are used only for introducing content area or “Part.” Part headers should be in a shaded bar across the top of the page.</p>
hyphenation	<p>Turn off hyphenation. Do not hyphenate green colored pencil. Hyphenate fifth-grade students, fifth-graders, and 5-year-old boy.</p>
identifier	<p>A stem question should include identification of the type of Answer Choice presented if necessary.</p> <p>Examples: Which is the same as 0.5? Which fraction is the same as 0.5?</p>
if/whether	<p>The word if introduces a condition, whereas whether introduces alternatives. The word whether always implies the sense of “or not,” so the words “or not” do not need to appear.</p> <p>Example: If Steven separates 60 marbles into 3 bags, how many marbles will be in each bag? They wondered whether their guests would arrive on time.</p>
italics	<p>Use italics when introducing a new and unfamiliar term.</p> <p>Example: The individual film cell is called a frame. Italics should also be used when referring to a word as a “word.”</p> <p>Example: Write the word discovery on the board.</p> <p>Punctuation surrounding, within, or following italicized text should be in italics (quotes, apostrophes, commas, etc.).</p>
item numbers	<p>Each number appears in a screened box on the left</p>

	side of the item, vertically aligned with the first line of the stem.
line	<p>A line will be referred to redundantly, i.e., the text will use both the word “line” and the symbol for line (a short line with arrows at either end above the appropriate letters) will be used.</p> <p>Example: Which is a point on line \overleftrightarrow{AB} ?</p>
line breaks	<p>1) In items, avoid leaving a single word of fewer than five letters stranded on a last line of text. Following a mark of punctuation at the end of a line of text, any one- or two-letter word (I, as, at, in, to, etc.) should be run forward to the beginning of the next line.</p> <p>2) Do not break a date between month and day, and avoid breaking open compounds, such as personal names, titles of publications, or names of organizations.</p> <p>3) Avoid splitting numbers; do not strand one or a set at the end of a line break.</p> <p>4) In mathematics, the text for the stem should not extend beyond the answer box.</p> <p>5) Do not break United States.</p> <p>6) In the acknowledgments, do not break between the copyright symbol and the date following it.</p>
lists	<p>Introduce regular and bulleted lists with a colon only if an appropriate anticipatory phrase is used, such as “these,” “the following,” or “as follows” (making the list a grammatical continuation of the sentence in which it is introduced).</p> <p>In bulleted lists, entries are lowercase with no end punctuation (caps for proper nouns only), unless all entries are complete sentences. Do not use a colon if the bulleted list completes the lead-in.</p>

	<p>Example: Be sure to discuss the observations you made data you collected conclusions you drew</p> <p>In numbered lists, the numbers are always followed by periods. Examples: _____ _____</p> <p>Use complete sentences in the bulleted list if the lead-in is complete. Example: Use these tips for rushing through a book. Do not take notes. Skip the illustrations. Skim the text as quickly as possible.</p> <p>If a complete sentence is appended to a lowercase, non-punctuated entry, enclose it in parentheses and leave lowercase with no end punctuation. Example: mignonette marjoram mistletoe (this plant can be poisonous)</p>
manipulatives	Punch-out manipulatives are provided for the mathematics assessment. An icon of the manipulative will appear, to indicate which manipulative the student should use.
margins	Refer to art specs.
mean	<p>The word mean is sometimes used instead of the word average. Example 1: Find the mean weight of all the players.</p> <p>Sometimes both are used for clarity.</p> <p>Example 2: Find the mean (average) weight of all the players. Here, mean is the term (appears first), and average is the explanation (appears second). This order should not be reversed. measurements</p> <p>Measurements that have significance to the solving of an item should be expressed in digits.</p>

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	<p>Example: The distance from Laura’s house to Roberta’s house is 4 kilometers.</p>
minus sign	Should be vertically centered next to number. Do not use a hyphen or dash. Check with A&P to make sure a true minus sign is used.
negative number	To indicate a negative number, use a true hyphen and raise it three-quarters of the way up from the baseline of the number. Avoid confusing it with a minus sign. See minus sign.
not correct/incorrect	Use the words “not correct” instead of the word “incorrect.”
now	<p>If direction begins with Now or Today, etc., do not use a comma.</p> <p>Example: Now you will do something a little different.</p> <p style="text-align: right;">Today you will be taking a mathematics test.</p>
number sentence	A number sentence has an equal sign (or an inequality symbol), an expression does not. Use the appropriate term.
numbered rules	See lists.

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<p>numbers/numerals</p>	<p>In test directions, items are referred to as “Numbers” and should be initial capped. Example: Read the passage. Then do Numbers 1 through 9.</p> <p>Never begin a sentence with a numeral/figure. If a number begins a sentence, it should be spelled out, or the sentence should be recast.</p> <p>Example: One hundred ten candidates were interviewed. In all, 110 candidates were interviewed.</p> <p>When two numbers appear together, use a digit for the first one and spell out the second one. If the first of two numbers is a one, simply drop it or replace it with an article.</p> <p>Example: 2 twelve-foot pythons / an 8-inch piece of string</p>
<p>ordinals</p>	<p>Spell out the number for a century (tenth century, twenty-first century).</p>
<p>pagination</p>	<p>In test books, page 1 is always a right-hand page. The pagination starts over for each content area. Page numbers appear at the outside edge of the footer bar, preceded by initial capped “Page.”</p>
<p>pictograph</p>	<p>When referring to a pictograph, use “pictograph,” not “picture graph” or “graph.”</p>
<p>prepositions</p>	<p>Ending a sentence with a preposition is not incorrect, but can generally be avoided. It is best to rewrite the sentence by putting the preposition first, followed by “which”: By which..., Under which..., In which..., etc.</p>
<p>present tense</p>	<p>Present tense is generally preferred in test items.</p>

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quotation marks	<p>Use quotation marks (should always be smart quotes) to set off key words or phrases, quotations, and the titles of charts, short poems, songs, stories, articles, and unpublished manuscripts. Titles of television and radio programs are also set within quotation marks, unless they are a continuing series, in which case they are italicized.</p> <p>Examples: 1) According to the “Average Energy Requirements” chart, which group requires the most food energy each day? 2) What reactions require a “push” in the form of energy?</p> <p>Do not use quotation marks around a boldface statement quoted in the stem. reason Do not use “the reason is because...”</p> <p>Example: “The reason Jason got in trouble is because he was riding his bike after curfew” should be written to read “The reason Jason...is [that] he was...” or “Jason got in trouble because he was...”</p>
ruler	<p>Directions for using ruler should read as follows: Use the [inch/centimeter] side of your ruler to help you solve this problem.</p>
seasons	<p>Do not capitalize winter, spring, summer, and fall, unless they are used in table or chart headings. However, seasons may be capitalized when referring to test administrations (e.g., Spring 2002 administration).</p>
screens	<p>Screens may be used behind headings for tables, but not in pie charts.</p>
segments	<p>Line segments will be referred to redundantly, i.e., the text will use both the term “line segment” and the symbol for segment (a short line above the appropriate letters).</p> <p>Example: What is the length of segment \overline{AB} ?</p>
show your work	<p>Directions for showing work should read: “Show your work and write you answer on the line.”</p>
slashes	<p>Avoid using slashes in test directions or stems.</p>
smart quotes	<p>These are “curly” quotes, as opposed to the straight ones used to indicate “ditto,” “feet,” and “inches.”</p>
spelling	<p>These words should be shown as follows: doughnuts e-mail rainforest timeline website/webpage</p>

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stem	Always provide text to introduce art in an item. Although students may not need to be told to “Look at” the art, there should be some text next to the item number so that art is not just left “hanging” in the middle of the page. Always locate the actual question immediately preceding the answer choices (i.e., do not allow art to separate question from its answer choices).
stem-and-leaf plot	Should be accompanied by a key.
stimulus	Passage or art preceding items.
stop	A STOP indicates the end of a test/section. It can appear on either a left- or right-hand page, depending on where the test/section ends.
trademarks	Trademark and registered trademark symbols should be placed before any punctuation. Examples: California Achievement Tests®, Sixth Edition
type size	All stem and Answer Choice text is set in 12 point Arial or Optima for Grades 3–8.
universal design	Principles of universal design are intended to make all items more accessible to the greatest number of students. In order to ensure best readability for all students, the following guidelines should be followed: <ol style="list-style-type: none"> 1) type size must be large enough in all art (matching size of specs for text, or larger, but never smaller) 2) text should be set in black type, not color 3) set items in single-column format, extending the full width of the page 4) avoid screened backgrounds behind text (exception: headings of tables).
unit	When answers are units of measurement, always include the unit in the stem (units are not always included with the Answer Choices). Example: What is the distance, in miles, from New York City to Buffalo?
variables	Should always be italicized, in art as well as stem.
which/that	Use that for essential phrases, which with a comma for nonessential.
widows/orphans	Avoid leaving a single word of fewer than five letters stranded on a last line of text.
write	Use “write” only, not “write down.”

Appendix J-3-D: DOE ASSESSMENT CONTENT REVIEW GUIDELINES

General Guidelines Applying Across All Content Areas for machine-scorable items:

General Item Review Criteria

1. There should be one and only one correct answer for each item.
2. Stems should be clearly and unambiguously stated.
 - a. Stems must define one specific problem so that one and only one correct answer can be rendered.
 - b. Stems and distractors should be concise.
 - 1.) For Grades 3 and 4, stems should have no more than 14 words (excluding quotes from the text). Options should have no more than 8 words. Shorter stems may be followed by longer options and vice versa. The total number of words between the stem and any one option should be no more than 20.
 - 2.) For Grades 5 – 8, stems should have no more than 18 words (excluding quotes from the text). Options should have no more than 12 words. There should be no more than 25 words between the stem and any one option.
 - c. Students should not have to make assumptions or rely on specialized prior knowledge to answer an ELA content question. The answer to a question should be come from information presented in the reading passage or mathematics problem.
3. The language (phrasing, word choice, vocabulary) used in items, scenarios, and passages should be age- and grade-appropriate.
4. Distractors must be plausible and based on the information presented, reflecting potential student misinterpretation and/or misapplication of procedure.
5. Distractors must be presented in a logical order with similarity in syntax and length (i.e., parallel construction).
 - a. Parallel construction of options. All four options should be similar in type and language. Or two options may be similar to each other and different from the other two options which may be similar to each other (two and two). No distractor should stand out; i.e., all (or two and two) should be similar visually and syntactically.
 - b. Examples of logical order: The sequence of events, objects, etc. in the stem should be reflected in the same sequence in the distractors.
6. No clueing (i.e., hinting at the correct answer) or clangs can occur within items. No clueing or clangs should appear between or among item stems and answer choices.
7. Font size and passage length should be grade appropriate and consistent within the grade.
 - a. 3rd and 4th grade font is enlarged to 14 point and all other 12 font (as per state).
 - b. Quality of the type should be accurate and easily readable.
8. Topics should be age/grade appropriate.

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- a. A list of topics is provided for passages and items that are not allowed by the DOE. However, the DOE may render judgments that additional topics may not be appropriate for a particular age or grade.
9. All content must be grammatically correct, contain proper punctuation, and be free of typographical errors. Language must be written using Standard American English.
 - a. Use of idioms in passages should be sparse and appear in context with sufficient explanation.
 - b. Idioms should not appear in items if there is no context around the idiom in the passage that makes the meaning clear.
10. All information provided must be factually correct.
 - a. Facts in ELA passages should be fact checked. Facts should be correct mathematically and scientifically.
11. Art must be factually correct, accurately labeled, appropriate resolution, clean, and easily readable.
 - a. Item and passage art should be consistent with the passage or the context of the item it is illustrating.
 - b. Decorative art accompanying a passage should not hint at nor give away the correct answer to an item.
12. Items written to the same standard or performance indicator should be varied.
 - a. The items should not be too similar to each other, i.e. cookie cutter.
13. Content should not reflect any “taboo” subjects as noted in the NYCDOE test development guide.
14. Bias, stereotyping, and insensitivity toward any group are unacceptable.

General Form Specific Review Criteria

1. Items must be independent of other items unless otherwise specified.
 - a. Item does not refer to another, clue another, distract another.
 - b. A cloned or similar item should not face another on the form.
2. Test form must conform to test blueprint.
3. To the extent possible, correct answer choices (option letters) must be distributed evenly within a test form.
 - a. No more than three options with the same correct answer should appear consecutively.
4. No clueing (i.e., hinting at the correct answer) can occur among items in a form.
5. The order of passages can be changed (within thirds of the assessment) to improve test item order.
 - a. The order of items for a passage can also be changed to improve test item order.

Application of General Item and Form Review Criteria from an ELA Content Perspective

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1. The language (phrasing, word choice, vocabulary) used in items, scenarios, and passages should be age- and grade-appropriate.
 - a. The following resources will be used for the grade-level determination of a word:
 - i. Educational Development Laboratories (1989). *EDL Core Vocabularies In Reading, Mathematics, Science, and Social Studies*. Austin, TX: Steck-Vaughn Dale, E. (1981).
 - ii. *The Living Word Vocabulary: A National Vocabulary Inventory*. Newington, CT: World Book-Childcraft International.
 - b. DOE's working definition is that words being used to test the meaning of unfamiliar words should be one or two grade levels above the grade level being tested with sufficient context in the passage.
 - c. With regard to the use of context to determine meaning of multiple-meaning words, depending upon the NY state standards, these are tested at grade level.
2. No clueing (i.e., hinting at the correct answer) can occur within sets of items. No clueing or clangs should appear within item stems and answer choices.
 - a. When using an excerpt from a passage in an item stem, the excerpt (or words or phrase extracted from it) should not be part of any distractor.
 - b. Only one item should refer to any given excerpt (or words or phrase extracted from it) from a passage within an item set.
 - c. No key words (clangs) should be used in both stem and distractor(s).

Application of General Item and Form Review Criteria from a Mathematics Content Perspective

1. Stems should be clearly and unambiguously stated.
 - a. Students should not have to make assumptions. For example, an item has four geometric shapes as distractors. One of which is a pentagon, one is octagon. The stem should not ask "Which figure has five sides?" It should ask "Which shape has exactly five sides?" Geometry questions seem to have a number of assumptions. The graphic or stem, should provide sufficient information that a student would not need to make any assumptions. Some examples of this include that lines are parallel without so stating and that angles are right angles without the right angle designation
2. Distractors must be presented in a logical order with similarity in syntax and length (i.e., parallel construction).
 - a. Item distractors for mathematics should be in ascending or descending order.
 - b. Coordinates in mathematics should be alphabetized.

Appendix K-1: NYCDOE DATA SECURITY POLICY AND STANDARDS

Note: This appendix includes sections 5.6-5.8 from the NYCDOE Security Standards document

Communications and Operations Management

The New York City Department of Education must produce and maintain formal documented information processing procedures for all information systems including the management and operation of their communications and operations.

- All key operating procedures must be documented for all systems and devices to the detail required of a person with working knowledge of the machine or device.
- Operating procedures must include:
 - The processing and handling of information in the Administrative and Instructional network environments;
 - Scheduling requirements, including interdependencies with other systems, earliest job start and latest job completion times, if applicable;
 - Documentation for instructions on handling errors or other exceptional conditions;
 - The required access to system utilities as well as the restrictions required for these powerful tools;
 - The support contact(s) names and phone numbers in the event of unexpected operational or technical difficulties;
 - How to manage special output handling instructions, such as the use of special stationery or the management of confidential output, including procedures for secure disposal of output from failed jobs; and
 - System restart and recovery procedures for use in the event of system failure.
- Key documentation must be kept current when changes are made or when systems are added, removed, upgraded or modified.
- Documented operating procedures must be linked to the change management process and not closed until the documentation has been updated.
- Information systems administration must develop and implement procedures to prevent programs running in the wrong order, or running after a failure of prior processing.
- Information systems administration must ensure the use of correct programs and utilities to recover from failures, in order to guarantee the accuracy of the subsequent processing of data.

Segregation of Security Duties

Adequate separation of critical functions must be implemented to reduce the risk of collusion or accidental system misuse.

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- Whenever separation of duties is difficult to achieve, other compensatory controls such as monitoring of activities, audit trails reviews and management supervision must be implemented.
- The audit of security activities must remain independent of the security function.
- Organizational and procedural controls must be implemented to ensure no single person can commit fraud without detection.
- The initiation of transactions or events must be separate from their approval.

Separation of Development, Test and Production Environments

Development, testing, and operational activities must be performed in separate environments.

- Development, test and production environments must be separate environments. Where sensitive information is involved, this includes different network segments and separate physical or logical machines;
- Data used in the test and development environment must be anonymous or unspecified for confidentiality and privacy reasons;
- Different procedures and passwords must be used for logging into the production and test systems. To further prevent errors, the login banner or identification messages should specify the type of environment a user may be accessing.
- System utilities such as compilers and editors must not be accessible from production systems, when not required.
- Emergency change procedures must be defined to ensure that emergency changes are consistently documented and reviewed.

Sharing Information with External Parties

The New York City Department of Education must require all facilities that are managed by third parties to maintain an appropriate level of security.

- External contractors that provide services must provide a level of assurance that is acceptable to the New York City Department of Education.
- Security requirements for third party service providers must be based on risk assessments and detailed in the contracts with the third party service providers.
- Implications for the New York City Department of Education's business continuity plans must be considered when requiring services from external parties
- External contractors or parties must be provided with security standards and the process by which they will measure compliance to these standards.
- Contracts between third parties and the New York City Department of Education must include requirements for maintaining privacy of information and address confidentiality, integrity and availability requirements.
- Communications of sensitive information must be encrypted between parties when using a public network.

Network Management

The New York City Department of Education must implement a range of network controls to maintain security in its Administrative and Instructional networks.

- Measures must be implemented to limit traffic flow between the Administrative and Instructional networks, except for network management purposes.
- Controls must be in place to ensure the protection of both the Administrative and Instructional networks from connected outside services and networks.
- Operational responsibility for networks must be separate from computer operations, when possible.
- Responsibilities and procedures for the management of remote equipment, including equipment in user areas, must be established.
- All sensitive data passing over public networks must be encrypted according to its classification requirements.
- Built in alerts and/or alarms must be configured and activated to notify the Network Administrator if unauthorized attempts are made to access or probe network services.
- Network devices must be reviewed on an annual basis to validate that the equipment in place agrees with the documented inventory, and a report must be provided to management documenting the findings.

Vulnerability Scanning

All the New York City Department of Education owned systems must be scanned for vulnerabilities and weaknesses.

- For hosts that are accessible from outside the New York City Department of Education network, vulnerability scanning must be performed on an annual basis and after software, operating system or configuration changes are made.
- For internal systems, scans must be performed, at least annually.
- Where the New York City Department of Education has outsourced a server, application or network services, responsibility for scanning must be coordinated by the New York City department of Education CSO.
- A process to perform the scanning must be defined by the New York City Department of Education, tested and followed at all times to minimize the possibility of disruption.
- Reports from vulnerabilities scans must be forwarded to the New York City Department of Education CSO.
- Vulnerability scanning must be conducted exclusively by CSO authorized New York City Department of Education staff or 3rd party.

Penetration & Intrusion Testing

Penetration testing must be performed periodically to identify vulnerabilities that could allow unauthorized network access from the Internet.

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- All New York City Department of Education computing systems that provide information through a public network, must be subjected to New York City Department of Education penetration analysis and intrusion testing
- The penetration testing and analysis must be designed to determine if:
 - an individual can make an unauthorized change to an application;
 - a user may access an application and cause it to perform unauthorized tasks;
 - an unauthorized individual may access, destroy or change any data; or
 - an unauthorized individual may access an application and cause it to take actions unintended by the application designer(s)
- Only New York City Department of Education staff or 3rd parties authorized by the CSO will perform penetration testing.

Internet and Electronic Mail Acceptable Use

Please see The New York City Department of Education Acceptable Use Policy

External Connections

A secure environment must be provided to ensure that transactions, data and infrastructure are protected against threats from the Internet.

- A must will be established and secured with firewalls to prevent internet users from having direct access to the New York City Department of Education's internal, trusted network.
- Confidential or sensitive data must not be stored on any device in the DMZ.
- All web-pages containing personal information or financial transaction information must be encrypted using 256 bit or higher encryption.
- Individuals accessing a New York City Department of Education's website to view personal information must be identified and authenticated prior to access being granted.
- Users must only be able to view their own data.
- All web transactions must be logged with user ID, date, time, and transaction details.
- Confidentiality must be maintained using encryption techniques, where appropriate.
- All New York City Department of Education's web applications and web pages must be backed up, and restoration procedures must be developed and tested to ensure timely recovery of the website.

Security of Electronic Mail

The New York City Department of Education must implement security measures to reduce the risks associated with electronic mail.

- Email users must not share their User IDs and passwords with anyone.
- Staff members should be notified of the existence of the New York City Department of Education's Email Acceptable Use Policy, and that their transmissions may be monitored, thus eliminating any expectation of privacy.

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- All E-Mail must go over approved organization gateways.
- E-Mail systems must be used primarily for business related purposes.
- Users must not archive, store, distribute, transmit, edit, record, create, or receive E-Mails containing:
 - intimidating, offensive, or hostile material
 - discriminatory information regarding age, race, color, religion, sex, or national origin
 - sexually explicit, obscene, threatening, or otherwise offensive images, documents or messages
- No users shall send E-Mail originating from another user unless authorized to do so.
- All messages composed, sent, or received on the E-Mail system are considered to be the property of the New York City of Education.
- Deleting E-Mail messages or files do not completely remove them from the system and the New York City Department of Education may still recover them for viewing.
- E-Mails produced by any New York City Department of Education user belong to the New York City Department of Education.
- Each individual using E-Mail at work must identify him/herself honestly, accurately and completely.
- Users must not retrieve or read any E-Mail messages that are not addressed to them without permission.
- Users must be educated in the personal use of E-Mail:

Occasional personal use of E-Mail and Internet systems is permitted, as long as such use does not adversely impact the Users productivity or the New York City Department of Education's business processes.

Personal use must not use excessive amounts of system resources (e.g. processing power, data storage space).

Personal use must not involve solicitation or be related to outside business activities.
- E-Mail files containing sensitive New York City Department of Education information must be encrypted using approved New York City Department of Education encryption software.
- E-Mails must be monitored for violations and those identified must be brought to management's attention.
- New York City Department of Education reserves the right to review, audit, interpret, access and disclose all messages created, received, sent or stored over the E-Mail system for any purpose.
- Users must not use E-Mail to deliberately propagate malicious code (e.g. viruses, worms, Trojan horses).
- Users must not knowingly use New York City Department of Education's Internet equipment or software to disable or overload any computer system or network or to circumvent any system intended to protect the privacy or security of another user.

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- Files downloaded from E-Mail must be scanned by anti-virus software before being loaded on to any New York City Department of Education system.
- Non-standard applications, executables and other files that are received via E-Mail must not be executed or loaded onto a user's machine.
- Individuals must not release confidential New York City Department of Education information via E-Mail.

Instant Messaging, Teamrooms and Conferencing

The New York City Department of Education must provide security protection of its network when Instant Messaging, Teamrooming and Conferencing technologies are deployed.

- Instant Messaging, Teamrooming and Conferencing systems must not be connected to external parties or networks without the written approval of the New York City Department of Education Chief Security Officer.
- Connection by a 3rd party to a New York City Department of Education Instant Messaging system requires an appropriate non-disclosure agreement together with authentication, access control, data protection and logging mechanisms.
- External, public Instant Messaging, Teamrooms and Conferencing services must not be used to conduct the New York City Department of Education business unless authorized in writing by the New York City Department of Education senior management and the New York City Department of Education CSO.
- Non-public New York City Department of Education information must not be exchanged over an Instant Messaging or conferencing system unless authorized by the New York City Department of Education senior management.

Portable Devices

All portable computing resources and information media must be secured to prevent loss resulting in compromise of confidentiality or integrity of the information it contains.

- When using mobile computing facilities, such as notebooks, palmtops, laptops and mobile phones, controls include physical protection, access controls, cryptographic techniques, back-ups, virus protection, must be implemented to ensure that information is not compromised.
- Controls must be in place to avoid the risk of unauthorized persons viewing information on-screen when portable devices are used in public places.
- Procedures to protect against malicious software must be developed and implemented and be kept up to date.
- Equipment must be available to enable the quick and easy back up of information.
- Equipment carrying important, sensitive and/or critical business information must not be left unattended and, where possible, must be physically locked away, or special locks must be used to secure the equipment.
- Employees in the possession of portable, laptop, notebook, palmtop, and other transportable computers must not check these computers in airline luggage systems.

Telephone and Fax Equipment

The use of telephones outside the New York City Department of Education for business reasons is sometimes necessary, but can create security exposures. Employees should:

- take care that they are not overheard when discussing sensitive or confidential matters;
- avoid the use of wireless or cellular phones when discussing sensitive or confidential information;
- avoid leaving sensitive or confidential messages on voicemail systems;
- verify the destination phone number for sensitive or confidential fax, and contact the recipient to ensure protection of the fax, either by having it picked up quickly or by ensuring that the fax output is in a secure area;
- avoid using Internet fax services to send or receive sensitive or confidential information;
- not use third party fax services to send or receive sensitive or confidential information;
- not send sensitive or confidential documents via wireless fax devices;
- not send teleconference call-in numbers and passcodes to a pager, if sensitive or confidential information will be discussed during the conference;
- confirm that all participants are authorized to participate before starting any discussion, when chairing a sensitive or confidential teleconference.

Wireless Networks

No wireless network or wireless access point must be installed without a risk assessment being performed and the written approval of the New York City Department of Education CSO.

- Media Access Control (MAC) address restriction, authentication and encryption must be implemented to protect wireless network or access points.
- When selecting wireless technologies, 802.11x wireless network security features on the equipment must be available and implemented from the beginning of the deployment.
- Access to systems that hold non-public information or the transmission of non-public or sensitive information via a wireless network is not permitted unless appropriate and adequate measures have been implemented and approved by the New York City Department of Education CSO.

Modem Usage

Connecting dial-up modems to computer systems on to the New York City Department of Education network is prohibited, unless a business case is justified and approved by the New York City Department of Education IT department and the New York City Department of Education CSO. If approved, the following conditions shall apply:

- For Outbound service (Configured for outgoing calls only):

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- modems must not be left connected to computers in auto-answer mode, such that they are able to receive in-coming dial-up calls;
- communications systems must not be established that accept incoming dial-up calls;
- For Inbound service (Configured for modem to accept incoming calls only):
 - all dial-up modem phone numbers must be kept confidential;
 - dial-up modem must be configured not to answer calls before the fourth ring;
 - system configuration must be set up to disconnect after three unsuccessful password attempts.

Public Website Content Approval Process

The New York City Department of Education must protect the integrity of electronically published information.

- The content of each public site must be reviewed according to a process that is defined and approved by the New York City Department of Education.
- Sensitive or confidential New York City Department of Education information must not be made available through a server that is available to a public network without appropriate safeguards approved by the New York City Department of Education CSO.
- The New York City Department of Education CSO must implement safeguards to ensure user authentication, data confidentiality and integrity, access control, data protection and logging mechanisms.
- The design of a hosting service must be reviewed and approved in writing by the New York City Department of Education IT management and the New York City Department of Education CSO.
- The implementation of any web site or software is subject to all requirements set forth in the Systems Development and Maintenance Policy.

Electronic Signature

See Cryptographic Controls – Information Systems Acquisition, Development and Maintenance.

Public Key Infrastructure

See Cryptographic Controls – Information Systems Acquisition, Development and Maintenance.

System Planning and Acceptance

The New York City Department of Education must perform advance planning and preparation to ensure the availability of adequate capacity and resources.

- Storage and memory capacity demands must be monitored and future capacity requirements projected to ensure adequate processing and storage capability is available when needed.
- Acceptance criteria must be developed and documented for new information systems, upgrades and new versions of existing systems.

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A set of criteria must be created to evaluate information systems prior to being approved and implemented.

- Upgrades must not be performed until tested and approved using the change management process.
- New installations must not be installed in the production environment until tested and approved using the change management process.
- All information systems, new or upgraded, must be assessed to identify limitations of security controls.
 - Limitations must be documented and be available for review when making the decision to implement.
 - All limitations and security weaknesses must be addressed prior to the system being implemented. Compensatory controls must be developed when a fix can not be determined.
- All documentation relating to an upgrade and/or new software must be updated, including security related areas and user manuals.
- The final sign-off for new or upgrades systems must be done by the information asset owner(s), prior to loading.
- Users must be educated in the use of new or upgraded system, and computer staff trained to operate and maintain the system correctly.

Protection Against Malicious Code

New York City Department of Education must implement protection against malicious code across all computer systems, laptops and servers.

- Anti-virus software must be used to protect all workstations and servers.
- All files received via external networks, CDROMS, or diskettes must be checked for viruses.
- All electronic mail containing attachments must be checked for viruses and unauthorized software.
- A set of formalized procedures and responsibilities must be in place to deal with installation of virus protection on systems, providing user training, and reporting and recovering from virus attacks.
- Business continuity plans must be developed for recovering from virus attacks, including data and software backup and recovery arrangements.
- All externally received virus warnings must be forwarded to the information security organization for verification and action.

Software Maintenance

All system software must be maintained at a vendor-supported level to ensure software accuracy and integrity, unless the New York City Department of Education CSO approves otherwise in writing.

- Accurate records must be maintained for all software, indicating vendor, version, patches installed, etc.

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- Records must be maintained to ensure changes are authorized, tested and accepted by the New York City Department of Education management.
- All known security patches must be reviewed, evaluated and appropriately applied, in a timely manner.

Information Backup

The New York City Department of Education Information Owners must ensure that procedures are in place for backing-up and restoring their information assets. These procedures must be tested periodically to ensure they meet the business requirements.

- Backup information, together with accurate and complete records of the backup copies and documented restoration procedures, should be stored in a remote location, at a sufficient distance to escape any damage from a disaster at the main site.

At least three generations or cycles of backup information should be retained for important business applications

- Backup media must be given an appropriate level of physical and environmental protection consistent with the standards applied to the main site.

The controls applied to media at the main site should be extended to cover the back-up site.

- Backup media must be regularly tested, where practicable, to ensure that they can be relied upon for emergency use when necessary.
- Restoration procedures must be regularly checked and tested to ensure that they are effective, and that they can be completed within the time allotted in the operational procedures for recovery.

Security Systems Checking

Systems and services that process or store sensitive or confidential information or provide support for critical processes must undergo technical security reviews to ensure compliance with implementation standards.

- Reviews of systems and services that are essential to supporting a critical New York City Department of Education function must be conducted at least once every year
- Reviews of a representative sample of all other systems and services must be conducted at least once every 24 months

Access Control

The New York City Department of Education's information assets must be protected by logical and physical access control mechanisms commensurate with the value, sensitivity, consequences of loss or compromise, legal requirements and ease of recovery defined for these assets.

User Registration and Management

Formal user registration and de-registration procedures for granting and removing access to all information systems services must be established. In addition, users who move within the environment must also be managed. These Standards apply to all individuals with access to the New York City department of Education resources

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The formal documented User ID request process standards must provide that:

- All users must be provided with a unique user ID.
- A user's manager must sign off on all user access requests.
- Privileged user access must include the approval of the system owner.
- The manager's signature or E-Mail details must be validated against an existing list of authorized users able to sign-off on access.
- Business requirements for the access request must be provided.
- Access to data and IT services will only be authorized based on job function.
- Access rights should not compromise segregation of duty roles and responsibilities.
- Where possible, access rights outside of personal directories must be assigned via groups and not to individual user IDs.
- Standard sample profiles for user IDs should be created but cannot be copied from one user to another.
- Users are not allowed to sign off on their own access requests.
- New user IDs must have the password set to expire and require resetting on first login.
- All users must be familiar with the New York Department of Education's Security Policy and Standards.
- An auditable record must be maintained for all users who have access to the system.
- Third party rights and permissions for access must be limited to only the activities, applications or sub-systems required. This access must always be logged.
- All security violations must be logged for all user IDs.

The formal user transfer process must provide that:

- Managers must inform security administrators of the transfer of an individual to ensure the timely removal of all access rights for the user's current function. The receiving manager must notify security administrator of the new access requirements.
- New access must be added as outlined in the registration process above.
- Information Owners must periodically review the access lists of the resources they own to ensure their accuracy.
- Managers must inform Security Administrators when a person is going on long term leave, such as maternity leave or sick leave, so their user ID can be de-activated.

The formal user deletion process must provide that:

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- Managers must inform security administrators of the termination of an employee to ensure the user ID is disabled on the day the user leaves.
- Advance notice must be provided to security administrators of staff members' dismissal so that the user ID can be blocked at the appropriate time.
- When notified that a user is leaving voluntarily, all systems must be checked to ensure that access from all systems is removed.

Devices dedicated to providing access must be retrieved. Authentication devices (e.g. tokens), must be disabled.

- Files owned by a disabled user ID must be reviewed within 90 days of being disabled and moved to other staff to ensure continuity of ownership.
- Human Resources must provide security Administrators with a list of users who have left within the previous six months to ensure all removals have been performed.
- User IDs that have been deleted or blocked must not be assigned to other users.
- Inactive groups must be removed in a timely manner.

Audit of User IDs:

- Information Owners must review user access rights and privileges on a periodic basis not to exceed one year to verify access and to ensure that job functions align with the access rights.

Logon Banner

Logon banners must be implemented on all systems, where that feature exists, to inform all users that the system is for the New York City Department of Education business or other approved use consistent with the New York City Department of Education policy

- The banner must also indicate that user activities may be monitored and that the user should have no expectation of privacy. Logon banners must be presented during the authentication process.

Privileged Accounts Management

The allocation and use of privileges (any feature or facility of a multi-user information system that enables the user to override system or application controls) must be restricted and controlled. Normally, access privileges should not be assigned collectively (i.e. to a group of users). In the rare case where they need to be assigned to a group, the business justification should be documented, approved by the Information Owner and subject to additional controls, such as restricted access privileges and contractual conditions. Additional controls should be applied to special access privileges, including high-level privileges (such as 'Root' in UNIX or 'Administrator' in Windows NT), powerful utilities and privileges that provide access to sensitive application capabilities.

The privilege management process must provide that:

- Privileges must be assigned to a different user identity than those used for normal business use.

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- Users must only use their privileged user ID when required. At all other times their regular user ID must be used.
- Privileges must be allocated to individuals on a “need-to-use basis” or on an event-by-event basis.
- Privileged user access must be limited to only those individuals that have a valid business need.
- Individuals who have been granted privileged access must be documented for each system to which they have access.
- Activity of privileged user IDs must be logged.
- Overriding systems to gain privileged access must be prevented.
- Backdoors in applications must be removed from all software (e.g. this includes all trap doors and other short cuts that could be used to compromise security. In addition, all system privileges needed for development efforts but not required for normal production activities must be removed).
- All system passwords must be changed when an individual who had a system user ID leaves the organization.
- When possible privileged access must be limited to two users, a primary person and back-up (i.e. administrator access, QSECOFR, root).
- The Chief security Officer, or a delegate, must perform periodic review of privileged user operations. The review must be performed at least annually.
- Default system administration user ID passwords must be changed as soon as the system is installed, or as deemed necessary by the System Administrator.
- Privileged users working directly on the systems must log-off before leaving the vicinity of the server.
- Privileged access (e.g. root in UNIX) must be restricted for accessed directly only when at the console or when dual authentication is used over a secure channel.
- Third party administration access (vendor) must be supervised at all times with the access changed immediately upon the completion of the task.
- The privileged user ID and password for critical systems must be written down and sealed in an envelope and stored in a secure location for emergency purposes, or other controls must be enacted to ensure that there is no single point of failure if the privileged User ID and password are lost.

User Password Management

Passwords must be used throughout the New York City department of Education as a single level authentication to provide access to information systems and services. It is essential to control the allocation of passwords with a formal management process. Additional levels of authentication may be required for information classified as Confidential.

- A User ID must be unique to an individual. A User ID must not be re-assigned to another person when the first owner leaves.
- All electronic data must be protected using at least a password.

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- All New York City Department of Education staff members and other authorized users must be trained to protect passwords from unauthorized disclosure and/or use.
- Upon receipt of any secure temporary password, the user must be forced to change the password immediately.
- Before resetting or providing a password, the Help Desk must ensure that the user has been positively identified.
- Passwords must never be stored on a computer system in an unprotected form (e.g. embedded in code or stored in a file in clear text).
- All systems that handle passwords must prohibit their display on any input, reports, or other media.
- The following password rules must apply on all New York City Department of Education systems where technically possible:
 - User passwords on all New York City Department of Education systems must expire every 90 days. Privileged passwords must expire every 30 days.
 - Passwords must contain both alphabetic and non-alphabetic characters (special characters and numbers).
 - Passwords must be a minimum of eight characters.
 - Passwords must not include the same character next to each other.
 - Users must not be able re-use any of the previous 12 passwords.
 - Six consecutive invalid log-on attempts must disable the user ID.
 - Password lockout duration – forever, or until reset by authorized person
 - All unsuccessful log-on attempts must be logged.
 - Temporary passwords must be changed at first log-on (new user ID and reset).
 - Users must select non-dictionary words for passwords (not easy to guess).
 - Users must be prohibited from changing their passwords within 7 days of any previous change.
 - Password must not be the same as user-id;

Network Access Control

The New York City Department of Education must control local and wide area network access to ensure that the network traffic is secure. This must include implementing devices that monitor and control the network environment, provide authentication mechanisms and control user access to information services.

Use of Network Services

The New York City Department of education must limit network services to prevent risk to the organization.

- All network services must be validated to ensure that vulnerabilities are not introduced into the New York City Department of Education networks.

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- All network services must be approved based on a business case and a risk assessment.
- Only authorized users must be allowed access to the network and network services.
- Services that are not required must be removed, not just disabled.
- The New York City Department of Education trusted internal networks must be segregated from external networks by means of firewalls and routers.
- The New York City Department of education Administrative and Instructional networks must be segregated from each other by means of firewalls and routers.
- Any New York City Department of Education hosts that support incoming service requests from the Internet must sit within a secure zone isolated from the production machines. (DMZ).

Enforced Path

New York City Department of Education must control the access to resources available on the network.

- All external networks connecting to the New York City Department of Education networks must be protected by firewalls.
- Services must only be available to those who have a legitimate business need.
- Unnecessary services must be removed.
- Remote access telephone lines must be used only by those who have a legitimate business need.
- Standard ports must be used for application systems and security gateways.
- Network devices must be prevented from unauthorized scanning of the network environment.
- The firewall must be a standalone machines, not shared with any other application or service.
- The firewall must be structured so that there are no back doors into the environment (everything has to pass through the firewall).
- The firewall must block both incoming and outgoing traffic relating to unnecessary services.
- The firewall must not switch any IP packets between the protected and unprotected network.
- The firewall must be configured to not accept any session initiation from the public Internet for business transactions unless over a secure channel with appropriate authentication.
- The New York City Department of Education networks must have non-routable addresses which are translated (Network Address Translated NAT) when going to the Internet.
- Firewalls must log all network traffic and have a process of archiving the logs.
- The firewall must generate alarms when suspicious activity is detected.

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- The machine that the firewall runs on must be hardened to minimize the possibility that an attack could penetrate the system or allow a hostile takeover.
- Firewall logs must be reviewed on a daily basis and violations or issues identified and reported to management.
- Access to the firewall management and rules must be restricted to two authorized, trained individuals.
- A second party (familiar with the implications) must review all modification of the rules base prior to their being implemented. Changes to the firewall rule must be approved through the New York City Department of Education change management process.
- Business requirements for access control must be defined and documented before access is permitted to any component within the firewall.
- The firewall must be physically protected from unauthorized access.
- The firewall must be patched with the latest security release patch within one week of the patch being made available.
- Firewall administrators must monitor vendor news on security problems, new releases, patches and other relevant information on the firewall product installed.

User Authentication for External Connections (Remote Access Control)

External connections require user authentication.

- External network connections and access via phone lines must have strong authentication in place to validate the users.
- Users must not connect public or third party computer equipment to the New York City Department of Education network

Node Authentication

Node authentication can be performed to provide a low level of assurance that the users are who they say they are. This however should not be the sole means of authentication.

- The New York City Department of Education must not rely on node authentication as the sole means of authentication

Remote Diagnostic Port Protection

Maintenance access to remote support devices must be securely controlled.

- Remote access devices must be removed from equipment when the equipment no longer requires remote access maintenance.
- All remote maintenance devices must have access control standards (see passwords).
- Passwords must adhere to the password standards.

Segregation of Networks

The New York City Department of Education must effectively segregate its networks internally and from business partners.

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- Networks between business partners and the New York City Department of Education must be restricted using firewalls or similar functioning devices.
- Traffic between the New York City Department of Education's Administrative and Instructional networks must be restricted using firewalls or similar functioning devices.
- Network connection must be monitored for access violations or attempted accesses.

Network Connection Control

The New York City Department of Education must use network connection controls to prevent unauthorized access to networks.

- All shared network connections must be evaluated for necessary restrictions.
- Networks housing confidential information must be secured from other networks using firewalls or similar functioning devices.

Operating System Access Control

Access to operating system code, services and commands must be restricted to only those individuals who require this access in the normal performance of their job responsibilities.

- The user logon process will require the use of the user name and password to prevent unauthorized access to a system (Refer to User Access Management section)

User Identification and Authentication

All New York City department of Education users (including technical support staff, such as operators, network administrators, system programmers and database administrators) must have a unique identifier (user ID).

- All Users must have a unique user ID.
- Security Administrators must be assigned a general user ID that is different from their 'Administrator' user ID.
- A naming convention must identify administrator accounts.
- A standard naming convention must be developed for all user IDs, servers and workstations.
- Vendor or third party contractor user IDs must be identified with the vendor/third party name attached.
- All default system accesses to the system must be changed, especially the default user passwords.
- User IDs which are inactive for 45 days must be disabled. After an additional 20 days the ID must be removed or placed in a holding account for an investigation by Information Security and the manager of the person whose user ID was suspended has been completed. This investigation should determine whether the user ID is to be deleted or reinstated.
- All system guest user IDs must be deleted or disabled.
- Third party and vendor user IDs must be deleted from the associated system or workstations upon termination of contractual agreements.

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- All third party and contractor user IDs must have an expiration that is reflective of the time required for the work to be performed.

Use of System Utilities

Access to system utilities requires identification, authentication and proper authorization.

- System utilities access must be restricted to those trusted individuals with a business need for access.
- Logging must be enabled on all system utilities.
- Logs must be monitored by individuals not involved in the execution of the utility.
- All accesses to system utilities must be documented and maintained.
- All unnecessary utilities must be removed from the system

Application Access Control

The New York City Department of Education must implement application access control measures to meet business requirements.

- Users must only have the level of access required to perform their job function.
- User training must be functional and role specific.
- Access to the system prompt must be restricted.
- The root directory of a drive (e.g., C:\) must not be shared on any individual workstation or laptop. Any drive designation or directory containing system files or data classified as Confidential or higher should also not be shared.
- Applications deemed high risk must be isolated into a specific computing environment.
 - Access to this environment must be highly restricted and limited to only authorized users.
 - Access to this environment must be documented and maintained.
 - Access to this environment must be logged, monitored and reported if violations occur.

Monitoring System Access and Use

The New York City Department of Education must enable event logging to track exceptions and other security related events.

Monitoring System Access

The following is the minimum log requirement that must be captured: User ID, date, time, transactions performed, status, files accessed, program/utilities used, location or IP address.

- For operating systems the following must be logged:
 - Dates and times for log-on and log-off;
 - Records of successful and rejected system access attempts;
 - Records of successful and rejected data and other resource access attempts;
 - Console alerts or messages.

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- For all privileged operations the following must be logged:
 - Use of supervisor account;
 - System start-up and stop;
 - Security changes;
 - Input/Output device attachment/detachment.
- For all network devices the following must be logged:
 - Access policy violations and notifications for network gateways and firewalls;
 - Alerts from proprietary intrusion detection systems;
 - Network management alarms;
- Security Log history must be maintained for 1 year, financial information must be maintained for 7 years;
- Logs must be protected to prevent tampering or deletion.

Monitoring System Use

Systems must be monitored based on the level of risk.

- Systems, applications and devices must be evaluated to understand the level of risk and the level of monitoring required.
- Exception monitoring must be performed on systems and devices to identify the threats, patterns and violations from the normal activity.
- Devices and systems designed to monitor high-risk environments must be set up in such a way so that they can perform monitoring independent of the environment (i.e., intrusion detection Systems).
- Network monitoring equipment must not be utilized without consent of the security team.
- For critical systems real time alarming must be set for significant security related events.
- Log reporting must be centrally managed and exceptions reported to management.

Maintaining and Reviewing Logs

Secure and tamper proof logging facilities must enable adequate review and interrogation.

- Controls must protect against unauthorized changes and operational problems including:
 - The person reviewing the logs must not be the person working on the machine (separation of duties).
 - Privileged users must not be allowed to de-activate logging functions.
 - Log files must be protected from tampering.
 - Log files must not overwrite themselves.
 - Logging system must not impact the machine in the event the logs fill up.

- Logs must be reviewed daily.

Information Systems Acquisition, Development and Maintenance

New York City Department of Education must ensure that security is planned, designed and built into systems from their outset, including infrastructure, business software, and user-developed software. Security countermeasures are substantially cheaper and more effective if incorporated into systems and applications at the requirement specification and design stages. Secure design and implementation of business processes involving the application or service is critical. Security requirements, including privacy requirements, must be identified and agreed prior to the development of any information system. Additional security measures may be required for systems that process or impact confidential or critical organizational assets. Such measures should be determined on the basis of a specialist's security advice, taking into account identified security threats and their possible business impact. All security requirements, including the need for fallback processing and privacy controls, must be identified at the requirements phase of a project and justified, agreed, and documented as part of the application development project plan for an information system.

Security Requirements of Systems

All security requirements, including the need for business continuity arrangements and privacy controls, must be identified and included in the application development requirements.

- A process must be put in place to assess and mitigate the information security risk in all development, procurement, update, upgrade, modification, or system enhancement projects. All of these types of projects are collectively referred to as information systems projects in this Standard.
- Information systems must be designed in such a way that the security of any one New York City Department of Education information system must never be entirely dependent on the security of another computer system. Single-point-of-failure analysis must be performed and resolved to Information Security's satisfaction for all New York City Department of Education confidential, valuable, and critical information systems. Single points of failure must be minimized in all other New York City Department of Education information systems.
- Generally accepted programming standards and procedures must be adopted that contribute to stable and correct programs, including data checking standards and procedures.
- All New York City Department of Education in-house software development projects must use mature development tools and techniques.
- Naming conventions must be used for New York City Department of Education software to clearly distinguish between development, test, and production files.
- The version number of all production New York City Department of Education software files must be indicated in a manner that is readily available to system maintainers, either through naming conventions, file property segments, or internal comments that are displayable to the maintainer at individual computers.
- The Project Manager of any information systems project must officially inform the Chief Security Officer of the existence of the project and its information security implications.

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- The Chief Security Officer must independently assess the information security implications of all information systems projects through a threat and risk assessment process, and provide security and risk mitigation recommendations back to the project.
- The Project Manager must respond to each of the Chief Security Officer's risk mitigation recommendation to the Chief Security Officer's satisfaction.
- The Project Manager must obtain the Chief Security Officer's approval prior to commencing each project phase in the process after the initial business case has been made, the project is approved-in-principle, and a budget has been allocated. Minimally, the Chief Security Officer's approval is required prior to commencing requirements development, design specification, testing, and installation or release-to-production.
- The Chief Security Officer and the New York City Department of Education Information Security department must ensure that the stability of any new network-based application is monitored and further stabilized as necessary.
- The Chief Security Officer must educate, and refresh as necessary, all information systems project team members on security considerations in projects.
- The Project Manager must ensure that existing New York City Department of Education security controls are utilized in their project, unless they obtain the Chief Security Officer's approval to incorporate new, additional, or modified controls. System developers must rely on system services for security functions rather than incorporating them into applications. Examples of system services include operating systems, network operating systems, database management systems, access control packages, front-end processors, firewalls, gateways, and routers.

Security in Application Systems

The New York City Department of Education must ensure suitable security controls and audit trails are designed into application systems, including user-written applications, to prevent loss, modification or misuse of organization data in those systems. High standards of modern software engineering techniques must be maintained, including:

- ensuring that default, initial values, and permitted range and type of values are specified for all variables in programs;
- bounds checking is performed, especially to avoid register, array, stack and buffer overflow and underflow conditions; and
- reasonableness or other validation checks are performed on all input data, internal processing and intermediate values, and output data.

Additional verification and security controls may be required in information systems that handle confidential or critical corporate assets.

Input Validation

All data input to the New York City Department of Education application systems must be verified to ensure that it is correct and within allowable limits. These checks must be made, either by data entry operators, the program, or both, on the initial input of all data to the New York City Department of Education information systems.

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- Wherever possible, the originator of New York City Department of Education information must input new or modified data directly into the New York City Department of Education applications using automated data entry techniques, either directly (e.g. workstation, authenticated secure Internet sessions, etc.) or indirectly (mark sense forms, punch cards, etc.).
- The complete communications path from the originator to the data repository must be secure at all times during data gathering, collation, and input sessions, to prevent unauthorized modification of the data.
- Positive feedback to the originator or data entry operator must be used to confirm the entry of data into an information system's data repository, preferably by displaying the data as recorded in the repository on the input monitor.
- Data collected from secondary sources that must be manually input by New York City Department of Education data entry operators, must be verified for correctness (e.g. accuracy, precision, value, range, data type, units, etc.) prior to entry into New York City Department of Education data repositories. This includes inspecting hard-copy input documents for any unauthorized changes to the input data.
- All changes to input documents must be authorized by the originator or, if unavailable or not cost-effective, by the Information Owner.
- The Information Owner is ultimately responsible for the integrity, including correctness, of New York City Department of Education data from which information is derived. The Information Owner is responsible to ensure that a periodic review of the content of key fields or data files is performed, to confirm their validity and integrity.
- Programmed input checks must be incorporated into all New York City Department of Education applications to detect, notify, and correctly resolve, as a minimum, the following input errors:
 - Out-of-range values;
 - Invalid characters in data fields;
 - Missing or incomplete data;
 - Incorrect type data (e.g. Alpha character data in a numeric field);
 - Exceeding upper and lower database size limits; and
 - Unauthorized or inconsistent control data.
- Application developers must implement procedures to respond to validation errors on input of data, both at the originator interfaces and when being entered by New York City Department of Education data entry operators.
- Responsibilities of all people involved in the data input process, including non-employee originators must be clearly defined and communicated.

Control of Internal Processing

Data processed by application systems must be validated at each step in its processing. Data that has been correctly entered can be corrupted by processing errors, human error, or deliberate acts. Applications must be designed with controls incorporated that minimize the risk and consequences of data corruption, both malicious and accidental.

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- Programming procedures must control the use and location in programs of ADD, APPEND, DELETE, and similar data modification functions to implement changes to data.
- Programs must implement program checks that perform the following where appropriate:
 - Ensuring that default, initial values, and permitted range and type of values are specified for all variables in programs;
 - Bounds checking is performed, especially to avoid register, array, stack and buffer overflow and underflow conditions;
 - Full use is made of hardware and operating system functions, and other boundary controls, and
 - Reasonableness and other validation checks are performed on all internal processing and intermediate values.

Information systems that process confidential, valuable or critical data assets must incorporate strict controls over access to the data and, in particular, WRITE privileges within those data repositories. Control elements such as individual authentication and logging of WRITE-privileged users must be used in such systems.

Output Validation Controls

New York City department of Education must ensure that all data output from application systems are validated as correct and appropriate for output in the circumstances.

- Information systems must incorporate reasonableness checks on all output data.
- Information systems must reconcile control counts to ensure that all data intended for processing is processed.
- Information systems must provide sufficient information for a reader or subsequent processing system to determine the accuracy, completeness, precision and classification of all information provided.
- Procedures must be developed and implemented for all users to apply output validation tests and respond appropriately to resolve discrepancies.
- Information systems must incorporate user identification and authentication techniques to ensure that all output information is provided on a need-to-know basis, appropriate to the classification of the information, and the status and privileges of the user.
- Responsibilities must be clearly defined for all personnel involved in the data output process.

Message Integrity

Message authentication must be considered for applications where there is a security requirement to protect the integrity of the message content, e.g. electronic funds transfers or other similar electronic data exchanges. An assessment of security risks must be carried out to determine if message authentication is required and to identify the most appropriate method of implementation.

- Message Authentication Codes (MAC) must be used as appropriate.

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- If Message Authentication is required, then New York City Department of Education information systems must use one of the following approved message authentication systems, such as:
 - U.S. FIPS 113-certified Data Authentication Code (DAC), better known as Message Authentication Code (MAC) products, until the U.S. NIST updates or replaces FIPS 113, at which time this Standard's use in New York City Department of Education must be reviewed and amended as appropriate;
 - U.S. FIPS 198-certified Keyed-Hash Message Authentication Code (HMAC) products;
 - ISO 8731-2: 1992-certified Banking -- Approved algorithms for message authentication -- Part 2: Message authenticator algorithm products;
 - ISO 15408 Common Criteria-certified implementations of common commercial message authentication algorithms, such as SHA-1 MAC and MD5; and
- All certified message authentication products used by the New York City Department of Education must be installed and utilized according to manufacturer/vendor and certification authority recommendations. The Chief Security Officer must certify correct installation and use of such products upon installation and at regular intervals, at least annually.
- Message authentication is being superseded in many transactional environments by cryptographic techniques, including digital signatures. New York City Department of Education information systems must use encryption as the preferred message authentication technique. The Chief Security Officer's approval is required to implement a message-authentication-only data transmission communications path.

Cryptographic Controls

New York City Department of Education must use cryptographic systems and techniques where a risk assessment and risk management determination have indicated that the information to be protected is considered at risk, and other controls do not provide adequate protection.

- Information systems must utilize New York City Department of Education-authorized cryptographic controls to protect New York City Department of Education confidential information when a risk assessment determines that such protection is necessary.
- No in-house development of cryptographic or other algorithmic encoding intended to protect the confidentiality of information is authorized by New York City Department of Education, unless authorized as an official security project.
- When cryptographic control is indicated, only algorithms such as those contained in ISO TC68/ SC2/ WG11 developed standards should be used by New York City Department of Education. New York City Department of Education information systems must be protected by cryptographic products that are currently certified under the Cryptographic Module Validation Program (CMVP), a joint U.S. NIST/ CA CSE program.
- Encryption products must be implemented strictly according to manufacturer/vendor recommendations and the certification authority guidelines. Where these are in conflict, guidance must be sought from the certification authority.

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- A detailed and robust general cryptographic control implementation management program shall be implemented. Both the U.S. NIST and Canada’s CSE have publicly available documents that must be used as resources in developing the New York City Department of Education cryptographic management program. Among issues that must be described in detail are:
 - strict procedures for key issue, control, and management;
 - limits on administration of encryption services to only the most trustworthy individuals and verification oversight of their performance (e.g. two-person rules, etc.);
 - procedures for handling the failure of any cryptographic control;
 - methods to deal with cryptography during business interruption, disaster recovery or in the event of compromised keys;
 - the recovery methods for encrypted information in the case of lost or damaged keys; and
 - roles and responsibilities within the cryptographic management program (e.g. who is responsible for implementing the program and who is responsible for effective key management).
- User ID and passwords, and any other identification and authentication information, that provide access to New York City Department of Education information protected by cryptographic controls must be protected on the Internet and internal New York City Department of Education networks by encryption using the same strength as that used to protect the information (e.g. secure session must be established prior to presenting request for user ID and password to the user).
- Note that access control identification or authentication tokens must meet the requirements of the “Access Control” section of this Standard where they are only being used for that purpose and their use conflicts with standards contained here; otherwise, they must meet the requirements of these Standards.
- Information systems must use the following cryptographic algorithms to protect New York City Department of Education information:

NYC Dept. of Education Data	Cryptographic Algorithm	Comments
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NYC Dept. of Education Data	Cryptographic Algorithm	Comments
Confidential	AES, Triple DES, Skipjack	<ul style="list-style-type: none"> - implementation of AES, 3DES, and DES must be in accordance with recognized standards (e.g. U.S. FIPS 197, FIPS 46-3); - Internet data transmission must use an authorized New York City Department of Education secure VPN or SSL, using DES or better, and SHA-1 MAC or digital signature, or a New York City Department of Education authorized Public Key Infrastructure (PKI) using the public key of an authorized recipient or group of recipients.
Operational	AES, Triple DES, Skipjack	<ul style="list-style-type: none"> - Internet data transmission must use an authorized New York City Department of Education secure VPN or SSL, using DES or better.
Public	No Requirement	N/A

Key Management

The New York City Department of Education must use a cryptographic key management system to support and protect the organization's use of cryptographic techniques and their associated keys.

Two types of cryptographic keys exist:

- Secret keys, also known as *symmetric* keys, where two or more parties share the same key. The common key is used by all to encrypt and decrypt information. This key must be kept secret since anyone having access to it would be able to decrypt all information being encrypted, or introduce unauthorized information, with that key, possibly without being noticed.
- Public keys, also known as *asymmetric* keys, where each user has a unique key pair assigned to them, a public key (which can be revealed to anyone and is available through a trusted site, the CA) and a private key (which must be kept secret by them). In use, the two keys are combined to encrypt or digitally sign documents in a manner that can only be attributed mathematically to the holder of both keys.

New York City Department of Education must protect its cryptographic keys and their production systems at the highest possible standards, because the loss, unauthorized modification or destruction of keys, or the unauthorized disclosure of secret and private keys, could lead to loss of confidentiality and integrity of information.

- A culture must be created and an environment developed that recognizes the value of cryptographic keys and the necessity for their strict protection.

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- Assigned New York City Department of Education public keys must be protected within the CA sufficiently to assure their protection against modification or unauthorized destruction.
- New York City Department of Education cryptographic keys must not be generated until they are needed, just prior to issue.
- Physical and other protections, to at least the same standards as for Confidential information, must be used to protect any equipment used to generate, process, store or archive keys. Additional security controls may be required as determined by a key management risk assessment process.

Protection of System Test Data

Formal documented procedures must be created for the production and control of test data. Test data must be developed according to test plans, protected from unauthorized modification, and controlled. The controls must include access control procedures and appropriate authorization for changes. Test environments must be catalogued and archived once testing has been completed until they are obsolete. Development and acceptance testing usually requires realistic amounts and ranges of test data that are as close as possible to operational data. True operational data, particularly any containing personal or private data, must never be used as test data in New York City Department of Education test systems. Operational data may be sampled, depersonalized, and modified as necessary to meet the needs of the test plans. The authorized copying and subsequent modification of operational information to be used for test data must be logged.

- The access control procedures that apply to New York City Department of Education's operational information systems must also be applied to New York City Department of Education's test information systems.
- There must be a separate authorization each time New York City Department of Education operational information is copied for use in a New York City Department of Education test information system.
- Operational information that is an authorized copy must be completely depersonalized and randomly modified prior to use as test data.
- True New York City Department of Education operational information must never be used in a New York City Department of Education test information system.
- Authorized copying, depersonalization, modification, and use of New York City Department of Education operational information must be logged to provide an audit trail.
- New York City Department of Education test environments must be catalogued and archived in a test software library once testing is complete, until they are obsolete and authorized for destruction.
- To preclude New York City Department of Education records being improperly updated by non-production transactions, transactions used for auditing, testing, training and other non-production purposes must be clearly labeled, with redundant coding (e.g. special color media cases, etc.), and otherwise separated from transactions used for production processing.

Change Control Procedures

The New York City Department of Education must document and utilize change management procedures for all changes within the environment.

- The defined change control procedures must include requirements for security review and approval of changes.
- A member of the security organization must be assigned the responsibility of reviewing changes to ensure that security of the environment is not compromised.
- An assessment of all changes must be performed to identify the potential impact to security in the environment.
- Formal approval must be provided by a member of the security organization prior to implementation of changes.
- All changes must be authorized in writing.
- Change must have documented back-out plans in the event the change fails.

Appendix K-1a: SAML SECURITY REQUIREMENTS

SAML 2.0 Security for 3rd Party Vendors

Article I. SAML – Security Assertion Markup Language

“SAML, developed by the Security Services Technical Committee of the Organization for the Advancement of Structured Information Standards (OASIS), is an XML-based framework for communicating user authentication, entitlement, and attribute information. As its name suggests, SAML allows business entities to make assertions regarding the identity, attributes, and entitlements of a subject (an entity that is often a human user) to other entities, such as a partner company or another enterprise application.” – OASIS (SAML V2.0 Executive Overview)

In other words, SAML allows Single Sign-On between Partner Websites and through this allowing sharing of user identities to provide a better user experience. SAML can thus be used for:

- Web Single Sign-On (SSO)
- Attribute-based Authorization (followed by Web SSO)
- Securing Web Services

Article II. Advantages of SAML

- **Platform neutrality** – SAML makes Security more independent of application logic in SOA.
- **Loose coupling of directories** – User information does not have to be synchronized between directories.
- **Improved online experience for end-users** – SAML enables SSO by allowing users to authenticate to an IDP, and then access SPs without additional authentication. Identity federation (linking of multiple identities) is another feature.
- **Reduced Administration costs for SPs** –SSO feature reduces the burden of maintaining authentication information multiple times. The responsibility is passed to IDP.
- **Risk transference** –SAML can act to push responsibility for proper management of identities to IDP, keeping focus on business model.

Article III. SAML History

- SAML V1.0 became an OASIS standard in November 2002.
- SAML V1.1 followed in September 2003.
- SAML V2.0 unified SAML V1.1, Shibboleth and the Liberty Alliance's Identity Federation Framework in 2005

Article IV. SAML Components

Below is a list of some SAML components included for the purpose of this document.

Assertion

An assertion is a package of information that supplies one or more statements made by a SAML authority (the Identity Provider). The assertion may contain authentication information, attributes for authorization and other information as desired.

Identity Provider

The Identity Provider (or IdP) is the user authenticating authority in a SAML environment, responsible for authenticating a user and providing authorization information. **DOE will assume this role.**

Service Provider

The Service Provider (or SP) is the partner or service that requests for and consumes the user authentication and authorization information, enabling users to access their Website or Web Services without re-authenticating themselves. **The content provider will assume this role.**

Protocols

Defines a number of requests/response protocols that allow service providers to:

- Request from SML authority one or more assertions.
- Request that an IDP authenticate a principal and return the corresponding assertion.
- Request that a name identifier be registered.
- Request that the use of an identifier be terminated.
- Retrieve a protocol message that has been requested by means of an artifact.
- Request a near-simultaneous logout of a collection of related sessions (Single Logout)
- Request a name identifier mapping.

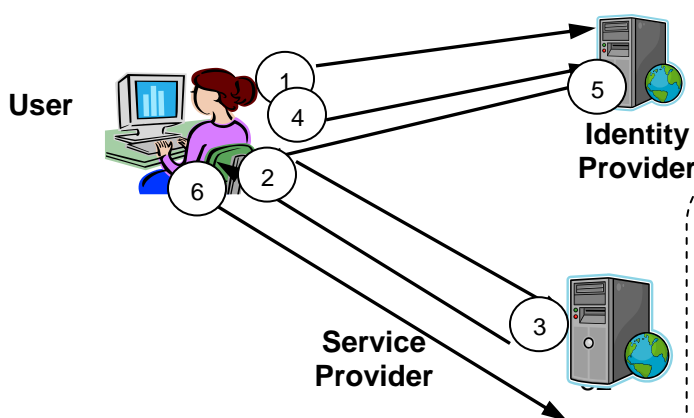
Binding

Defines how the IdP and SP exchange information. The most common bindings are:

- HTTP Redirect (GET) Binding
- HTTP POST Binding
- HTTP Artifact Binding

Article V. SAML Flow

The following diagram illustrates the SAML flow from a high-level for the SAML Post Binding with an Identity Provider initiated login.



1. User logs in to an SSO Portal (Identity Provider -IdP)
2. User then clicks on a Partner website link (Service Provider- SP)
3. The SP then asks the IdP to authenticate the user
4. The request is redirected through the user browser to the IdP.
5. The IdP validates the request and sends a signed SAML assertion back (the user would have been challenged for credentials by the IdP if she hadn't already logged in).
6. The SAML assertion is redirected to the SP through the user browser. The SP identifies and authorizes the user using information in the assertion and logs in the user

Note: For security purposed it is optimal that all communication occur over a secure channel (HTTPS) and all information be digitally signed by either party.

Article VI. Additional Reading

http://en.wikipedia.org/wiki/SAML_2.0

<http://www.oasis-open.org/committees/download.php/13525/sstc-saml-exec-overview-2.0-cd-01-2col.pdf>

<http://en.wikipedia.org/wiki/SAML>

Article VII. SSO Requirements to NYC DOE

New York City, Department of Education (NYC DOE) will act as the Identity Provider (IdP) being the authority for authentication and providing authorization information (if required) to various Service Providers.

In order for partner websites or entities to act as Service Providers, they would need to:

1. Host a working SAML 2.0 supported Service Provider (SP) setup. Products that support SAML 2.0 functionality:

- [Shibboleth](#)
- [Ping Federate](#)
- [SimpleSAMLphp](#)
- [CA SiteMinder](#)
- [Novell Access Manager](#)
- [Tivoli Federated Identity Manager](#)

Other products can be found at:

- <http://saml.xml.org/products>
- <http://xml.coverpages.org/SAML-v20-InteropTesting.html>

2. Send NYC DOE their SAML 2.0 metadata. NYC DOE will send them the IdP metadata.
3. Ensure their SAML 2.0 relevant URLs are secure (HTTPS). This is recommended for security purposes. Ideally the whole website should be secure.
4. Exchange the public keys of their Website certificates with the NYC DOE IdP.
5. Provide the list of user attributes required by the SP to map the NYC DOE users to users in their local user store. This may also include attributes the SP may need to carry out authorization decisions (like user role, grade, school etc.).

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```
cmtTb2x1dGlvbnNfQ0EuY3JsMDegNaAzhjFodHRwOi8vY3JsMi5uZXRzb2xzc2wuY29tL051dHdv
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AQCeZjmGyXU+6WxrMVePmlZ6foO5VruDai3QL+0pBSx2Qzm10njfAKROIkP/8ObqRpLMRY3C5eOM
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Thf5U7jT0Vmi22HwhmRguh469ceu5fz9xUaZkGe5VhZRwIK9UrGWSs8EBQNRKwsfdWM/ZNw2G9p0
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</ds:X509Data>
</ds:KeyInfo>
</ds:Signature><EntityDescriptor
ID="SM33ab2697e9e7eb49438abc2e804d576dc8b5dbf509"
entityID="idpoc.nycenet.edu">
  <IDPSSODescriptor ID="SMf6d23e3df368222c8fea9ecf7ea8891c8b970b8c8"
WantAuthnRequestsSigned="true"
protocolSupportEnumeration="urn:oasis:names:tc:SAML:2.0:protocol">
  <ArtifactResolutionService
Binding="urn:oasis:names:tc:SAML:2.0:bindings:SOAP"
Location="https://idpoc.nycenet.edu/affwebservices/saml2artifactresolution"
index="0" isDefault="false"/>
  <SingleLogoutService
Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-Redirect"
Location="https://idpoc.nycenet.edu/affwebservices/public/saml2slo"/>
  <SingleSignOnService
Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-Redirect"
Location="https://idpoc.nycenet.edu/affwebservices/public/saml2sso"/>
  </IDPSSODescriptor>
</EntityDescriptor>
</EntitiesDescriptor>
```

From the above metadata the following conclusions are important from a SP point of view:

1. SAML 2.0 POST Profile is supported and will be used for the CLE project
2. The IdP entity ID is **idpoc.nycenet.edu**
3. All authentication requests from the SP need to be signed. So NYC DOE would require the SP's public certificate.
4. The IdP SSO URL is <https://idpoc.nycenet.edu/affwebservices/public/saml2sso>
5. HTTP –Redirect binding is to be used (browser-based redirection)
6. All SAML assertions will be signed by the IdP (the metadata above includes the IdP's public certificate). This public certificate will also be provided to the SPs so that they can validate the assertion.
7. The IdP is SSL-enabled and as a security best practice all SAML URLs from the SP should also be SSL-enabled.

The NYC DOE can provide any user attributes or roles the SP (content provider) may want for appropriate user-role mapping but this will be discussed as part of the enrollment process too.

Article IX. Third-Party Content Provider – The SAML 2.0 Service Provider

The third-party content providers will act as SAML 2.0 Service Providers, sending authentication requests to the NYC DOE IdP and then consuming the SAML assertion sent back to provide SSO capability to the end user.

Here's a brief overview of the user experience and the SSO flow:

1. The user will access the CLE landing page
2. The landing page will host an authentication form (username and password) which will be used by the user to log into the CLE
3. This initial user authentication will be carried out by the NYC DOE IdP
4. After successful authentication the user will have a valid CLE session and will be provided access within the CLE based on the user's role
5. The user will now click a Content Provider's link and will be redirected to their page
6. As a part of the redirection the Content Provider, using the SAML SP functionality, will send a signed authentication request to the NYC DOE IdP
7. The NYC DOE IdP will validate the authentication request
8. If the user's initial session is already valid (through the initial landing page authentication) the user will not be prompted for his username and password again. Otherwise the user will be requested by the IdP to log in again.
9. The IdP will validate the user's session and send back a signed assertion (SAML 2.0 POST profile) to the SP's Assertion Consumer Service URL (ACS)
10. The SP will validate the SAML assertion, extract any user attributes sent for role-mapping (this may not be required based on the initial enrollment process) and allow the user to log into their Content Provider website.

Article X. Requirements from Content Providers for SAML 2.0 SSO

To enable SAML 2.0 POST Profile based SSO in the CLE, the Content Provider needs to:

1. Act as a SAML 2.0 Service Provider (SP)
2. Support SAML 2.0 POST Profile for authentication
3. Send NYC DOE the SP's metadata
 - a. Send NYC DOE the SP's entity ID
 - b. Send NYC DOE the SP's Assertion Consumer URL (ACS)
4. Enable authentication request signing and send NYC DOE the public certificate with which the authentication requests will be signed
5. SSL-enable (HTTPS) all SAML 2.0 URLs

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6. Appropriately process the SAML assertion sent back by the NYC DOE IdP, mapping users to roles based on attributes sent in the SAML assertion or through any information exchanged in the enrollment process. In the former case the NYC DOE would need the list of attributes required by the SP for proper role-mapping.

Note that the Content Provider will not have direct administrative or configuration access to the NYC DOE IdP. They will work with the DOE Security team in partnership for SAML integration exchanging any configuration information required.

Appendix K-2: DOE INFRASTRUCTURE OVERVIEW

Article XI. Overview

The current NYCDOE network is large and complex, with a central downtown Brooklyn campus consisting of five buildings, one Data Center, and more than 1500 schools housed in more than 1200 buildings. The NYCDOE network comprises multiple major building blocks including an IP network, Mainframe and client server application environment and is governed by security restrictions needed to protect student information.

Article XII. IP Network

The current IP network consists of a main data center at 2 Metrotech Center that provides application and network services to a number of remote sites, including the downtown Brooklyn campus, central headquarters at the Tweed Courthouse, and 1200 remote school sites. Current network hardware consists primarily of Cisco routers, switches, firewalls, VPN concentrators, CSS and CSM load balancers.

Wide Area Network (WAN)

School Wide Area Networks (WAN) operate with a mix of high speed ATM and EVPL fiber links operating at 5 – 40 Mbps, primarily for high schools and junior high schools, and Frame-Relay circuits, operating at 1.544 Mbps, primarily for elementary and middle schools. Downtown Central Administrative Offices' WAN operates via EVPL or DS-3 circuits integrated into the central core network at 2 Metro Tech Center.

The School WAN is based on a high speed Wavelength Division Multiplexed (WDM) Synchronous Optical Network (SONET) ring. SONET is an international standard for optical transmission. Access lines from schools and administrative offices are directed toward one of six locations on the SONET ring for termination on SONET multiplexing equipment. Three diversified ISP Points of Presence (POPs) have been established to provide robust Internet access to students, teachers and administrative users. Riding over the SONET ring, traffic can be dropped at any of the SONET nodes. This allows the DOE to distribute its computer resources as well as provide diverse nodes for Internet access. The ring was initially configured at 10 Gbps. Upgrades to 40 Gbps are possible by adding cards to existing equipment racks. Upgrades up to 320 Gbps are possible by adding additional hardware.

Local Area Networks (LANs)

Local Area Networks (LANs) are provided at each school and administrative site to support intra-location communication and provide access to necessary peripherals, servers and WANs. School Local Area Networks (LANs) operate at 100 Mbps. LANs support the entire DOE population of more than 1,100,000 students and 80,000 teachers and administrators.

At each school, LAN communication is partitioned into administrative and instructional Virtual Local Area Networks (VLAN). In some schools a third, service, VLAN is provided as well. Users working on the administrative LAN have access, via their LAN and WAN connection, to sensitive student data stored on systems such as Automate the Schools (ATS). Students and teachers use the instructional LAN to connect through the WAN to Internet access. The DOE strictly enforces this partition in order to maintain the security of student records. Applications for third-party vendors that require secure access use the service VLAN, described in the next section.

Hardware supporting school LANs includes domain controllers, switches, firewalls and routers. This equipment is deployed in a series of Intermediate Distribution Frames (IDFs) throughout the school and a single Main Distribution Frame (MDF) that connects the IDFs and provides access to the WAN.

DOE LANs work with a variety of Windows and Mac computers, and many versions of Windows and Mac operating systems are currently in use at DOE schools. In the last few years, schools have greatly increased the use of wireless laptop computers in their classrooms. To accommodate these devices, wireless access points have been installed in schools, connecting users, wirelessly, with the school's instructional LAN.

Service Virtual Local Area Network (Service VLAN)

Until recently the LAN in every school was logically divided into two distinct Virtual LANs, the instructional VLAN and the administrative VLAN. Students and teachers used the instructional VLAN to access the Internet. Administrators used the administrative VLAN to report student attendance and access other sensitive (biographical as well as educational) data about students. Recognizing the importance of keeping student information confidential, users of the instructional VLAN have no access to the administrative VLAN. Typically, the only ports connected to the administrative VLAN were in administrative offices for the principal, assistant principal, school secretaries, etc. From the outset, the instructional VLAN was designed to support a large population of users, while the administrative VLAN supports a relatively small number of users. The design of the VLANs, e.g., the number of IP addresses available, reflects that.

The introduction of the IPDVS (IP Digital Video Surveillance) forced DIIT to reconsider the structure of VLANs in schools. In some cases, IPDVS may involve 70 cameras throughout a large school building. The video from these cameras as well as the video information stored in the local databases are confidential, preventing us from using the instructional VLAN to support IPDVS. However, the administrative VLAN was not able to accommodate the additional hardware.

The solution that DIIT developed, working with the IPDVS project, was to provide a third VLAN, called a Service VLAN. Enabling the service VLAN required that the schools have the newest PIX 525 firewall. (The PIX 525 has enough ports to support three VLANs; the older firewalls did not.) It also required an additional switch, a Cisco 3750. Since IPDVS, other projects, including CAASS (building access control), LONWORKS (facilities monitoring), and POS (food services), also use the service VLAN.

Remote Network Access

Remote network access to internal DOE network applications is often required by DOE staff working away from their base locations, by vendors working with the DOE who need access to specific data, and by non-DOE NYC governmental agencies. This remote access is established through secure communications over the Internet via Virtual Private Networks, LAN to LAN VPN, secure socket layer protocols, and terminal services.

Authorized staff members working at remote locations are able to access secure, encrypted data resources and applications from NYC Department of Education's internal network called the Intranet, by means of a broadband connection to the public Internet. DOE/DIIT conforms and acts in accordance with NYC agency security directives.

The process of securing VPN accounts is usually coordinated by ISC staff working with staff at 2 Metrotech, where the VPN accounts are approved and created. Limited remote access may be provided for vendors managing equipment co-located in the DoE's facilities, subject to certain restrictions as specified by DoE security policy.

Article XIII. Wireless Clients Standards

Instructional Clients

Wireless clients to be deployed in the school instructional network must be configured per the DOE standard and must meet the following requirements:

- Must support 802.11n in 2.4GHz and 5GHz Bands.
- Must be 2x2 MIMO with 2 spatial streams. (strongly prefers 3x3 MIMO with 3 spatial streams)
- Support of UNII-1, UNII-2, UNII-2 Extended, UNII-3 channels in 5GHz Band.
- Support of channels 1 to 11 on the 2.4GHz Band.
- Supports of 802.11n Channel Bonding on 5GHz Band.
- Must be Wi-Fi Alliance certified for 802.11n, 802.11b, 802.11g, and 802.11a.
- Supports WPA2/AES encryption with Pre-shared key and 802.1x PEAP MSCHAPv2 Authentication.
- Supports Static WEP-40bit encryption.
- Authentication: PEAP (MSCHAPv2) authentication support. (Win7, OS X (10.6.2 or version above supported by DOE)).
- For windows systems, the wireless card must be tested to work with Windows Wireless Zero Configuration utility.
- Encryption: 802.11i based WPAv2 with AES encryption.
- Support for WPA2-PSK.
- Client wireless credentials must be retained upon reboot.
- Wireless card driver and firmware must be up to date.
- Machine serial number must be properly encoded in the BIOS.
- Wireless clients must be certified by DIIT before deployment.

Article XIV. Network Security

Security Infrastructure

A security policy exists for both the school/district and the central administration network. Vendors planning on-line testing should note that schools are configured for outbound session only, and sessions can be initiated only on ports that are restricted for this purpose. Furthermore, all web access from school networks must pass through a filtering proxy server; so no direct access to the Internet (port 80) is permitted. Central administration is configured for any outbound session, however only specific incoming ports are allowed for Department of Education's (DoE) enterprise services. Well known ports are open for ingress traffic to specific servers, located in the DoE's perimeter network, for WWW, SSL, SMTP and other applications. No ports are open for ingress traffic to servers housed in the DoE's private internal network.

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The collection of all pages made public over the official DoE website by any district/school/office must adhere to the Internet Acceptable Use Policy approved by the Department of Education, February 2001 and revised February 2006. It can be viewed at:

<http://www.nycenet.edu/Administration/Offices/FinanceandAdministration/DIIT/Departments/WebServices/iaup/default.htm>

A department has been recently created to review all security processes and policies. At this time a process exists for providing VPN services, and other processes are being developed.

A Cisco Secure PIX firewall is used to safeguard each network. Security parameters are changed by the Network Administrators (4 total). The changes are approved by the architecture committee and are subject to signature approval at the weekly Quality Assurance Change Control meeting. Currently DoE is in the process of fully deploying an Intrusion Detection and Prevention system to all parts of the network. Malicious and abnormal network activity is being detected and reviewed by our security operational staff. A host-based intrusion prevention system (Cisco Security Agent or CSA) is installed on most school workstations. Adjustment of CSA settings may be required for certain client applications to function properly, and is performed centrally by the security operational staff.

The DOE currently utilizes a multi-tiered proxy infrastructure, including a filtering proxy (Symantec Web Security or SWS) and several caching proxies (Cisco Content Engines and Microsoft ISA 2004). All web traffic passes through these proxies on a non-standard port. Web browsers on school computers are configured to locate these proxies using a Proxy Autoconfiguration (PAC) file.

Allot Communications NetEnforcer have been providing us visibility and dynamic control over internet bandwidth utilization by different applications and users. NetEnforcer's ability to identify, classify, prioritize, and shape network traffic has allowed us to reduce the undesirable traffic such as P2P traffic to acceptable limits. The appropriate packet shaping policies are established by the Architecture Committee. "Top Talker and Application" reports resulting from this analysis has enabled DoE to pinpoint problematic applications and users. Procedures are currently being developed to keep Superintendents and principals aware of any abuse that occurs under their jurisdiction.

Mainframe and Client/Server Application Environment

Applications developed and managed by DIIT are supported by two major organizations – Productions Systems and Major Systems Development. The Production Systems organization is responsible for business and student applications that are hosted on the mainframe. The Major Systems Development organization develops "new" web-based and client-server applications that typically enhance and/or extend the production mainframe-based business (personnel and payroll) and student (general and special education).

The NYCDOE has developed a hardware standard to support the increasing demands for application services. Oracle and SQL databases, Web services and Crystal reporting systems typically run on IBM 3XXX servers. QA and development environments are typically standardized on IBM Blade Centers using VMware. Database and application are backed up nightly to a Client Disc Library (CDL).

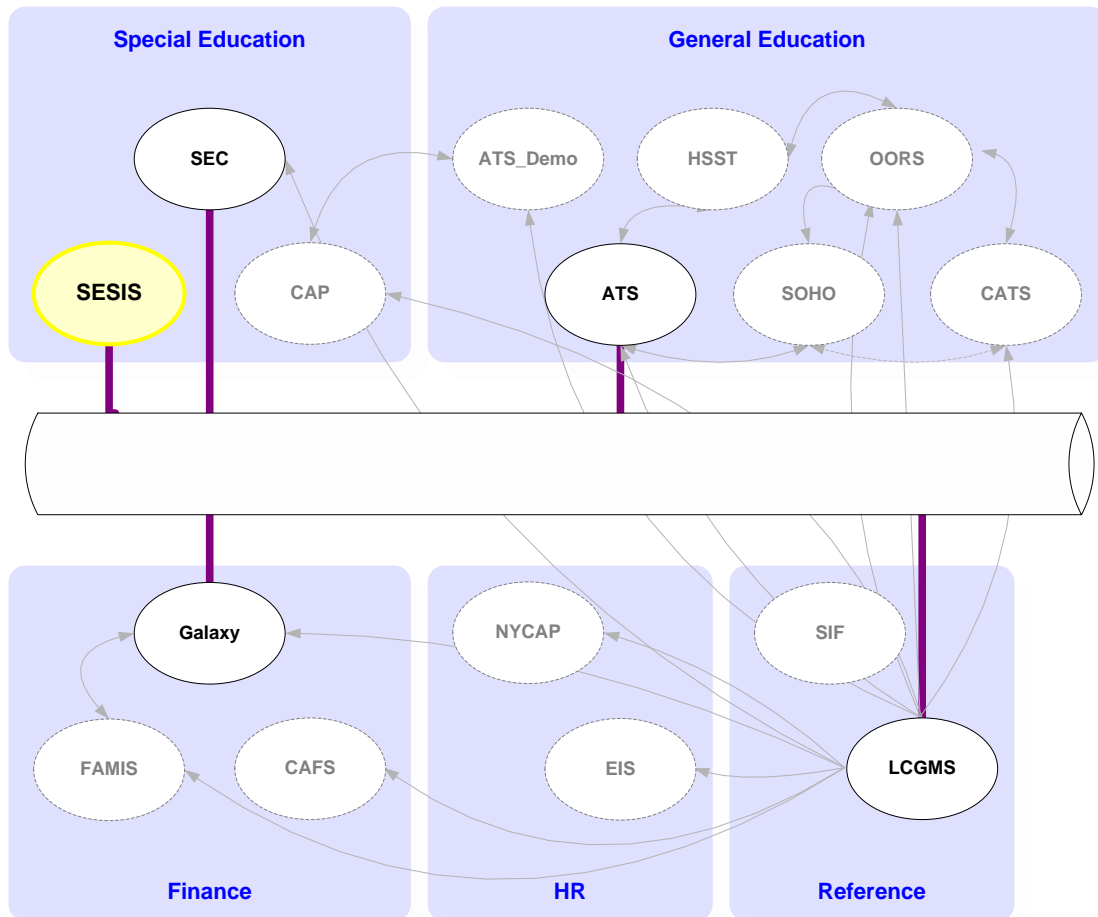
Appendix K-3 – DOE Enterprise Service Bus (ESB)

Article XV. DOE High Level Reference Notes

Below please find a high level summary of the ESB in a program and technical context. The content is excerpted from several documents including ESB Reference Architecture and Service Delivery Documents for specific projects.

Article XVI. DOE ESB & SOA Initiative

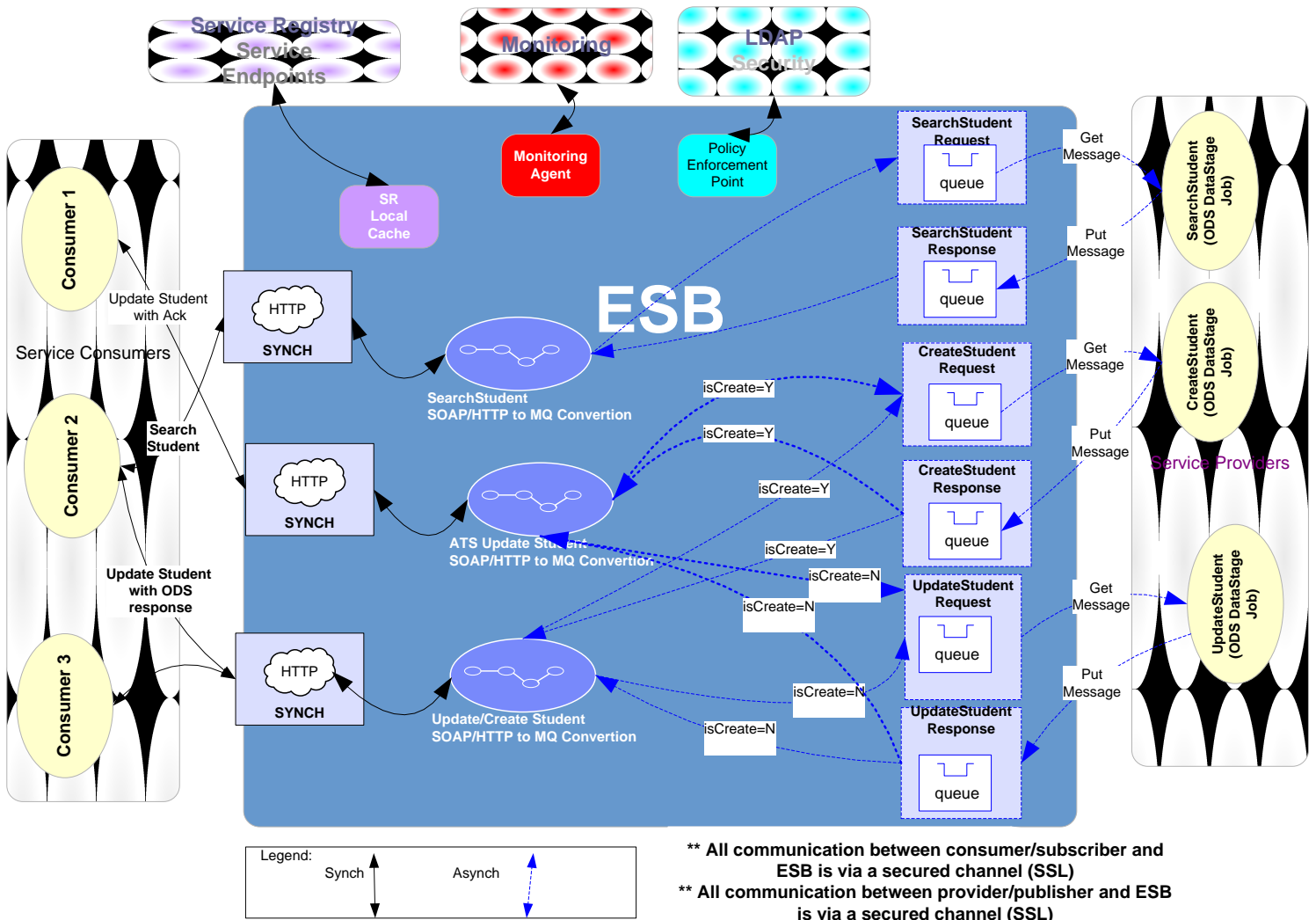
At the core of the DOE SOA initiative is the Enterprise Service Bus (ESB). The ESB delivers inter-connectivity services across the distributed component topology. Transport services, routing services, event services, and mediation services are provided through the ESB. Transport services provide the fundamental connection layer; event services allow the system to respond to specific events arising as part of a business process; and mediation services allow the loose-coupling between interacting systems. The enterprise service bus essentially becomes the extended enterprise’s arterial system providing messaging, notification and invocation services across the enterprise’s various operating environments.



The ESB is primarily used to host request-reply based web service and queue based event driven services. ESB is not used for any bulk transfer but can be used to initiate the request for the bulk transfer.

Article XVII. Example Service Delivery

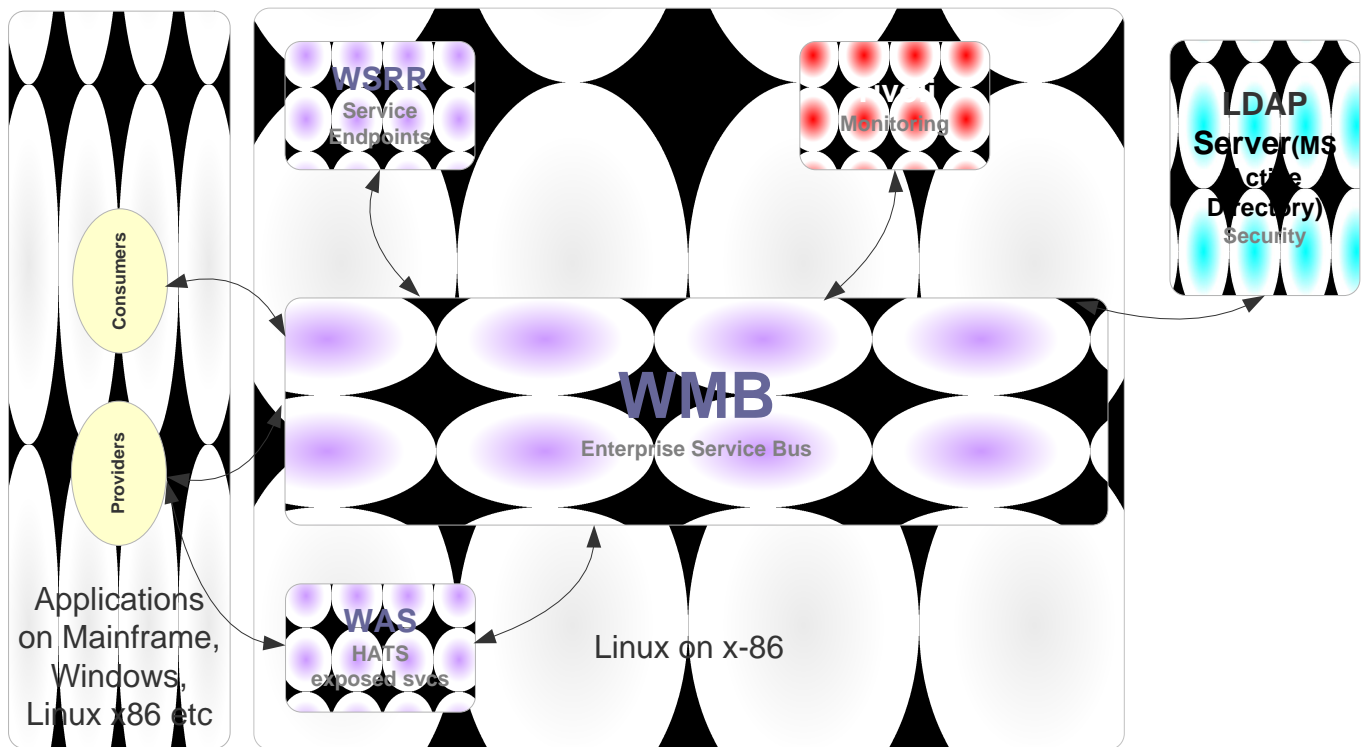
The figure below is the service delivery design for a project currently under development. It depicts a Request Reply pattern implementation.



Article XVIII. ESB Product View

<p>1.1 Enterprise Service Bus</p> <ul style="list-style-type: none"> • WebSphere Message Broker (WMB) v6.1 • WebSphere MQ (WMQ) v6.0 	<p>1.2 Service Registry</p> <ul style="list-style-type: none"> • WebSphere Service Registry and Repository (WSRR) v6.2
<p>1.3 Monitoring</p> <ul style="list-style-type: none"> • ITCAM for SOA • Omegamon XE 	<p>1.4 Mainframes Exposed Services</p> <ul style="list-style-type: none"> • HATS WAS v7

Article XIX. ESB Logical Architecture from a Product and OS perspective



Article XX. ESB Integration Pattern Descriptions

Integration patterns describe the mediation purpose. Some of the common patterns are described here, though is not intended to be an exhaustive list. The patterns are not necessarily mutually exclusive. In some cases solutions will be based on a combination of patterns.

Service Virtualization – this pattern describes ways that an ESB enables integration between true service consumers and service providers. It represents integration decoupling.

Service Enablement – this pattern describes ways that an ESB could “enable” a non-service consumer or provider to interact with a “service oriented” consumer or provider. This service façade should not be mistaken to mean that a non-service provider suddenly becomes a well thought out business or IT service; it most likely is not. Instead we may deem these as “legacy” services where the ESB is providing access to core application functionality that provides value to the service community.

File Handling – this pattern describes ways that service processing may occur via files, especially where the service consumer or the provider require service enabling.

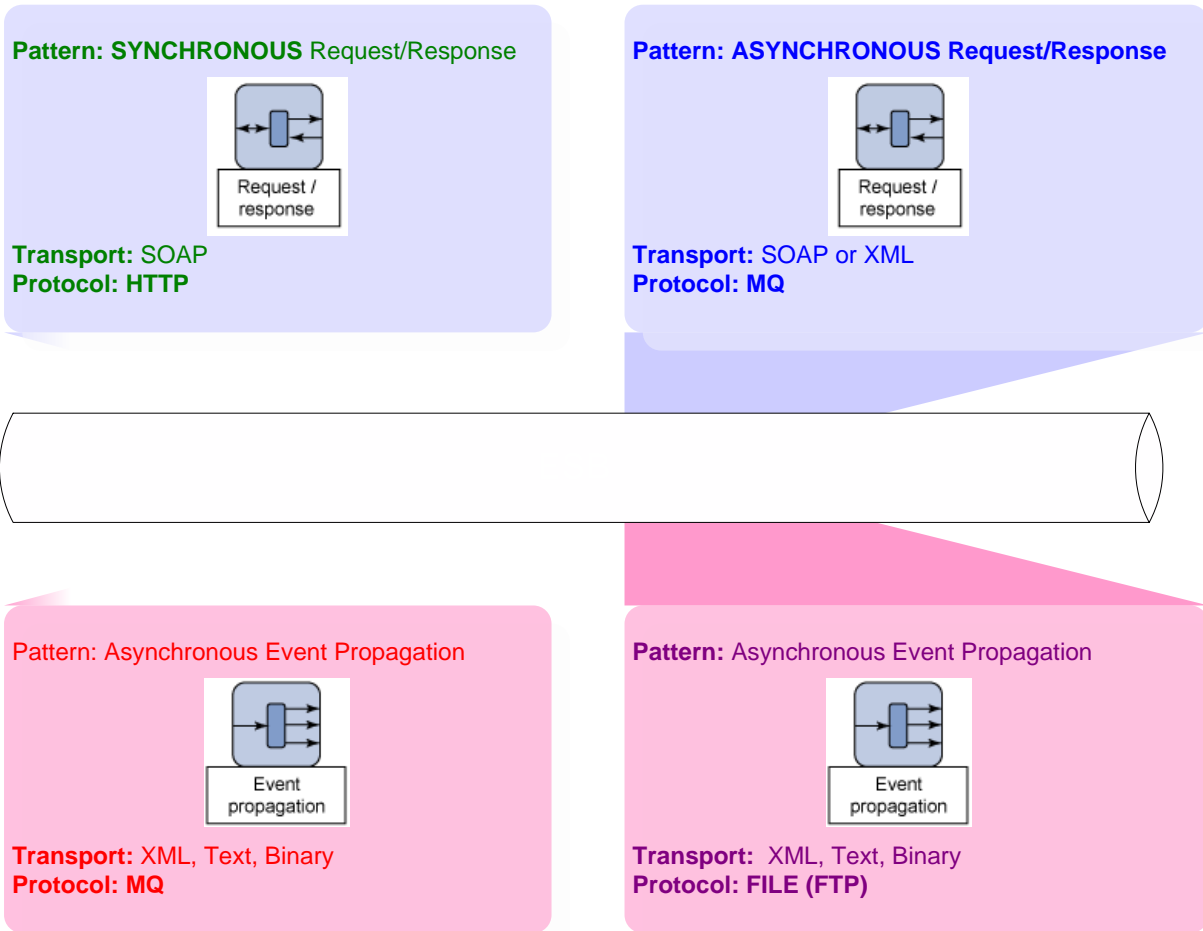
Event Driven Service– this pattern describes the type of integration resulting from some activity such as data modification or time based activity.

Service Gateway – describes processing that redirects requests based on header or other contextual message information.

Service Composition/Aggregation – this pattern represents ways that an ESB could support a single service request that is reliant on more than one service provider input. The aggregation of the discrete service responses would not entail business logic.

1.5 ESB Interaction Patterns

Common ESB Interaction Patterns Expected at NYC DOE



Article XXI. Canonical Message Model (CMM)

Producers and consumers integrated via the DOE ESB must agree to employ the DOE CMM.

The ESB design pattern involves hosting a set of enterprise services in a common location; these services would act as façades in front of service implementations hosted by various back-end systems. These enterprise services will expose interfaces that define service messages. Service messages are the input and output message formats for service methods. Service messages will not be generic; each service method will be specific to one method of one service. To achieve a hub-and-spoke data representation, the data types within the service messages should be drawn from a set of predefined canonical data types – which serve as the formats for enterprise data as it flows across the ESB.

Such a set of canonical data types should be a superset of the data representations in all the particular applications in the enterprise. For example, if student data is found in two different systems, then the Student canonical data type should have fields that correspond to all the fields in each of the two systems that store student data, so that the Student canonical type would be able to carry any student detail data that either of the back-end systems in question could offer.

The data types developed so far are organized into four categories:

- DOE Common Types
- External Code Sets
- Location
- Staff

The common types are mostly derived from SIF (Schools Interoperability Framework). The external code sets are taken directly from SIF. They represent a series of code sets defined by standards bodies other than SIF. The data types are all implemented as XSD complex types.

Appendix K-4: DATA EXPORT SAMPLE FIELDS

Sample Fields for Custom Data Export		
% Points Obtained	Language_Arts_Test_Date	Reading_GLE
Academic Year	LEP	Reading_NCE
AccLanguage_Level	Lexile	Reading_Percentile
AccMath_Level	Lexile_Research	Reading_Rate
AccReading_Level	Listening Points Earned	Reading_Scaled_Score
AccScience_Level	Listening Points Possible	Reading_Standard_Error
Algebra_Scaled_Score	Living_Things_Scaled_Score	Reading_Test_Date
Algebra_Standard_Error	Living_Things_Standard_Error	Reporting_Date
Assessment Date	Long_Passage_Scaled_Score	School Name
Assessment Period	Long_Passage_Standard_Error	School Percentile Rank
Band	Math_GLE	Science_GLE
Beginning_Of_Date_Range	Math_NCE	Science_NCE
Capitalization_Scaled_Score	Math_Percentile	Science_Percentile
Capitalization_Scaled_Score	Math_Scaled_Score	Science_Process_Scaled_Score
Capitalization_Standard_Error	Math_Standard_Error	Science_Process_Standard_Error
Citizenship	Math_Test_Date	Science_Scaled_Score
Class 1	Math_Test_Language	Science_Standard_Error
Class 2	Meal_Assistance	Science_Test_Date
Class 3	Measurement_Scaled_Score	Sentence_Structure_Scaled_Score
Content Strand/Band	Measurement_Standard_Error	Sentence_Structure_Standard_Error
Data_Analysis_&_Probability_Scaled_Score	MEP	Site_ID
Data_Analysis_&_Probability_Standard_Error	Middle_Init	Site_Name
Disability	Migratory	SMEP
District Name	Nonfiction_Scaled_Score	Standard
District Percentile Rank	Nonfiction_Standard_Error	Standard - % Correct
Ecology_Scaled_Score	Number of items	Standard - Force Scored
Ecology_Standard_Error	Number of Students in District Completing Test	Standard - Items Not Scored
Economically Disadvantaged	Number of Students in School Completing Test	Standard - Items Omitted
End_Of_Date_Range	Number_&_Operations_Scaled_Score	Standard - Number of Items
English Proficiency	Number_&_Operations_Standard_Error	Standard - Points Obtained
Enrollment_Date	NYSESLAT_Pred_Level	Standard - Points Possible
Ethnicity	Overall % Points Obtained	Standard Error of Measurement
Expected Performance % Predicted Probability of Score Range 0-54	Overall Percent Correct	Student Birth Date
Expected Performance % Predicted Probability of Score Range 55-64	Overall Points Obtained	Student First Name
Expected Performance % Predicted Probability of Score Range 65-84	Overall Scaled Score	Student Grade

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Expected Performance % Predicted Probability of Score Range 85-100	Overall_Scale_Score	Student ID Number
Fiction_Scaled_Score	Parts_Of_Speech_Scaled_Score	Student Last Name
Fiction_Standard_Error	Parts_Of_Speech_Standard_Error	Student_ID
Force scored	Performance Indicator	Subject
Gender	Period	Test Date
Geometry_Scaled_Score	Points obtained	Test Delivery Method
Geometry_Standard_Error	Points possible	Test ID
Grade	Primary Teacher 1	Test name
Grade of Assessment	Primary Teacher 2	Test Type
IEP	Primary Teacher 3	Title_1
Independent Reading Level	Probability of Scoring	Vocabulary_Scaled_Score
IRL Benchmark	Probability of Scoring Advanced	Vocabulary_Standard_Error
Items not scored	Probability of Scoring Beginning	Writing Points Earned
Items omitted	Probability of Scoring Proficient	Writing Points Possible
Language_Arts_GLE	Punctuation_Scaled_Score	
Language_Arts_NCE	Punctuation_Standard_Error	
Language_Arts_Percentile	Punctuation_Standard_Error	
Language_Arts_Scaled_Score	Reading Points Earned	
Language_Arts_Standard_Error	Reading Points Possible	

Appendix K-5: TECHNOLOGY & SECURITY GENERAL REQUIREMENTS

The Scope of Work—Technical Requirements and Service Level Requirements (SLRs) are detailed in the tabs of the Appendix K-6 Workbook. The spreadsheet asks vendors to check whether the function is “Existing, Out-of-box functionality, Delivered after integration and configuration (included in price), Delivered after customization (included in price), Delivered after development (included in price), Delivered through integration with Third-Party Tool or existing City Application (indicate tool or City application; included in price), or Not Offered, and Additional Explanation.” The Additional Explanation column allows vendors to provide clear explanations of each proposed product or service, if needed.

It is envisioned that the selected vendor will be responsible for implementing and integrating several solution components in order to meet the DOE’s business requirements. The technical requirements for this work are intended to provide a secure and scalable solution that minimizes ongoing maintenance costs, and will integrate with existing DOE source systems. This requires the solution to be consistent with DOE’s current technology requirements and future technology direction (described in the Appendices). Please describe how your overall solution meets these requirements in Appendix K-6 Worksheets.

Appendix K-6: IMPLEMENTATION REQUIREMENTS RESPONSE WORKBOOK

1.1 Platform Implementation Services, Roles and Responsibilities

The vendor shall provide responses to questions posed in this section and identify roles within the provided tables. Each section contains tables specifying the specific roles and responsibilities and a code indicating who will be responsible for work/deliverable development related the task.

- Leading (L),
- Reviewing (R),
- Supporting (S),
- Approving (A)

1.1.1 Project Management

High-Level Design Activities Roles and Responsibilities	Vendor	DOE
1. Maintain control over the work duties, schedule, budget and performance of the vendor team's members on all projects, including all sub-contractors	L	R,S
1. Report all material project events. The format of, and the means for, distributing all reports will be agreed upon at the beginning of the project as set forth in the vendor proposal or as otherwise directed by the NYC DOE	L	R
2. Prepare for and attend regular status meetings	L	R
3. Possess overall responsibility for the success of the projects that make up the Virtual Learning project	L	S
4. Provide work/project plans that define tasks and responsibilities, as well as projected and actual start and end dates for all projects. The work plans should be revised and reported weekly, should include in-progress action items, and should identify emerging risks and risk mitigation-plans. The work plans should be electronically stored according to NYC DOE standards	L	R,S
5. Coordinate and lead project change control	L	R
6. Be responsible for internal quality control of all deliverables, which will be prepared according to NYC DOE standards in place at project inception. The final determination of the acceptance of deliverables lies with the City project manager	L	R
7. Maintain continuity of their team's staff throughout the engagement. NYC DOE must approve any changes in staff before such changes are planned or made	L	A
8. Maintain responsibility for vendor's own administrative support. NYC DOE will not provide such support, associated materials, or accept billing for these services	L	R
9. Provide any necessary tools or equipment in support of its staff	L	R

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High-Level Design Activities Roles and Responsibilities	Vendor	DOE
10. Fully conform to NYC DOE's policies, technical standards, security policies and procedures	L	R
11. Maintain up-to-date Project Management metrics including, but not limited to: Schedule Variance (SV), Cost Variance (CV), Estimate to Complete (ETC), Actual Cost (AC)	L	R,A
12. Conduct time and cost reviews at the end of each project activity to identify variances of actuals against budget, and provide an assessment of the impact of any variances to the overall project. Variances (unless due to scope changes) are the System Integrator's responsibility	L	R,A
13. During the Transition Phase (i.e., turn-over at conclusion or termination of the Agreement), the vendor shall again provide to NYC DOE current and up-to-date documentation needed for such purpose	L	R,A
14. Notify NYC DOE of any defect or malfunctions in the systems, operations, software hardware or documentation, including any that the vendor discovers from any source. Vendor shall be responsible for correcting any defects or malfunctions in the systems, operations, software, hardware, or documentation discovered at any time by either the vendor or NYC DOE	L	R
<p>15. System Documentation. The vendor will deliver to NYC DOE, at the conclusion of the project, all material and documentation that was developed and was appropriate to the nature of the engagement, including a glossary of all data elements used by the systems installed pursuant to this contract. Updated documentation will be provided with all changes/updates to the software which is turned over to NYC DOE. Examples include, but are not limited to:</p> <ul style="list-style-type: none"> • All project documentation and source code • A report of findings and recommendations for business process analyses or re-engineering designs • All application configuration items, including relevant code, products, objects, style sheets and supporting documentation • All post-project review documentation, including questionnaires, worksheets, and lessons learned • Product specifications • All relevant code, documentation of test plans, test scripts and test results, documentation of development, installation, and maintenance protocols, and all supporting documentation for new applications developed 	L	R,A

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.1.2 Platform Strategy, Architecture, and Planning

DOE expects the following roles and responsibilities:

Platform Architecture Roles and Responsibilities	Vendor	DOE
1. Maintain “End State” Platform Architecture	L	A
2. Develop and maintain Platform Roadmap	L	A
3. Develop, Document and maintain release specific Platform Architectures	L	A
4. Participate in Platform Architecture planning and recommend Architecture design	L	A
5. Develop and Document the System Technical and Functional Architectures	L	A
6. Develop and Document Platform Integration Architecture	L	A
7. Develop and Document Data Conversion Architecture	L	A
8. Evaluate, recommend, and select software technologies, packages, and tools within the framework of this work as required	L	A
9. Collaborate with the DOE or DoITT Infrastructure Architecture team	S	L
Content & Data Architecture Roles and Responsibilities	Vendor	DOE
10. Develop, Document and maintain DOE High Level Content organization modeling and Logical Data Model for Transactional and Reporting requirements	L	A
11. Recommend Platform Content & Data Models against DOE requirements	L	A
12. Approve Content organization and Data modeling	S	A
13. Provide DOE Content / Data Standards	S	L

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14. Develop, Document and maintain Content	L	A
15. Develop and Document Data	L	A
16. Maintain Data	S	L,A
17. Conduct and Document Data Quality Assessments	L	A
Platform Integration Roles and Responsibilities	Vendor	DOE
18. Manage the integration and touch points between the platform DOE materials and content from other providers.	L	A
Platform Software License Management Roles and Responsibilities	Vendor	DOE
19. Manage software license inventory (i.e., maintain inventory and ensure license requirements are being met and vendor agreements being fulfilled)	L	A
20. Manage platform provider software license inventory and report to DOE on a monthly basis	L	A
21. Manage software budget for licenses and recurring maintenance agreements	S	L
22. Negotiate software licenses and maintenance contracts	L	A
23. Manage Content Provider Relationships	L	S
24. Approve Negotiated License and Maintenance Contracts	L	A
25. Manage all IT Contract Services that are not the responsibility of platform provider	S	L

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.1.3 Planning and Analysis

DOE expects the following roles and responsibilities:

Planning and Analysis Roles and Responsibilities	Vendor	DOE
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Planning and Analysis Roles and Responsibilities	Vendor	DOE
16. Clearly define project roles and responsibilities for DOE and Platform Provider staff	L	A
17. Prepare project charter/statement of work	L	A
18. Prepare task orders, change orders or change of scope related documentation as appropriate	L	A
19. Prepare activities/work breakdown structure	L	A
20. Develop detailed project schedule, including milestones and deliverables	L	A
21. Develop a quality assurance (QA) plan	L	A
22. Develop Project Management Plan	L	A
23. Conduct ongoing project planning and status report activities that reflect schedule and resource changes throughout the project	L	S
24. Perform business liaison function to DOE business and operational units	S	L
25. Recommend and document overall systems development life cycle process improvements, including those for which DOE retains responsibility	L	A
26. Conduct and document technical and business planning sessions to establish standards, architecture, and project initiatives	S	L
27. Perform and document platform operational assessments for capacity and performance purposes	L	A
28. Perform and document platform security planning	L	A
29. Develop and document the system security architecture (e.g., for data in motion and data at rest, to maintain multiple customers data access segregated within a single system)	L	A
30. Document and recommend potential improvements to application security architecture	L	A
31. Perform application security planning for development tasks	L	A
32. Identify and document possible product and software tool enhancement opportunities for improved performance and potential cost savings	L	A
33. Perform and document project estimation using a commercial project estimation tool that can size application projects and can categorize them by level of effort (e.g., low, medium, high)	L	A
34. Approve projects to implement security and application enhancement opportunities	S	L

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.1.4 Detailed Requirements Definition

DOE expects the following roles and responsibilities:

Detailed Requirements Definition Roles and Responsibilities	Vendor	DOE
1. Develop and document platform functional and technical requirements	L	A
2. Conduct and document DOE interviews, group workshops, and surveys to determine detailed technical, functional, and end user requirements	L	A
3. Develop and document detailed functional requirements documents, use cases, and logical and physical data models	L	A
4. Act as primary point of contact to review and prioritize business requirements	S	L
5. Conduct and document value assessments of detailed functional requirements and generate a fit/gap analysis, including affected DOE systems, alternative design scenarios, etc.	L	R
6. Approve all requirements documents	S	A
7. Develop and document platform test plan (e.g., functional, volume, end-to-end, integration, stress, regression, system, and user acceptance test if applicable)	L	A
8. Approve Platform test plans	S	A

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.1.5 Design Specifications

DOE expects the following roles and responsibilities:

High-Level Design Activities Roles and Responsibilities	Vendor	DOE
35. Develop and document the high-level Design Document from the business and functional requirements	L	A
36. Develop and document platform and configuration settings to demonstrate support of requirements	L	A
37. Approve platform and configuration settings that demonstrate support of requirements	S	A
38. Develop and document high level requirements/criteria for extending platform and configuration settings to the full complement to satisfy the complete virtual learning capability requirements	L	A
39. Develop and document high-level Content and Logical data model	L	A
40. Approve planned technology to support Platform	S	A
41. Develop and document platform configuration, development and implementation cost and schedule estimates	L	A
42. Develop and document overall project cost and schedule estimate	L	A
43. Develop and document program expenditure request and acquire approval	S	L

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Detail Design Activities Roles and Responsibilities	Vendor	DOE
1. Develop and document design standards and documentation	L	A
2. Review and approve design standards and documentation	S	A
3. Provide DOE business and technical resources as applicable	S	L
4. Conduct and document site surveys for design efforts as required	L	A
5. Develop and document the detailed design document from the business and functional requirements and the system design	L	A
6. Create and document the system security features in compliance with DOE security policies and local regulatory requirements	L	A
7. Develop and document the technical system design specifying all components, program modules, content storage, data stores, interfaces, interface components, and associated operations procedures for the platform	L	A
8. Review and approve detailed design documentation	S	A
9. Develop and document technical requirements, use cases, and logical and physical content / data models	L	A
10. Review and approve technical requirements and physical data models for consistency with documented requirements	S	A
11. Develop and document test cases as defined in testing plan	L	A
12. Approve test cases	S	A
13. Develop and document implementation and deployment policies, project schedules, and staffing requirements to meet deployment and delivery requirements	L	A
14. Approve implementation deployment policies and schedules	S	A
15. Develop and document revised platform configuration/development and implementation cost and schedule estimates	L	A
16. Develop and document revised overall project cost and schedule estimates	S	A

<p>Please indicate acceptance of these assignments, suggest alternatives and/or additions:</p>



1.1.6 Configuration/Programming/Development

DOE expects the following roles and responsibilities:

Configuration/Programming and Development Activities Roles and Responsibilities	Vendor	DOE
1. Develop and document configuration, programming, development, and technical documentation policies, procedures, and standards in conformance with Software Engineering Institute (SEI) requirements where applicable	L	A
2. Review and establish configuration, programming, development, and technical documentation policies, procedures, and standards	S	A
3. Establish and document the overall configuration, programming and development project schedule	L	A
4. Approve overall configuration, programming and development module delivery schedule	S	A
5. Establish logically or physically separated Development, Test, Training, and Production environments	L	A
6. Perform all necessary technical design, configuration, programming, development, unit and string testing, scripting, configuring, or customizing of application modules as required to develop and implement the design plans and specifications	L	A
7. Perform application database administration functions	L	A
8. Develop and document modifications and performance-enhancement adjustments to system software and utilities based on DOE performance standards	L	A
9. Manage all configuration, programming and development efforts using industry-standard project management tools and methodologies	L	A
10. Conduct and document predetermined development status reviews and provide written report on results to DOE	L	R

Configuration/Programming and Development Activities Roles and Responsibilities	Vendor	DOE
11. Conduct and document code reviews to ensure software complies with coding standards; to share knowledge between developers; and to reduce defects	L	R
12. Review and approve results of platform provider's configuration/development reviews at DOE's discretion	S	L

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.1.7 Integration and Testing

DOE expects the following roles and responsibilities:

Integration and Testing Activities Roles and Responsibilities	Vendor	DOE
1. Create all integration, user acceptance and application security testing plans for new and upgraded equipment, software, or services	L	A
2. Create test cases, test data, and perform all appropriate testing (e.g., unit testing, end-to-end testing, stress testing, regression testing)	L	A
3. Create test environment and data where required by project, including demonstration of requirements traceability to verify the requirements as specified in the Requirements Document have been satisfied	L	A
4. Review and approve testing plans	S	A

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Integration and Testing Activities Roles and Responsibilities	Vendor	DOE
5. Coordinate User Acceptance and Assurance Testing (e.g., gain user involvement, establish and define acceptance criteria, setting high-level test objectives, establish high level test scenarios)	S	L
6. Facilitate and support User Acceptance Test as prescribed by DOE, including: establishing adequate test environment based on User Acceptance Criteria; preparing data to support test scenarios within modified system as well as managing the relationship with all interfaced systems necessary to conduct test; troubleshooting; supporting users to progress through scenarios; simulating interfaces or working with integrated systems to conduct end-to-end tests; supporting content ingestion; exercising functionality; and reporting results	S	L
7. Conduct User Acceptance Test	S	L
8. Validate all new and upgraded software or services for compliance with DOE application security policies and regulatory requirements	L	A
9. Manage the functional, integration, and regression test environments and associated test data including creation and maintenance during the testing period	L	R
10. Review testing results for compliance with policies, procedures, plans, and test criteria and metrics (e.g., defect rates, progress against schedule)	S	A
11. Provide shared access to the mutually agreed Defect Tracking System for purposes of allowing DOE to initiate, track, and report DOE found defects (i.e., user acceptance testing).	L	R
12. Notify Vendor in the event DOE notices a discrepancy between DOE's requirements and the requirements document or Vendor deliverables	S	L
13. Correct defects found as a result of testing efforts	L	A
14. Conduct selective random independent testing, where the random selection includes some complex modules (i.e., independent verification and validation testing)	S	L
15. Stage system releases before implementation	L	A

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.1.8 Code Migration

DOE expects the following roles and responsibilities:

Code Migration Roles and Responsibilities	Vendor	DOE
1. Develop and document recommended operations and administration procedures related to code migration	L	A
2. Approve operations and administration procedures related to code migration	S	A
3. Develop and document test-to-production turnover requirements and instructions for each project or release	L	A
4. Approve test-to-production turnover requirements and instructions via Change Management	S	L
5. Document results from test-to-production activities	L	A
6. Review reports on test-to-production results	S	R
7. Migrate code from development to test on an agreed upon basis	L	A
8. Track migration status and notification	L	A
9. Escalate and resolve issues with Vendor Services delivery team and development teams	L	R
10. Participate in environment setup and decommissioning for new and changed environments	S	L
11. Migrate defect correction code during warranty period	L	A

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.1.9 Software Configuration Management

DOE expects the following roles and responsibilities:

Software Configuration Management Activities Roles and Responsibilities	Vendor	DOE
1. Define, develop and document configuration management policies and procedures consistent with the SEI Capability Maturity Model (CMM) Software Configuration Management Key Process Area (KPA)	L	A
2. Review and approve configuration management policies and procedures	S	L
3. Perform configuration management activities throughout the development life cycle	L	A
4. Review configuration management results	S	L

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.1.10 Change Management

DOE expects the following roles and responsibilities:

Change Management Activities Roles and Responsibilities	Vendor	DOE
1. Recommend and document procedures associated with DOE authorized change requests	L	R
2. Review and approve the Project Change Request Process	S	A
3. Review maintenance production release plans and schedules	S	L
4. Ensure custom code approvals are received from the designated DOE IT personnel	S	L
5. Assist DOE with documentation and communicate change management processes and procedures	S	R
6. Participate in scheduling releases	L	A
7. Manage documentation changes to the underlying application development environment via use of library management version control and turnover management as described above	L	A
8. Document impact analysis associated with proposed project changes	L	R
9. Prepare DOE system change request	L	R
10. Validate that any changes (e.g., configuration, interface development) by the DOE do not adversely impact the system functionality prior to release	L	S
11. Integrate implementation of changes with release management plans	L	A

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

Describe the proposed change management process including:

- 1. Classification of severity for change requests**
- 2. Systems engineering, development, test and regression procedures**
- 3. Implementation process and schedule**

The vendor shall describe their process (including system in place to support this process) for capturing changes to the project, including bug identification and resolution, problem identification, reporting, engineering change requests, product or application enhancements.

1.1.11 Training and Knowledge Transfer

DOE expects the following roles and responsibilities:

Training and Knowledge Transfer Activities Roles and Responsibilities	Vendor	DOE
1. Develop and document training and knowledge transfer plan	L	R
2. Approve training and knowledge transfer plan in the project plan	S	A
3. Provide technical training assistance and knowledge transfer to existing DOE support personnel, during deployment as requested	L	A
4. Validate knowledge transfer success through documented test results	L	A
5. Develop and document training materials related to the technical aspects of the assessment platform for the DOE as applicable	L	A
6. Provide End-User training content and materials for the assessment and reporting platform.	L	A
7. Provide technical training content and materials for the assessment and reporting platform.	L	A
8. Review and validate training content and materials	S	A
9. Provide training to platform system administrators and Help Desk staff as appropriate	L	A
10. Provide direct training to DOE staff as appropriate	L	A
11. Provide train-the-trainer training to the assessment and reporting platform as appropriate	L	A
12. Create and maintain DOE Training instances or clients as required by the DOE	S	L
13. Provide Help Desk agent training, including developing dialogue scripts	L	A

<p>Please indicate acceptance of these assignments, suggest alternatives and/or additions:</p>

1.1.12 Organizational Change Management

DOE expects the following roles and responsibilities:

Organizational Change Management Activities Roles and Responsibilities	Vendor	DOE
1. Conduct organizational change management readiness assessment	L	S
2. Develop and document an organizational change management plan based on readiness assessment results	L	R
3. Approve organizational change management plan	S	A
4. Develop and apply appropriate organizational change management tools and activities	L	A
5. Lead organizational change management activities with support from DOE personnel as required	L	S
6. Assess effectiveness of organizational change management activities	L	S
7. Provide recommendations for continuous organizational change management activities	L	A
8. Determine how organizational change management recommendations will be implemented	R	L
9. Implement organizational change management recommendations as planned	S	L

<p>Please indicate acceptance of these assignments, suggest alternatives and/or additions:</p>
Empty space for response

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1.1.13 Documentation Deliverables

DOE expects the following roles and responsibilities:

Documentation Roles and Responsibilities	Vendor	DOE
1. Recommend specifications and documentation format and content per SEI requirements	L	R
2. Approve documentation format and content	S	A
3. Develop and document system functional specifications	L	A
4. Develop and document system architecture including security	L	A
5. Develop and document systems design specification	L	A
6. Develop and document system use cases	L	A
7. Develop and document system interface specifications	L	A
8. Develop and document systems interface control plan	L	A
9. Develop and document database design (logical and physical) documents (optional)	L	A
10. Develop and document data dictionary (optional)	L	A
11. Develop and document user interface specification	L	A
12. Develop and document data conversion plans (optional)	L	A
13. Develop and document System (and Release) Test Strategy	L	A
14. Develop and document system Test Plan(s) and Scripts	L	A
15. Develop and document system Quality Assurance Plan	L	A
16. Develop and document system turn over to production plans	L	A
17. Develop and document System Training and Knowledge Transfer Strategy and Plans (end-user and system administration).	L	A
18. Develop and document System Training and Knowledge Transfer Materials (end-user and system administration).	L	A
19. Develop and document knowledge transfer testing results/completion documentation	L	A
20. Develop and document system post implementation support plans	L	A
21. Develop and document system back-up and recovery requirements and plans	L	A
22. Develop and document Configuration Management Plan	L	A
23. Develop and document Weekly Project Status Reports	L	A
24. Develop and document Project Management Plans and Schedules	L	A
25. Develop and document Risk Management Plan	L	A
26. Develop and document Issues Logs	L	A
27. Develop and document Organizational Change Management Plan	L	A

Documentation Roles and Responsibilities	Vendor	DOE
28. Develop and document Platform Content Model(structure/ organization of content)	L	A
29. Develop and document operational process flows and use cases	L	A
30. Develop and document system installation, support, configuration, and tuning manuals	L	A
31. Develop and document application hardware and system software requirements documentation	L	A
32. Develop and document Application Code Listings	L	A
33. Develop and document End-User documentation	L	A
34. Develop and document system and application security procedures	L	A
35. Develop and document systems standard operating procedures	L	A
36. Develop and document updates and release notes	L	A
37. Develop and document deliver updates and release notes to end users	L	A
38. Approve documentation delivered	S	L

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.2 Application Maintenance Services

1.2.1 Release Packaging

Describe the release packaging approach:

1.2.2 Technical and End-User Support

DOE expects the following roles and responsibilities:

Technical and End-user Support Activities Roles and Responsibilities	Vendor	DOE
1. Develop maintenance and repair policies and procedures	L	A
2. Approve maintenance and repair policies and procedures	S	L
3. Develop “Application Maintenance Plan” and any and all revisions to the “Plan” (e.g., committed and proposed work schedules)	L	A
4. Review and approve “Application Maintenance Plan”, including any and all revisions to the “Plan” (e.g., committed and proposed work schedules)	S	L
5. Execute “Application Maintenance Plan” for all categories of maintenance Services (e.g., Minor Enhancements, Corrective Maintenance, Preventative Maintenance, Adaptive Maintenance, and Perfective Maintenance) as described above	S	A
6. Provide technical and functional support to the DOE IT staff and other groups as directed by DOE IT	S	A
7. Provide customer support plan which is to include an 800 call center number that is staffed 7x24x365	L	A
8. Perform diagnostics on software and services	L	S
9. Perform routine system management on applications	S	L
10. Recommend DOE database tuning changes	S	A
11. Assist help desk with coordination of user support activities	S	L
12. Respond to escalated trouble ticket items in accordance with established procedures	S	L

Technical and End-user Support Activities Roles and Responsibilities	Vendor	DOE
13. Establish priority of Service Requests	S	L
14. Follow DOE change management procedures associated with maintenance and support	L	A
15. Develop a Disengagement Plan before completing an Agreement with the DOE. This plan will include the turnover to the DOE at least 40 Business Days before the end of the Agreement, all data for Services including system settings and passwords. The vendor must cooperate in good faith.	L	A

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

1.3 Monitoring, Reporting, and Review

DOE expects the following roles and responsibilities:

Monitoring, Reporting, and Review Activities Roles and Responsibilities	Vendor	DOE
1. Provide, maintain, and update project plans, identifying critical path dependencies, major critical milestones, project deliverables, and project earned value as mutually agreed upon by the DOE and Vendor for selected projects	L	R
2. Provide weekly status reviews and progress reports	L	R
3. Provide monthly service-level performance reports against each Service Level Agreement, including trends for each and a summary view	L	R

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Monitoring, Reporting, and Review Activities Roles and Responsibilities	Vendor	DOE
4. Provide monthly milestone achievement reviews and performance reports	L	R
5. Provide mutually agreed to reports to enable invoice reconciliation	L	R
6. Provide mutually agreed to reports that capture service requests demands and measure of ability to satisfy demand	L	R
7. Provide mutually agreed reports that represent general health of environments (e.g., number of stranded transports, patches not yet applied) as well as reports that represent demand fulfillment in end-customer terms (e.g., defect corrections/change requests that have slipped against commitment, backlogged defects/change requests, Priority 1, 2, and Priority 3 defects)	L	R
8. Define Service Level Agreement's (SLA), problem Priority levels, and reporting cycles	S	L
9. Measure and analyze performance relative to requirements	L	R
10. Develop improvement plans for services that do not meet Service Level Agreements	L	A
11. Review improvement SLA plans	S	A
12. Implement improvement SLA plans	L	A
13. Provide Service Request Response Time management reports, including a trend line, for new development work that reflects time to provide time and cost estimates	L	R
14. Maintain a log of downtime that DOE can view anytime.	L	R

Please indicate acceptance of these assignments, suggest alternatives and/or additions:

2.0 Service Support Requirements

2.1 Service Level Requirements (SLR's) [SAMPLE]

Application Development Service Level Requirements				
SERVICE TYPE	SERVICE MEASURE	PERFORMANCE TARGET	MINIMUM PERFORMANCE %	Measurement Interval
Project Estimation Methods and Tools Used for Cost and Schedule	Target	100% of projects	100%	Monthly
Project Estimation (actual cost vs. estimated cost)	Target Cost	Actual Estimate	Actual - Not more than +/- 10% of estimate	Monthly
Milestone Completion – Milestones on the Critical Path	Completion Date	Completion of milestones by scheduled completion date	100%	Weekly
Milestone Completion – All Milestones NOT on Critical Path	Completion Date	Completion of milestones by scheduled completion date	95%	Weekly
Functional Requirements Met	Employee Focus Groups	Consensus	95%	Module Implementation
Shared Benefits	Acceptance Test Results	Acceptance of functionality that will allow the DOE to achieve its expected business benefits through the automation of manual processes	80%	Application Module Implementation
	Formula	Performance = Transactions completed within required time/Total Transactions		
	Reporting Interval	Monitor Continuously, Report Monthly		
	Measurement Tool	[DOE will specify monitoring and reporting tool(s) to be used]		

Please indicate acceptance of the above SLRs, suggest alternatives and/or additions:

DEFINITION Application Operations and Maintenance Service Level Requirements are the performance metrics related to the services that Vendor must provide in support of the assessment and reporting platform system after acceptance. Availability and response time of application is measured from an end user perspective.

Application Operations and Maintenance Service Level Requirements				
SERVICE TYPE	SERVICE MEASURE	PERFORMANCE TARGET	MINIMUM PERFORMANCE % UPON GO-LIVE	Measurement Interval
Availability of Application	Availability	Per schedule	99.9%	Daily
Response Time of the Application	Response Time From Entering Command to Result	90% of transactions complete ≤ 1.0 sec	99.9%	Daily
Incident Handling	Time to Resolve:			Monthly
	Priority Level 1	<2 hours	95%	
	Priority Level 2	<4 hours	95%	
	Priority Level 3	<6 hours	95%	
	Formula	Performance = Transactions completed within required time/Total Transactions		
	Reporting Interval	Monitor Continuously, Report Monthly		
	Measurement Tool	[DOE will specify monitoring and reporting tool(s) to be used]		

Application Operations and Maintenance Service Level Requirements				
SERVICE TYPE	SERVICE MEASURE	PERFORMANCE TARGET	MINIMUM PERFORMANCE % UPON GO-LIVE	Measurement Interval

Please indicate acceptance of the above SLRs, suggest alternatives and/or additions:

Appendix L-1: NYCDOE SCHOOLS, STUDENTS and STAFF**NYCDOE Schools****Grades Represented and Number of School Locations**

Grades Represented in the School	Number of Locations
3-12	3
3-5	9
3-8	15
6-12	88
6-8	262
9-12	381
K-12	21
K-2	14
K-3	7
K-4	3
K-5	130
K-6	7
K-7	2
K-8	42
K-9	1
PK-1	6
PK-12	11
PK-2	13
PK-3	8
PK-4	10
PK-5	392
PK-6	28
PK-7	6
PK-8	94
PK-K	2

NYCDOE Students

Number of Students by Grade Level

Grade Level	Number of Students
PK	22,351
K	73,298
1	76,851
2	75,237
3	73,662
4	72,860
5	72,007
6	70,503
7	71,591
8	73,176
9	91,159
10	73,298
11	66,198
12	63,076
Algebra	250,065
Geometry	157,763
Algebra 2 and Trigonometry	99,072

* Represents the number of students scheduled in throughout the entire year, which include courses that are only scheduled during parts of the year (i.e. semesters or terms)

NYCDOE Staff

Educators per Function and Grade Level

Assistant Principal	3264
Central Staff	4974
Instructional Coach	809
Data Specialist	3235
Guidance Counselor	2881
Network Staff	930
Principal	1557
Teacher	80,000
Testing Coordinator	1472

Appendix L-2: CITYWIDE INSTRUCTIONAL EXPECTATIONS

INTRODUCTION TO THE FINAL DRAFT OF THE CITYWIDE INSTRUCTIONAL EXPECTATIONS FOR 2011-12 *(the 2012-13 expectations are not yet final, but will be made available when they are released)*

To successfully prepare all students—including students with disabilities and English language learners—for life after high school, teachers need to create cognitively demanding learning experiences in their classrooms every day. To this end, we have developed a collective focus for the next school year that has been shaped by extensive consultation with both local and national experts, including more than 1,400 New York City principals—who participated in over 50 feedback sessions across the City this spring—and the writers of the Common Core State Standards.

As a result of these conversations, we have adjusted the instructional expectations:

- By broadening the standards of practice in mathematics to include constructing a viable argument and mathematical modeling, and shifting the selected domains for kindergarten and grade 3 to allow a broader focus as we build a path to algebra; and
- By explaining the role of clusters and networks.

In addition, we have added to the FAQ, which now includes an explanation of the connection to collaborative inquiry, resources to help schools get started, suggestions for making time to do this work, further explanation of the selected literacy standards for grades 3-8, and an updated explanation of the selected mathematics standards.

At the feedback sessions in May, principals were clear about their needs and concerns, particularly around limited time, budget cuts, and potential teacher layoffs. There are no simple ways to allay these concerns. The central office, networks, clusters, and schools will need to work together during these challenging times. Throughout the year, we will provide examples of this work in practice, including Common Core-aligned curriculum and assessments and teacher supports. We will also provide guidance to schools around long-term implementation that will take us through the 2014-15 school year.

Educators throughout our school system are embracing this important instructional work and understand how critical it is for our students. The work of transitioning to these new, higher standards will not be easy. But we have a tremendous opportunity to lead the way, and the bottom line is that our children are counting on us.

CITYWIDE INSTRUCTIONAL EXPECTATIONS

FOR 2011-12

As we continue to work toward graduating students who are college and career ready, we are setting specific instructional expectations for the 2011-12 school year. These expectations build on the inquiry work of the last several years:

- Strengthening student work by examining and refining curriculum, assessment, and classroom instruction; and
- Strengthening teacher practice by examining and refining the feedback teachers receive.

As school leaders engage students and teachers in strengthening the instructional core, networks and clusters will play a crucial role in supporting schools as well as coordinating learning across schools. Engaging our school communities in conversations about how we are preparing students to be college and career ready will also be an important part of this work.

Rigorous Curriculum and Tasks for All Students

This year, we have gotten to know the Common Core standards and practiced revising curriculum, assessment, and instruction. Next year, as we deepen our efforts, we will engage teachers in the next stages of aligning curriculum and assessment to the Common Core. Teachers will work together to engage all students in rigorous tasks, embedded in well-crafted instructional units and with appropriate supports.

At a minimum, teachers will be expected to:

- In teams, look closely at current student work to understand the steps needed to reach the level of performance that the Common Core demands (spring/fall 2011).
- Engage all students in at least one literacy task and one mathematics task aligned to strategically selected Common Core standards. These tasks should be embedded in Common Core-aligned curricula and include multiple entry points for all learners, including students with disabilities and English language learners (winter 2011-12).
 - In literacy, students will complete a task that asks them to read and analyze informational texts and write opinions and arguments in response.
 - In math, students will engage in a cognitively demanding mathematics task that requires them to demonstrate their ability to model with mathematics and/or construct and explore the reasoning behind arguments to arrive at a viable solution.
- In teams, look closely at resulting student work to continue the cycle of inquiry, making future instructional adjustments and communicating lessons learned to other school staff (spring 2012).
-

We ask that educators engaging in this work use rich performance tasks as a vehicle for examining student work, developing a shared understanding of success as defined by the new standards, and determining how to adjust teacher practice to support student development along the continuum of college and career readiness. Our goal is that, through the work of implementing a task, teachers will begin to adjust their curriculum and instruction to help all students move toward the higher expectations of the Common Core.

Schools will have the flexibility to select the teachers who engage in this work, the types of tasks they teach, and the curriculum they develop. Excerpted student work and diagnostic tasks aligned to the selected Common Core literacy standards are available on the Common Core

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Library now: <http://schools.nyc.gov/Academics/CommonCoreLibrary>. For samples of NYC homegrown Common Core-aligned tasks, annotated student work, and related instructional supports in both literacy and math, as well as a variety of professional learning resources, please check back at the end of June and throughout the summer to see our growing collection.

Effective Feedback for All Teachers

School leaders who improve the instructional core across classrooms take certain actions: they utilize a common lens for instruction and curriculum, set clear expectations, and provide evidence-based, applicable feedback from frequent classroom observations. When they do so, their teachers know what effective teaching looks like, have a shared language to discuss what's working and what needs to be improved, and know which actions to take to improve their practice.

Principals and other school leaders are encouraged to:

- Use sections of Charlotte Danielson's Framework for Teaching, or continue to use a research-based teaching framework that is already in place, to articulate clear expectations for teacher practice and serve as the focus for teacher development (by summer 2011).
- Engage in short, frequent cycles of classroom observation*, collaborative examination of student work, and timely, specific, evidence-based feedback teachers can act on to increase the rigor and effectiveness of their instruction (throughout 2011-12). Teachers should receive feedback on student work on Common Core-aligned tasks and on successes and challenges related to reaching all students, including students with disabilities and English language learners.
- Strengthen their own capacity to provide high-quality feedback to teachers through professional development and support from network teams (throughout 2011-12).

Schools can learn about Charlotte Danielson's Framework for Teaching, read profiles of NYC DOE principals who are using Danielson and providing frequent feedback to their teachers, find online professional development, and explore observation templates and feedback protocols in ARIS Learn (www.arisnyc.org).

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Schools can choose how to implement these expectations to integrate them effectively with other priorities. But all schools will share a common goal: achieving excellence in student work through highly effective teaching.

The Common Core standards outline a new definition of and trajectory toward college and career readiness that reflect the demands of the 21st century. These instructional expectations are intended to support schools as we begin to adjust what and how we teach in order to help all students succeed on cognitively demanding tasks and develop along the continuum toward college and career readiness.

For more information, please see our evolving FAQ document on the Principals' Portal: <http://intranet.nycboe.net/DOEPortal/Principals/SchoolSupport/AcademicServices/>.

* The short observation and feedback cycle does not take the place of formal evaluations. The difference between an informal and formal observation as stated in the current collective bargaining agreement is that formal observations require a pre-observation conference. For probationary and tenured teachers, evaluators may conduct as many informal observations as deemed necessary and do not require a pre-observation conference. There is no minimum

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amount of observation time required for a formal observation. Engaging in informal observations with teachers is complementary to the formal observation process.

ROLE OF NETWORKS AND CLUSTERS

Networks and clusters play a crucial role in supporting schools with the implementation of the 2011-2012 instructional expectations. Assessing the current state of teaching and learning in each school is a critical starting point. As part of a cluster- and network-level inquiry cycle, clusters and networks will analyze student work, teacher work (curriculum and assessments), and school leader work (samples of feedback to teachers) to help schools understand both where this work meets expectations and where educators need additional supports.

Networks

By offering clear guidance and structured support around content and pedagogy, network teams can help educators develop the skills they need to increase the rigor of instruction for all students as we move toward full implementation of the Common Core standards.

Next year, each network will have an instructional team of at least four achievement coaches, whose roles and assigned schools will vary according to the needs of the schools within the network. Additionally, each team will have one achievement coach who will focus on supporting schools' implementation of Universal Design for Learning and other instructional work related to the teaching of students with disabilities. These achievement coaches will support instructional leaders (administrators and key teachers) in:

- Analyzing teacher and student work to develop and implement plans to support teachers toward success with all students
- Providing content area support in all subjects
- Facilitating discussions and using protocols
- Developing systems and structures for implementation of short cycles of classroom observation
- Providing clear and concrete feedback to support teachers' professional growth and development.

Network teams will collect a portfolio of artifacts across their schools to analyze during monthly Children First Intensive Institutes. Although we will not track student work on the 2011 spring/fall tasks or the 2011-12 winter tasks centrally, schools should make student, teacher, and school leader work accessible for professional learning across the system.

Clusters

Clusters are expected to strengthen network teams' capacity to provide the instructional support described above. In partnership with the Academics Office and the Office of School Support, clusters will develop and implement regular professional learning experiences for network teams and engage in a performance management process to support the professional growth of all network team members.

SELECTED COMMON CORE STANDARDS

To focus our efforts on critical college and career ready skills, we have strategically selected standards at every grade level. The authors of the Common Core helped guide our selection. To view the full Common Core Learning Standards, visit:
http://www.p12.nysed.gov/ciai/common_core_standards/.

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Selected Common Core Standards in Literacy Grade Band	Literacy Focus
Pre-K-2	Written response to informational texts through group activities and with prompting and support (Reading Informational Text Standards 1 and 10; Writing Standard 2)
3-8	Written analysis of informational texts (Reading Informational Text Standards 1 and 10) OR Written opinion or argument based on an analysis of informational texts (Reading Informational Text Standards 1 and 10; Writing Standard 1)
9-12	Written opinion or argument based on an analysis of informational texts (Reading Informational Text Standards 1 and 10; Writing Standard 1)

Rationale

The authors of the Common Core standards have pointed to the issues of text complexity in informational text and making an argument based on those texts as the key challenges in the Common Core. We need to begin exposing our students to this type of task, and supporting them accordingly, in a staircase fashion moving up through the grade levels. (For more information about how these specific Common Core standards were selected, please see the FAQ document on the Principals' Portal:

[http://intranet.nycboe.net/DOEPortal/Principals/SchoolSupport/AcademicServices/.](http://intranet.nycboe.net/DOEPortal/Principals/SchoolSupport/AcademicServices/))

Selected Common Core Standards in Mathematics Grade Band	Standard of Practice		Domain of Focus
Pre-K-K	Model with Mathematics and/or Construct Viable Arguments and Critique the Reasoning of Others	AND	Operations and Algebraic Thinking
1-2			Number and Operations in Base Ten
3			Operations and Algebraic Thinking
4-5			Number and Operations—Fractions
6-7			Ratios and Proportional Relationships
8			Expressions and Equations
Algebra			Reasoning with Equations and Inequalities
Geometry			Congruence

Rationale

The Standards for Mathematical Practices are one of the most distinct portions of the Common Core standards. Taken together, these standards paint a picture of a mathematically proficient student. We understand that the Standards for Mathematical Practice are interconnected and that a rich task may require students to demonstrate many of the practices. However, for the winter task, we ask that schools focus on one or both of the high-leverage practices we've selected—Model with Mathematics (#4) and Construct Viable Arguments and Critique the Reasoning of Others (#3)—and the domains of focus representing key content in each grade.

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Modeling is what real mathematicians do: using mathematics to represent and solve authentic problems in our world. Key to this process of problem-solving is the ability to clearly construct and analyze mathematical arguments, evaluating and articulating the reasoning behind claims. Facility with these two practices, and solid knowledge of key concepts, will enable students to demonstrate their mathematical thinking by successfully analyzing authentic problems and constructing and defending logical paths to solving problems.

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