Item Development and Test Construction Guidelines

by
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Sample Assessment Items:
State of Arizona, Grades 3 through High School
# Item Development and Test Construction Guidelines

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I. Introduction

This document details the rationale and procedures utilized by Assessment Technology, Incorporated (ATI) in item development and test construction for benchmark and formative assessments. The document includes sample ATI item specifications and items constructed in accordance with the rationale and procedures described here and representative of the items developed and maintained in ATI item banks. The rationale for the adopted procedures is informed by industry standards outlined by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education in *The Standards for Educational Testing*, 1999. The rationale behind the guidelines is also informed by the unique characteristics and purposes of benchmark and formative assessments and by a continuing research program that examines the psychometric properties of items used in ATI assessments.

Assessment is a central component of the Galileo® K-12 Online Instructional Improvement System (IIS). The purpose of the Galileo IIS is to provide management tools that can assist educators to promote student learning. The assessment component includes both benchmark and formative assessments along with many other forms of assessment, including interim/end-of-course and placement. The assessment component is intended to inform instruction aimed at promoting the mastery of standards reflecting valued educational goals. Currently the standards selected to guide instruction are generally state, local, and Common Core State Standards. If benchmark and formative assessments are to be effective in informing instruction, it is essential that these standards be reflected in item development and test construction. Assessing students using items that do not reflect the adopted standards of the state or agency opens that assessment process to valid criticisms about the validity and accountability of the instrument of assessment and the conclusions that can be drawn from it. As Haladyna notes,

The use of a test that is poorly aligned with the state’s curriculum and content standards, coupled with test-based accountability, results in test scores that may not be validly interpreted or used. (Haladyna, 2004 pp.9-10).

In order for the Galileo assessment component to be useful in informing instruction, it must:

- adhere to industry standards for item and test construction;
- provide information on the mastery of standards;
- provide recommendations as to what to teach next;
- be capable of forecasting standards mastery as reflected in statewide test performance;
- be capable of reflecting the full range of variations in knowledge levels reflected in the standards guiding instruction;
- be sensitive to diverse background characteristics of students that may affect student performance;
- adhere to Universal Design specifications for accommodating English Language Learners (ELL) and students with special needs;
- provide local control of test specifications that yields efficient measurement of standards targeted for instruction;
- reflect standards controlling the visual quality of items in a manner that accommodates both online administration and offline administration using test booklets; and
• estimate and evaluate item parameters through a continuing research program. Item Response Theory (IRT) provides the generally accepted procedures for conducting research on item parameters. IRT makes it possible to place scores from multiple assessments on a common scale facilitating the measurement of progress. In addition, IRT can be used to inform recommendations regarding what to teach next to promote learning.

The item development process for benchmark and formative assessments in Galileo® has been carefully designed to produce high-quality items that adhere to the conditions specified above.

This process includes the development of item specifications, item construction, and item review with certification. The discussion that follows outlines the item development process. In addition, the item types utilized in benchmark and formative assessment are summarized and the importance of local control of test specifications is reviewed. The ability of the assessment component to accommodate ELL and students with special needs is addressed. The discussion includes a brief outline of the design of assessments that are effective in forecasting performance on statewide assessments and also useful for guiding instruction. The document closes with a set of sample items from ATI item banks.

II. Item Specifications

When new items are to be added to the ATI item banks, the first step is to review the standard which is to be assessed. The standard is broken down into the skills that make up the standard. These skills are the starting point for developing an online list of item specifications defining the characteristics of the particular class of items to be written. Item specifications indicate the defining characteristics of the item class, the rationale for the class, and the required characteristics for each item component. For example, in the case of multiple-choice items, the required characteristics of the stem and the alternatives are specified. Specifications address such factors as the cognitive complexity intended for items included in the specification, the appropriateness of vocabulary, requirements related to readability levels, and the alignment of the item with standards.

The value of creating specifications as a guide for the item development process is recognized as a critical part of a process documenting that assessments are reliable and valid indicators of the ability they are intended to measure (Haladyna, 2004). Their structure and specificity also afford many advantages for ensuring that assessments may be readily adapted as district needs and or state/federal requirements change. The following screen shot provides an example of an item specification in the area of language arts.
III. Item Construction

After specifications have been written, items are constructed corresponding to the specifications using the online Bank Builder utility. Bank Builder includes features that promote item quality. For example, images constructed using Bank Builder conform to size and resolution standards that yield items that are visually suited to both online and offline administration. Similarly, fonts available in Bank Builder are chosen to work across platforms, for readability both onscreen and in printed material. Bank Builder also allows for the use of item families, or groups of items that refer to the same contextual material. For example, several language arts items may refer to the same reading passage.

To ensure reliable and efficient measurement of standards, passage length is controlled to accommodate the administration of tests of adequate length within the time constraints typically found in school settings. Reliability is a direct function of test length. Our research indicates that adequate reliabilities can typically be achieved for assessments of approximately 40 items in length (Bergan, Burnham, Bergan, & Bergan, 2008). When excessively long passages are selected or when excessive numbers of passages are selected, assessment length may be reduced and reliabilities may fall to unacceptable levels.
The item construction process also includes attention to important principles of item writing. For example, when writing multiple-choice items, incorrect alternatives must be plausible answers that may provide clues to the manner in which the student conceptualizes the problem reflected in the question. Distractors should resemble the correct choice in grammatical form, style and length (Haladyna, 2004). Care is also taken to ensure that items are written to accommodate students from diverse backgrounds. Sensitivity to diversity reflected in the needs of local programs is addressed in the test review process, which enables districts to select items appropriate for use with their students. For example, items are written to include a diversity of ethnic and multi-ethnic names so that districts will have choices available to meet local needs when deciding on which items to include.

When writing items including contextual material such as text passages, care is taken to ensure that the passages are not ones that the student is likely to have read previously. In many instances, original texts are utilized. In those cases in which previously published material is used, districts are encouraged to select passages that are not likely to have been previously read by students. When previous passage exposure is not controlled, assessment validity may be compromised. Student performance may reflect differential exposure to content rather than comprehension of the material presented (Haladyna, 2004).

Careful attention is also paid to ensure that the material is at the appropriate reading level. The level of text vocabulary and the readability of the text need to be considered in assessing the reading comprehension and reading skills of the students. Although the reading level of a passage may be quantified in several ways, there is a subjective component as well. Neither the complexity of sentence structure, the difficulty in comprehending the concepts presented in a passage, nor the level of abstraction can be quantified. For example, “I think, therefore I am.” results in a very easy readability level (2.8 grade level using the Flesch-Kincaid Index), but the concepts addressed by the sentence are not so easy to understand. The appropriateness of a given passage for a given grade level is also an issue. Therefore, while ATI does use Lexile® measures to measure readability, ATI also analyzes the reading passages more subjectively to ensure that reading ability does not get in the way of, for example, correctly answering a math question.

IV. Review of Items and Related Materials

The review of items and associated materials is a multi-stage process. As indicated above, each item is written to conform to an item specification. The first step in the process is to review the item specification. The second step includes an internal item review and item certification. This step may be accompanied by an independent review of materials such as texts that may be common to a number of items. The third step in the process is external review.

A. Review Criteria

The review process is informed by criteria established for the development of item specifications and for the items designed in accordance with those specifications. The following list outlines the criteria addressed in reviewing item specifications:

- The item specification must identify a class of items and detail the characteristics of items in the class.
The item specification must include a content standard to which items in the specification are to be aligned.

The specification must include at least one prototype item representing the class identified in the specification.

The content standard will typically be comprised of a number of skills identified as part of the process of constructing the item specification. The item specification must be designed to support the assessment of at least one of the skills comprising the standard.

Each skill included in the specification must be linked to a task to be accomplished by the students being assessed.

The item specification must detail the defining features of the task. For example, if the task takes the form of a multiple-choice item, the specification must include the defining characteristics of the stem and alternatives.

ATI frequently expands the information contained in new item specifications based on advances in research and technology. For example, recently written item specifications also identify the depth of knowledge that the items are intended to address. Similarly, recently written item specifications for items designed to present feedback to students specify criteria related to the feedback that will be provided. A planned initiative will also provide information in the specification about the demands of the task expected to affect item difficulty. For example, the cognitive complexity of the task and its effect on difficulty could be addressed in developing the specification.

The list below details criteria related to the review of individual items:

- Each item must reflect the class of items defined by the specification.
- Each item must be aligned with the content standard and a specific skill within the standard included in the item specification.
- Each item must meet standards with respect to font size and type. Determination of these item attributes is controlled automatically by Galileo® K-12 Online.
- Each item must conform to image size and quality standards. Adherence to these standards is controlled automatically by Galileo K-12 Online.
- Each item must be evaluated for clarity of expression and adherence to grammatical rules.
- Each item must be evaluated for grade-level appropriateness of language.
- Each item must be evaluated with respect to sensitivity to the needs of students from diverse backgrounds.
- Each item developed for the specification must meet all specification criteria.
- If depth of knowledge information is presented in the item specification, the items must reflect the appropriate level of depth of knowledge.
- If criteria for feedback are presented in the item specification, the feedback presented for the item must reflect the criteria.
- If task demands are presented in the item specification, the items must reflect the task demands associated with the task defined in the specification.

In some cases, common material called an item family is developed for use with multiple items. For example, a common text may be used with a number of items assessing various aspects of text comprehension. The ability to link a single text to multiple items increases the number of skills that can be assessed within a given time period. This enhances test reliability and is associated with increased forecasting effectiveness. The common material comprising an item family is reviewed independently as well as in conjunction with the
specific items linked to the family. Item families are typically linked to items reflecting multiple specifications. As the following list of criteria shows, this linkage affects item family review:

- Item families involving text must conform to stylistic norms associated with the genre they are intended to represent.
- Item families involving text must conform to grammatical conventions associated with the genre that they reflect.
- In some cases, item families are required to reflect errors in reasoning and/or grammatical errors.
- Typically, item families must be written in a manner that accommodates multiple items reflecting different item specifications. For example, an item family might accommodate questions addressing specifications related to character, plot, and setting.
- Text comprising an item family should be written concisely. Excessive text length may adversely affect both reliability and validity.
- Text should be written at an appropriate readability level.

B. The Review Process

The internal review process for item specifications, items, and item families occurs as a secure, in-house review and is composed of three steps. The internal review process is completed when the item has been certified. The item review process continues once a certified item is made available for use in an assessment. Items placed in district designed assessments are subjected to review by each member of the district’s review team during the test review process. The following text details both the internal and the district review processes.

The internal review process for item specifications, items, and item families occurs in three steps. Step one is an independent review using the online bank review tool in Galileo® K-12 Online. Reviewers may accept the material being reviewed, reject it, or accept it with modifications. If the material is accepted with modifications, the reviewer provides the writer with a list of suggested modifications, which are recorded in the online review. The modifications guide revision. Following the initial internal review, the material is subjected to a final internal review. When consensus is reached between the two reviewers and the writer, the material under review is accepted for use. In the case of item review, the item is certified. Certified items are locked so that they cannot be changed by Galileo users. Only certified items are provided by ATI for use by school districts.

With the exception of ATI developed instructional effectiveness (IE) items and assessments that are utilized for educator effectiveness initiatives, when a certified item is made available for use in an assessment (e.g., benchmark assessments), it is subjected to test review by districts planning assessments that may use the item. Test review is a two-stage process. In the initial stage, any number of district reviewers may review the assessment. In stage two, a final reviewer assembles the reviews from stage one and submits to ATI a final review of the assessment. Test review provides the district with the option to accept an item or replace it with an item that more closely meets district needs. The district may also suggest item changes. The development of new items based on district suggestions is one source of the continuing expansion of ATI item banks. ATI item banks, which currently contain over 104,000 items, are among the largest item banks aligned to standards in the nation. During the course of a single school year, ATI items are reviewed by hundreds of educators. The combination of a multi-material (specification, item and item family) multi-step internal review and item certification accompanied by continuous external review by educators representing districts with a variety of
needs provides a rigorous approach to evaluation producing assessments that meet local needs and that are highly effective in forecasting and guiding instruction toward standards mastery.

V. Multiple-Choice, Constructed-Response, and Online Item Formats

Galileo® K-12 Online supports multiple-choice, constructed-response, and specialized online item formats. Multiple-choice items have significant advantages over other formats with respect to assessment reliability, efficiency, and flexible support for online and offline assessment. Multiple-choice assessment with automated scoring minimizes the potential for error inherent in hand scoring and avoids the additional time and resources necessary to administer and score constructed response items. Multiple-choice items can be administered either online or offline. Moreover, multiple-choice items are capable of assessing a broad range of capabilities including a variety of higher order thinking skills (Downing, 2006; Haladyna, 2004). Nonetheless, other formats are also essential in a balanced assessment program. Constructed-response items are useful in addressing standards such as Common Core State Standards that explicitly call for an extended response from the student. Galileo provides technology that supports the use of constructed-response items aligned to Common Core State Standards. These items are particularly useful in assessing skills reflecting high Depth of Knowledge (DOK) levels. For example, Test Builder supports extended response items such as essays. In addition, scoring guidelines can be entered into the system and made available online. Finally, hand-written student responses can be scanned into Galileo and scored manually online. There are considerations that should be addressed in order to utilize constructed-response items effectively. A systematic approach to the development of scoring rules must be established. In addition, the reliability of scores must be addressed. This may be accomplished by assessing agreement between two or more observers. The effect of constructed-response items on test reliability and validity also must be considered. Constructed-response items generally involve multiple scoring levels. For example, a score ranging from zero to four is quite common. An item scored from zero to four is weighted four times as much as a typical multiple-choice item. Variations in score weights may produce circumstances adversely affecting test reliability and validity (Thissen & Wainer, 2001). Psychometric tools are available to address this problem if it occurs (e.g., Thissen & Wainer, 2001).

Galileo includes a number of online item formats designed for use in formative assessments. For example, short answer math problems including word problems can be generated and scored automatically in the system. Multiple-response formats are also currently under development that will make it possible to observe the student’s work in problem solving.

VI. Writing Assessment

ATI offers two types of writing assessments: assessments including multiple-choice items and assessments including a writing prompt and a standardized rubric. Districts can choose the type of assessment that best meets their specific needs. The use of multiple-choice items to assess writing is an attractive approach because these items can be automatically scored, requiring little time and effort from district staff. However, writing prompt assessments can provide more direct information about student writing skills. As Haladyna explains,

The most direct measure would be a performance-based writing prompt. MC items might measure knowledge of writing or knowledge of writing skills, but they would not provide a direct measure. (p.11)
A writing prompt assessment allows the students to express their responses in a manner that indicates an accurate representation of their ability to compose, convey, and communicate to match both the purpose of the text and the information that they possess relevant to the topic. However, a writing prompt assessment requires additional district resources as student responses must be scored by teachers.

VII. Local Control of Benchmark and Formative Assessment Specifications

If assessments are to be used to measure standards targeted for instruction in school districts, districts need to have a significant degree of control over test specifications (Standard 3.3 AERA, APA, NCME, 1999). For example, if a district targets a particular set of standards for instruction during a given time period, the district may elect to administer a benchmark test to assess those standards. In order to ensure the adequacy of the assessment for each standard, the district will probably want to control the number of items selected to assess each standard. In addition, the district may wish to select items that reflect varying depths of knowledge (see e.g. Webb, 2006) reflected in the specific skills targeted for instruction. The district may also want items that are sensitive to the experiences of students from diverse backgrounds represented in the district. Finally, the district will typically need to control the length of the assessment to cover the targeted content and to meet time constraints such as the length of periods during which assessments can be scheduled. Galileo® K-12 Online includes tools that support local control of both benchmark and formative assessments. These tools are described in detail at ati-online.com.

VIII. Universal Design

Thurlow, Thompson, and Lazarus (2006) present the basics of universal design as it applies to assessments in the following statement:

*The essential idea behind universally designed assessments is that they are to ensure that the assessment measures what is really intended—the relevant constructs—rather than construct irrelevant information.*

Construct irrelevant information might include the extent to which a student’s comprehension of English impairs their ability to understand what is asked in a word problem on a math test or it might include fatigue that impairs ability to perform calculations. In both cases, the validity of the final score as a measure of math skill might be unduly impacted if adequate attention is not given to assessment design and to the provision of appropriate accommodations.

A. Objectives of Universal Design

Thompson, Johnstone, and Thurlow (2002), lay out guidelines to ensure that tests meet the objectives of universal design. The discussion that follows illustrates ATI’s application of those guidelines in the construction of assessments:

- **Precisely defined constructs:** As indicated above, an essential part of the item development process followed by ATI is the construction of item specifications. Item specifications are written first before any items are produced. The specifications serve
as a blueprint to guide both the writing and later quality assurance review. Item specifications include detailed definitions of the exact capability that is intended to be measured. This level of detail helps to make sure that the items that are ultimately available for inclusion on an assessment provide data on the intended ability.

- **Accessible, nonbiased items:** Items are reviewed by ATI content specialists to ensure that they are free from potential sources of bias. The review process includes two phases. The first occurs before the item is made available for use. ATI content specialists review whether the items conform to the specifications and are free from identifiable sources of bias.

- **Amenable to accommodations:** The ATI system of assessment design and delivery has been constructed to be supportive of a variety of different accommodations. These are listed in detail in the next section in this document.

- **Simple, clear, and intuitive instructions and procedures:** In addition to a clear statement of the construct to be measured, item specifications also include guidance about the instructions to be provided to the student. These are reviewed as part of the review process.

- **Maximum readability and comprehensibility:** One of the fundamental objectives of the item specification is to ensure that the items that are produced are as clear and comprehensible as possible. ATI assesses the readability of each of the items in its banks in multiple ways: Items are written with reference to vocabulary lists that indicate grade-appropriate vocabulary. In addition, for items associated with reading passages, Lexile® measures are also used.

- **Maximum legibility:** Legibility is supported in several ways. First, items are designed to be presented in a consistent fashion when administered online. For example, all images are constructed to conform with specifications that ensure legibility. Second, printing algorithms are also designed to use consistent fonts and item layouts. Third, assessments may be printed in large print formats.

### B. Providing the Full Range of Accommodations

In order to effectively assess the capabilities of ELL students and students with special needs, the following standard accommodations may be allowed for ATI benchmark and formative assessments. Determination regarding the use of these accommodations should be based on the student’s ELL status and/or the specific needs outlined in his or her Individualized Education Program (IEP) if one is in place.

- **Extended time:** Those students whose IEPs indicate that they would benefit from extra time can be allowed to have the time that they require.

- **Large print:** Large print versions of the tests may be easily provided for visually impaired students from the printing interface.

- **Use of a scribe:** A scribe may be provided to assist in recording a student’s answers to test items. The scribe must limit their assistance to recording the student’s responses as given.

- **Use of a screen reader:** A screen reader may be provided to assist visually impaired students to obtain information from text. The Galileo® K-12 Online testing interface has been designed to support the use of screen readers.

- **Oral presentation or translation of test items and directions:** It is permissible for the district to provide a proctor to read the directions and items aloud for ELL and special needs students. Oral translation may also be used.
• **Settings accommodations:** If a student’s IEP includes recommendations that the student be allowed to complete assessments in an alternative setting, then this should be allowed.

To assist in the analysis and interpretation of test scores involving ELL and/or special needs students, the district is provided with an interface in the online application to indicate the accommodations that were used, the students with whom they were used, the particular assessment to which the accommodations were applied, and the reason for the accommodation.

The interface also provides space for documenting any non-standard accommodations that may be required. It is recommended that these be covered with the district’s ATI Field Services Coordinator prior to the administration of the assessment as this will assist ATI to plan subsequent data analyses appropriately.

**IX. Assessment Design and Forecasting Effectiveness**

Customized benchmark assessments constructed in the Galileo® assessment component are used to inform instruction and to forecast performance on statewide assessments. Data on forecasting effectiveness can be found in the technical manual for the Galileo IIS (Bergan, Burnham, Bergan & Bergan, 2008). The discussion here focuses on assessment design requirements related to forecasting. Assessment design supporting forecasting effectiveness is based on two considerations: First, the assessments (e.g., benchmark assessments) used to forecast standards mastery must provide credible information regarding the likelihood that students will meet standards as determined by their performance on the statewide test. The technical manual provides evidence related to this issue. Second, assessments must assess standards that are targeted for instruction. If this were not the case, the assessment would not provide information that could be used to guide instruction. There are a variety of ways to design assessments to reflect what is targeted for instruction. The Galileo IIS has the technology that makes it possible to customize assessments to reflect the district curriculum. This technology makes it possible to customize thousands of assessments each year. Reports obtained from these assessments identify students at risk of not meeting standards. In addition, recommendations are made as to which standards should be addressed next in order to bring at-risk students on course to meet standards.

**X. Summary of Item Development and Test Construction Guidelines**

The material in this document provides a summary of guidelines ATI uses to inform item development and test construction for benchmark and formative assessments. Implementation of these guidelines has produced one of the largest benchmark and formative assessment item banks in the nation. Tools in the Galileo system have made it possible to produce thousands of reliable and valid customized assessments aligned to standards reflecting district curriculums. The guidelines have promoted the development of efficient assessments of standards mastery within the context of the time constraints and logistical needs of schools. The precision and quality assurance features of the development process have minimized errors. The ongoing research program that accompanies item development and test construction has produced thousands of tests that are both effective in diagnosing learning needs and in predicting standards mastery on statewide assessments. The accompanying sample item specifications illustrate the application of those guidelines in the item development process.
XI. Sample Item Specifications

The sample item specifications below include the following:

- ELA instructional effectiveness assessments for grades 3, 8, and 10
- Mathematics instructional effectiveness assessments for grades 3, 8, and 10
- Science instructional effectiveness assessments for grades 3, 8, and 10

These items are mapped to Arizona standards as well as standards in other states.
A. English Language Arts Grade 3

*English Language Arts Bank 03rd-04th Grade/Nonfiction

3 Expository: locate facts

Description:
Student is asked to locate a fact in an expository text.

Note: Please reserve cause-effect items for that spec, to ensure good distribution of items in CC.

Stimulus Attributes:
A grade-appropriate expository text

Stem Attributes:
What...? Who...? Where...?

Response Attributes:
The responses may be sentences or fragments. They should be of similar length, or balanced so that there are two longer, two shorter.

Response Explanations:
ACs: "This is not [stem]."
CA: a quotation from the text that shows the CA to the stem

Prototype:
from "Grizzly Bears in Montana"
How fast can grizzly bears run?

A. 8 miles per hour
Feedback: This is not how fast grizzly bears can run.

B. 35 miles per hour
Feedback: "Grizzly bears can run 35 miles per hour."

C. 800 miles per hour
Feedback: This is not how fast grizzly bears can run.

D. 1000 miles per hour
Feedback: This is not how fast grizzly bears can run.
## Depth of Knowledge:

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<th>Scale Name</th>
<th>Performance Objective</th>
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<tbody>
<tr>
<td>aesd-R03: 3rd Grade Reading</td>
<td>aesd-R03-S3C1-02 Locate facts in response to questions about expository text.</td>
</tr>
<tr>
<td>AZ CC-R03: 3rd Grade English Language Arts</td>
<td>AZ-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</td>
</tr>
<tr>
<td>AZ-R03: 3rd Grade Reading &amp; Literature</td>
<td>R03-S3C1-02. Locate facts in response to questions about expository text.</td>
</tr>
<tr>
<td>CA CC-R03: 3rd Grade English Language Arts</td>
<td>CA-CC-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</td>
</tr>
<tr>
<td>CA-R03: 3rd Grade Reading</td>
<td>CA-3RC2.3 Demonstrate comprehension by identifying answers in the text.</td>
</tr>
<tr>
<td>CC-R03: 3rd Grade English Language Arts</td>
<td>CC-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</td>
</tr>
<tr>
<td>CO CC-R03: 3rd Grade English Language Arts</td>
<td>CO-03.RAP.2a.i Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (CC-RI.3.1)</td>
</tr>
<tr>
<td>CO-TCAP-R03: 3rd Grade Reading</td>
<td>3.1.a Use a full range of strategies to comprehend materials (for example, directions, nonfiction material, rhymes and poems, and stories).</td>
</tr>
<tr>
<td>DC-E03: 3rd Grade Reading/English Language Arts</td>
<td>3.IT-E.2. Identify the facts given in a text.</td>
</tr>
<tr>
<td>FL-NGSSS-R03: Reading 03 Gr.</td>
<td>LA.3.2.2.2: The student will use information from the text to answer questions related to explicitly stated main ideas or relevant details;</td>
</tr>
<tr>
<td>HI CC-R03: 3rd Grade English Language Arts</td>
<td>HI-CC-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</td>
</tr>
<tr>
<td>HI-R03: 3rd Grade Language Arts</td>
<td>HI-LA.3.1.6 Locate information in a variety of grade-appropriate sources</td>
</tr>
<tr>
<td>IL CC-R03: 3rd Grade English Language Arts</td>
<td>IL-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</td>
</tr>
<tr>
<td>MA CC-R03: 3rd Grade English Language Arts</td>
<td>MA-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</td>
</tr>
<tr>
<td>MA-E03: 3rd and 4th Grade English Language Arts Curriculum Framework</td>
<td>R.13.9.3/4 Locate facts that answer the reader’s questions.</td>
</tr>
<tr>
<td>MA-E03: 3rd Grade English Curriculum Framework</td>
<td>R.13.9.3 Form questions about the text and locate facts/details in order to answer those questions.</td>
</tr>
<tr>
<td>MO CC-R03: 3rd Grade English Language Arts</td>
<td>CC-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</td>
</tr>
<tr>
<td>RI CC-R03: 3rd Grade English Language Arts</td>
<td>CC-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</td>
</tr>
<tr>
<td>TX-R03: 3rd Grade Reading</td>
<td>3.12C recognize and use parts of a book to locate information, including table of contents, chapter titles, guide words, and indices (1-3)</td>
</tr>
</tbody>
</table>
WA CC-R03: 3rd Grade English Language Arts

**CC-RI.3.1 Key Ideas and Details: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.**
B. English Language Arts Grade 8

*English Language Arts Bank 07th-08th Grade/Nonfiction/Fact and Opinion

8 Fact vs. opinion

Description:
Student is asked to distinguish fact from opinion.

Stimulus Attributes:
a grade-appropriate expository text, or none

Stem Attributes:
Which statement contains an opinion? Which sentence is an opinion?

Response Attributes:
The responses will be quotations from the text or standalone sentences, preferably on the same topic or in a logical sequence. The distractors should include examples of fact.

Prototype:
from "Hurricanes"

Which statement from the text contains an opinion?
A) "Hurricanes are severe tropical storms."
B) "There is nothing like living through a hurricane."
C) "Hurricanes rotate in a counter-clockwise direction around an 'eye.'"
D) "There is also evidence in Florida of hurricanes more than 1,000 years ago."
Correct answer: B
### Depth of Knowledge: Spec Question Type:

<table>
<thead>
<tr>
<th>Scale Name</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>aesd-R08: 8th Grade Reading</td>
<td>aesd-R08-S3C1-03 Distinguish fact from opinion in expository text, providing supporting evidence from text.</td>
</tr>
<tr>
<td>AZ-R08: 8th Grade Reading and Literature</td>
<td>R08-S3C1-03. Distinguish fact from opinion in expository text, providing supporting evidence from text.</td>
</tr>
<tr>
<td>CO-TCAP-R08: 8th Grade Reading</td>
<td>8.4.c Differentiate fact from opinion in a variety of texts.</td>
</tr>
<tr>
<td>RI-R08: 8th Grade Reading</td>
<td>R08-8.4 Distinguishing fact from opinion, and identifying possible bias/propaganda or conflicting information within or across texts.</td>
</tr>
<tr>
<td>TN-E08: 8th Grade English Language Arts</td>
<td>TN-SPI 0801.5.7 Differentiate between fact and opinion.</td>
</tr>
<tr>
<td>TX-R08: 8th Grade Reading</td>
<td>8.10J distinguish fact and opinion in various texts (4-8)</td>
</tr>
</tbody>
</table>
C. English Language Arts Grade 10

*English Language Arts Bank 09th-10th Grade/Miscellaneous/Graphic Organizer

10 Graphic Organizer Add info LIT

Description: Student is asked which additional piece of information would best fit in a graphic organizer.

Stimulus Attributes: Grade-appropriate literary text with an accompanying graphic organizer.

Stem Attributes: Which would best complete this ___________?/ What information can be added to this ___________?

Response Attributes: May be fragments or complete sentences, but must be consistent across all options as well as consistent with the given information in the graphic organizer. Logical choices not in the text can be used, choices already in the GO can be used, choices from other places in the text can be used.

Prototype Question

from "October and June" and "5W Chart: October and June"

Which would best complete the space next to "Where?" in the chart?

☐ A. Spain
☐ B. New York
☒ C. Tennessee
☐ D. Florida
## Depth of Knowledge:

<table>
<thead>
<tr>
<th>Scale Name</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ CC-R10: 10th Grade English Language Arts</td>
<td>AZ-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
<tr>
<td>AZ-R10: 10th Grade Reading and Literature</td>
<td>R10-S1C6-03. Use graphic organizers in order to clarify the meaning of the text.</td>
</tr>
<tr>
<td>CA CC-R10: 10th Grade English Language Arts</td>
<td>CA-CC-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
<tr>
<td>CC-R10: 10th Grade English Language Arts</td>
<td>CC-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
<tr>
<td>CO-TCAP-R10: 10th Grade Reading</td>
<td>10.1.e Summarize, synthesize, and evaluate literary, expository, and technical texts.</td>
</tr>
<tr>
<td>FL-NGSSS-R10: Reading 10 Gr</td>
<td>LA.10.1.7.8: The student will use strategies to repair comprehension of grade-appropriate text when self-monitoring indicates confusion, including but not limited to rereading, checking context clues, predicting, note-making, summarizing, using graphic and semantic organizers, questioning, and clarifying by checking other sources.</td>
</tr>
<tr>
<td>HI CC-R10: 10th Grade English Language Arts</td>
<td>HI-CC-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
<tr>
<td>IL CC-R10: 10th Grade English Language Arts</td>
<td>IL-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
<tr>
<td>MA CC-R10: 10th Grade English Language Arts</td>
<td>MA-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
<tr>
<td>MO CC-R10: 10th Grade English Language Arts</td>
<td>CC-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
<tr>
<td>RI CC-R10: 10th Grade English Language Arts</td>
<td>CC-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
<tr>
<td>RI-R10: 10th Grade Reading</td>
<td>R10-7.1C Obtaining information from text features [e.g., table of contents, glossary, index, transition words/phrases, transitional devices (including use of white space), bold or italicized text, headings, subheadings, graphic organizers, charts, graphs, or illustrations].</td>
</tr>
<tr>
<td>TX-English II: English II</td>
<td>2E.7D construct images such as graphic organizers based on text descriptions and text structures;</td>
</tr>
<tr>
<td>WA CC-R10: 10th Grade English Language Arts</td>
<td>CC-RL.10.2 Key Ideas and Details: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</td>
</tr>
</tbody>
</table>
D. Mathematics Grade 3

*Math Bank 3rd-5th Grade/Operations/Decimals/Money

money - count money $10 to $20

**Item Class Description:** Students are asked to count money $10.00 through $20.00 using pictures or actual bills and coins.

**Notes:** This specification should be limited to amounts between $10 and $20.

**Rationale:** Many state released items are more wordy. This specification eliminates extraneous words to benefit ELL learners.

**Stimulus Attributes:** Each item has a picture of money, coins and/or bills, with a total of no more than twenty dollars. All money is realistic looking. When more than one of the same bill is used, bills may be overlapped so that denominations are shown, but less space is taken up. When both bills and coins are shown, bills are on the left and/or above the coins. Note that the maximum total value is $20 so if a $20 bill is used, there are no coins. Also, items which are less than $10 should be in the specification: money - count money through $10.

**Stem Attributes:** Each item is of the form "How much money is shown?"

**Response Attributes:** Each item has four responses, written in the monetary form $x.yy where x ranges from 0 through 20 and y ranges from 0 through 9.

If using monetary values less than $1.00, the four responses will be written in the form yy ¢, where y ranges from 0 through 9 or in the form of $x.xx.

**Prototype Question**

How much money is shown?

- A. $5.10
- B. $10.10
- C. $15.55
- D. $55.55
## Depth of Knowledge:

<table>
<thead>
<tr>
<th>Scale Name</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>aesd-M03: 3rd Grade Math</td>
<td>aesd-M03-S1C1-15 Count amounts of money through $20.00 using pictures or actual bills and coins.</td>
</tr>
<tr>
<td>aesd-M03: 3rd Grade Math 09-10</td>
<td>aesd-M03-S1C1-03 Count and represent money with coins and bills to $100.00.</td>
</tr>
<tr>
<td>AZ-M03: 09-10 3rd Grade Math</td>
<td>M03-S1C1-03. Count and represent money using coins and bills to $100.00.</td>
</tr>
<tr>
<td>AZ-M03: 3rd Grade Math</td>
<td>M03-S1C1-15. Count amounts of money through $20.00 using pictures or actual bills and coins.</td>
</tr>
<tr>
<td>CA-M02: 2nd Grade Math</td>
<td>CA-M02-NS.5.1 Solve problems using combinations of coins and bills.</td>
</tr>
<tr>
<td>CO-M0Allgrades: CO Unmappable Math Specs</td>
<td>General Math</td>
</tr>
<tr>
<td>MA-M03: 3rd Grade Mathematics Curriculum Framework</td>
<td>3.N.8 Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money.</td>
</tr>
<tr>
<td>TN-M0Allgrades: TN Unmappable Math Specs</td>
<td>general math</td>
</tr>
<tr>
<td>TX-M03: 3rd Grade Math</td>
<td>3.1C determine the value of a collection of coins and bills</td>
</tr>
</tbody>
</table>
E. Mathematics Grade 8

*Math Bank 6th-8th Grade/Algebra/Analysis of Change/Identify Change in Object Over Time

Is the relationship linear? (context)

Item Type: Standalone MC

Rationale: This set of items is designed to assess AZ standard M08-S5C2-12.

Objective: Students will be able to identify a pair of statements that (1) correctly answers whether the relationship between two quantities is linear and (2) provides a valid reason for the answer.

Item Class Description: A situation is presented, and two quantities are defined. Students must decide whether the relationship between the two quantities is linear and identify a valid explanation of why such is the case.

Stimulus Attributes: situation presented (text); quantities x and y defined; illustration of the changes in quantities (optional)

Stem Attributes: "Is the relationship between quantities x and y linear?"

Response Attributes: Distractors consist of four pairs of statements. Two distractors affirm that the relationship is linear, followed by differing explanations as to why. The other two negate that the relationship is linear, offering explanations as to why. Explanations offered in incorrect distractors may vary; explanations offered in correct distractors will address whether or not one of the quantities increases uniformly with respect to uniform increases in the other.
Prototype Question

Starla filled a kid-sized pool in 4 minutes. The amount of water in the pool after each minute is shown below, and the quantities \( x \) and \( y \) are defined as follows:

\( x \) = number of minutes since Starla began filling the pool
\( y \) = total amount of water in the pool

Is the relationship between quantities \( x \) and \( y \) linear?

- 20 gallons
- 25 gallons
- 35 gallons
- 50 gallons

- A. Yes; each minute, the number of gallons of water added increased by 5.
- B. Yes; each minute, the number of gallons of water in the pool increased by the same amount.
- C. No; each minute, the number of gallons of water in the pool did NOT increase by the same amount.
- D. No; the amount of water added in the first minute cannot be determined.
## Depth of Knowledge:

<table>
<thead>
<tr>
<th>Scale Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>AZ-M08: 09-10 8th Grade Math</td>
<td><strong>M08-S5C2-12.</strong> Make, validate, and justify conclusions and generalizations about linear relationships.</td>
</tr>
</tbody>
</table>
F. Mathematics Grade 10

*Math Bank High School/Structure and Logic/Logic/Logic in General

Logic - state inverse, converse, or contrapositive

Description and definitions: This PO asks students to state the inverse, converse, or contrapositive of a given statement.

inverse- Given “If p, then q”, the inverse is “If -p, then -q”.

converse- Given “If p, then q”, the converse is “If q, then p”.

contrapositive - Given “If p, then q”, the contrapositive is “If -q, then -p”.

Stimulus Attributes: none

Stem Attributes: “What is the inverse (converse/contrapositive) of the statement below?”, followed by a line space and an “If, then” statement.

Response Attributes: There are four responses that are “If, then” statements and include inverse, converse, contrapositive of the original conditional.

Prototype Question

What is the contrapositive of the statement below?

If a polygon is a parallelogram, then it is a quadrilateral.

A. If a polygon is a parallelogram, then it is a quadrilateral.
B. If a polygon is a quadrilateral, then it is a parallelogram.
C. If a polygon is not a parallelogram, then it is not a quadrilateral.
D. If a polygon is not a quadrilateral, then it is not a parallelogram.
## Depth of Knowledge:

<table>
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<tr>
<th>Scale Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>AZ-MHS: 09-10 High School Math</td>
<td>MHS-S5C2-09. State the inverse, converse, and contrapositive of a given statement and state the relationship between the truth value of these statements and the original statement.</td>
</tr>
<tr>
<td>AZ-MHS: Math</td>
<td>MHS-S5C2-11. State the inverse, converse, or contrapositive of a given statement.</td>
</tr>
<tr>
<td>CA-GEO: Geometry</td>
<td>CA-GEO.3.0 Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement.</td>
</tr>
<tr>
<td>CO-M0 Allgrades: CO Unmappable Math Specs</td>
<td>General Math</td>
</tr>
<tr>
<td>DC-MG: Geometry</td>
<td>G.G.9. Distinguish between postulates and theorems. Use inductive and deductive reasoning, as well as proof by contradiction. Given a conditional statement, write its inverse, converse, and contrapositive.</td>
</tr>
<tr>
<td>MA-M0 9th and 10th Grade Mathematics Curriculum Framework</td>
<td>G.G.2 Write simple proofs of theorems in geometric situations, such as theorems about congruent and similar figures, parallel or perpendicular lines. Distinguish between postulates and theorems. Use inductive and deductive reasoning, as well as proof by contradiction. Given a conditional statement, write its inverse, converse, and contrapositive.</td>
</tr>
<tr>
<td>TN-MO Allgrades: TN Unmappable Math Specs</td>
<td>general math</td>
</tr>
<tr>
<td>TX-Geometry: Geometry</td>
<td>G.3A determine the validity of a conditional statement, its converse, inverse, and contrapositive;</td>
</tr>
</tbody>
</table>
G. Science Grade 3

*Science Bank Grade 03-05 EARTH/3. Earth Science/B. Geology/1. Earth Processes and Structures/Fossils and History of Life

Describe How Fossils Form I

Describe How Fossils Form I

Notes: grades 3-5.

Item Class Definition: Students can describe how fossils are formed.

Definitions:

Mold fossils--animal or plant remains leave a mold in sediment that hardens into a rock.

Cast fossils--Minerals fill in a mold formed in sediment by plant or animal remains; the minerals create the shape of the plant or animal.

Imprint fossils--animal footprints or thin materials such as leaves or insect wings can create a mold in mud or sediment that eventually turns into rock.

Amber fossils--When an insect or other organism gets trapped in tree sap that hardens into amber. The remains of the organism are preserved in true form.

Tar pit fossils--are another example of true-form fossils. When animals walked into tar pits accidentally, they got stuck in them, and their bones were preserved.

Stimulus Attributes: No stimulus is necessary.

Stem Attributes: The stem should read, "How do ________ (amber, rock, tar pit, etc.) fossils form?"

Response Attributes: The correct response will describe how the identified fossil type forms. Distractors may describe the formation of other types of fossils. Responses should not exceed a sentence and should be similar in structure and length.

Prototype Question

How do amber fossils form?

☐ A. from rock that forms a mold
☐ B. from tree sap that hardens
☐ C. from water that freezes in rocks
☐ D. from sand that sticks together
<table>
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<tr>
<th>Scale Name</th>
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<tbody>
<tr>
<td>AZ-S03: 3rd Grade Science</td>
<td>S03-S6C1-05 Describe how fossils are formed.</td>
</tr>
<tr>
<td>CO-TCAP-S05: 5th Grade Science</td>
<td>5.4.1.b Predict or infer how fossils are formed from previously living organisms.</td>
</tr>
</tbody>
</table>
H. Science Grade 8


Edit Questions | Review/Certify | Bank Builder

Identify Matter Based on Chem. Properties (pH)

Identify Matter Based on Chemical Properties (pH)

Notes: grades 6-8.

Item Class Definition: Identify matter based on chemical properties (pH)

Rationale: Items will test students' knowledge of how the pH scale works, but without requiring that they have memorized where various substances fall on the scale.

Stimulus Attributes: The pH Scale Item Family should be used, or some other graphic showing the pHs of various substances should be included.

Stem Attributes: The stem may vary slightly in wording, but should ask the student to interpret the pH values of substances. "(According to the pH scale,) Which of these substances (foods, etc.) is most (most or least) basic (or acidic or neutral)?" or "...which of these substances would... (most neutralize an acidic food, etc.)?"

Response Attributes: Responses should consist of substances shown on the pH scale or in some other table/graphic.

Prototype Question

from "pH Scale"

According to the pH scale, which of these substances is most acidic?

☐ A. milk
☐ B. milk of magnesia
☐ C. egg white
☐ D. black coffee
<table>
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<tr>
<th>Scale Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>AZ-S08: 8th Grade Science</td>
<td>S08-S5C1-02 Identify different kinds of matter based on the following chemical properties: reactivity; pH; oxidation (corrosion).</td>
</tr>
<tr>
<td>CA-S08: 08th Grade Science</td>
<td>CA-S08-PS5.e Students know how to determine whether a solution is acidic, basic, or neutral.</td>
</tr>
<tr>
<td>HI-S06: 6th Grade Science</td>
<td>HI-SC.6.6.6 Nature of Matter: Describe and compare the physical and chemical properties of different substances</td>
</tr>
<tr>
<td>RI-S08: Eighth Grade Science</td>
<td>RI-PS1-08-2b. Students demonstrate an understanding of characteristic properties of matter by classifying and comparing substances using characteristic properties (e.g., solid, liquid, gas; metal, non-metal).</td>
</tr>
</tbody>
</table>
I. Science High School

*Science Bank Grade 09-12 EARTH/4. Earth Science/A. Space Science/1. Stars

Edit Questions | Review/Certify | Bank Builder

Analyze Evolution of Stars I (HR)

Analyze Evolution of Stars Using a Hertzsprung-Russell Diagram I

Notes: This spec is for HS.

Item Class Description: Analyze the evolution of various types of stars using an HR diagram.

Definitions:

Stimulus Attributes: The stimulus should provide an HR diagram.

Stem Attributes: "What is the best explanation for why... (question dealing with an observation from the HR diagram--why something is the way it is, what it means, etc.)?"

Response Attributes: Responses should offer possible explanations of the observation indicated in the stem. Just as the CA does, distractors should concern various factors/attributes represented or suggested in the diagram.

Prototype Question

from "Hertzsprung-Russell Diagram I"

What is the best explanation for why star #4 shares about the same luminosity as star #6 despite being far hotter?

- A. Star #4 is blue, whereas star #6 is red.
- B. Star #4 has less surface area than star #6.
- C. Star #4 emits much more total energy than star #6 emits.
- D. Star #4 is at the beginning of its life cycle, whereas star #6 is at the end of its life cycle.
### Depth of Knowledge: Spec Question Type:

<table>
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<tr>
<th>Scale Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>AZ-SHS: Science</td>
<td><strong>SHS-S6C4-03</strong> Analyze the evolution of various types of stars using the Hertzsprung-Russell (HR) diagram.</td>
</tr>
<tr>
<td>CA-SHS-ES: CA-SHS-Earth Science</td>
<td><strong>CA-S09-12-ES2.d</strong> Students know that stars differ in their life cycles and that visual, radio, and X-ray telescopes may be used to collect data that reveal those differences.</td>
</tr>
<tr>
<td>CO-TCAP-S10: 10th Grade Science</td>
<td><strong>10.4.16.a</strong> Classify stars based on their characteristics in a data table such as Hertzsprung-Russell diagram.</td>
</tr>
<tr>
<td>RI-SHS: High School Science</td>
<td><strong>RI-ESS3-HS-8a</strong> Students demonstrate an understanding of the life cycle of stars by relating the process of star formation to the size of the star and including the interaction of the force of gravity, fusion, and energy release in the development of the star</td>
</tr>
</tbody>
</table>
XII. Text References


