



WASHINGTON
COMPREHENSIVE
ASSESSMENT OF SCIENCE

Online Style Guide

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Section 1: Introduction

This document provides style guidance to assessment developers engaged in developing standalone items and item clusters for the Washington Comprehensive Assessment of Science (WCAS). The WCAS measures the level of proficiency that Washington students have achieved based on the [Washington State 2013 K-12 Science Learning Standards](#).

- [The grade 5 WCAS assesses the 3-5 band of the state science standards.](#)
- [The grade 8 WCAS assesses the middle school band of the state science standards.](#)
- [The grade 11 WCAS assesses the high school band of the state science standards.](#)

Test Design and Item Specifications

The Test Design and Item Specifications documents are a technical description of the WCAS that ensures the assessment will validly measure the science standards in a reliable manner every year. The test design component of the documents includes information about the structure of the standalone items and item clusters that comprise the WCAS, the annual assessment development cycle, online test delivery considerations, and the state science standards. The item specifications component of the documents supports multidimensional item development and alignment.

- [Grade 5 Test Design and Item Specifications](#)
- [Grade 8 Test Design and Item Specifications](#)
- [High School Test Design and Item Specifications](#)

Online WCAS Training Tests

The Training Tests for the Washington Comprehensive Assessment of Science (WCAS) for grades 5, 8, and high school are available on the [WCAP Portal](#). Please see the [Quick Start Guide](#) for information about accessing the WCAS training tests as a Guest User or through the secure browser.

Training Test lesson plans are available for each grade-level test. These documents include ways to practice using the tools for each item type, an answer key, and standards alignment for each item on the Training Tests.

- [Grade 5 Training Test Lesson Plan](#)
- [Grade 8 Training Test Lesson Plan](#)
- [Grade 11 Training Test Lesson Plan](#)

Critical Companion Guides:

- AIR Technical Guidelines for Creating Online Items (Updated 03/06/2019)
- OSPI Item Development Template and Headers

Additional References

The Chicago Manual of Style, 16th Edition and Merriam-Webster’s Collegiate Dictionary, 11th Edition may be used for additional guidance.

Section 2: General Specifications

The following specifications apply to item and stimulus entry into CAI’s item tracking system (ITSx). Font and alignment guidance for item writing Word documents are included in the companion item writing templates (see page 4).

ITSx Layout

Standalone items—Layout 8

Item Clusters—Layout 24

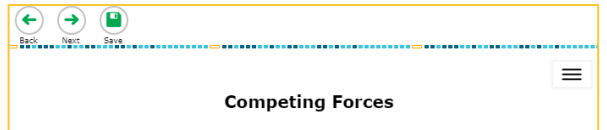
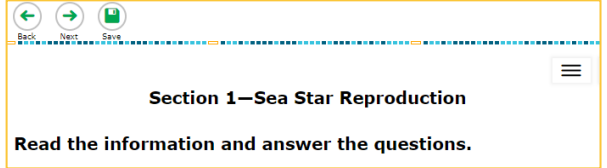
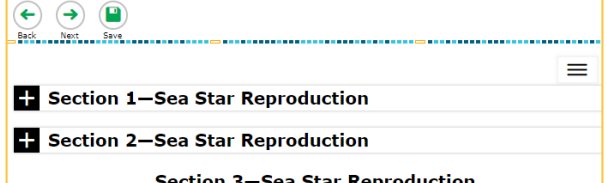
See the AIR Technical Guidelines for Creating Online Items (Updated 03/06/2019) for more information on Layout options.

Font and Alignment

Cluster Titles

An item cluster is always given a title. **Table 1** shows general specifications for cluster titles.

Table 1: Cluster Titles

ITSx Font	Stimuli	Title Description	Example from WCAS Training Test
<p>The title is 14 pt. Verdana bold, centered, and precedes the text for the stimulus in a cluster.</p> <p>Below the title, in 14 pt. Verdana bold and left-aligned, is the general direction.</p> <p>The general direction follows the first stimulus only.</p>	One Stimulus Section	One Stimulus	
	Multiple Stimulus Sections	First Stimulus Section	
		Second and Third Stimulus Sections	

NOTE: The dash between the section number and cluster title is an em dash.

Table 2 shows general font and alignment specifications for different text elements for stimuli and items. All text should be displayed on a white background.

Table 2: Content Alignment

Content	ITSx Font	Alignment
Items	14 pt. Verdana	Left-aligned
Part headings in items	14 pt. Verdana Bold	Left-aligned
Emphasis terms	14 pt. Verdana Bold	NA
Stimulus/Section Directions	14 pt. Verdana Bold	Left-aligned

Section 3: Item Type Styles

Templates for stimulus and item development are available separately from this style guide. The templates were designed to be used **in coordination with** this style guide for item development and the entry of stimuli, items, item rubrics, and human-readable rubrics (HRR) into the online system.

The templates are updated prior to the beginning of a development cycle. **Table 3** lists the current file names for the stimulus and item development templates.

Table 3: Current File Name and Version

Edit Task Inline Choice Template_11.2019	Multi-Part Item Template_11.2019
Grid or GGM Item Template_11.2019	Short Answer Template_11.2019
Hot Text Template_11.2019	Header Templates_11.2019
Matching Item Template_11.2019	Stimulus Template_11.2019
MC-MS Template 2020_11.2019	Table Input Template_11.2019

The item types used for the WCAS are describes in tables 4 through 14. The guidelines are applicable to both ITSx entry and item writing Word documents.

Table 4: Multipart Items

General	<p>Boilerplate language is added to the first line of the first item part.</p> <ul style="list-style-type: none"> For two-part items use: The following question has two parts. First, answer part A. Then, answer part B. For three-part items use: The following question has three parts. First, answer part A. Next, answer part B. Then, answer part C. <p>Each item part label (Part A, Part B, Part C) is capitalized and bolded before the stem of its item part. There should be one line space between the item part label and the stem of the item part and one line space before the next item part label.</p>
Task Statements	Follow the guidelines for the item type used for each part. If an item part is an MC, use MC style. If the item part is Grid, follow Grid style...etc.

<p>Example(s)</p>	<p>The following question has two parts. First, answer part A. Then, answer part B.</p> <p>Part A</p> <p>Predict what could happen to the number of mice if a windstorm causes all of the volcanic rock in the desert to be covered with sand for many years.</p> <p>Click each box and select a word or phrase to complete the sentences.</p> <p>The population of the light-colored mice would <input type="text"/> over time.</p> <p>The population of the dark-colored mice would <input type="text"/> over time.</p> <p>Part B</p> <p>Which statement gives a reason for the answer to part A?</p> <p>Ⓐ More dark-colored mice will be able to find seeds in the sand.</p> <p>Ⓑ Both light-colored mice and dark-colored mice will need volcanic rock to survive.</p> <p>Ⓒ Both light-colored mice and dark-colored mice will dig in the sand to hide from predators.</p> <p>Ⓓ More light-colored mice will survive and reproduce because they cannot be seen well on sand.</p>
<p>Guidelines</p>	<p>For the stem in a part B or part C that refers back to a previous item part, do not use "... the answer you chose in part A." This suggests that the student can get credit for pairing part A and B correctly but not selecting the correct answer to the question for part A.</p>
<p>Human Readable Rubric (HRR)</p>	<p>A full credit (2 point) response includes</p> <ul style="list-style-type: none"> • "decreased" selected for the first blank AND "increased" selected for the second blank in part A <p>AND</p> <ul style="list-style-type: none"> • "The total mass of the sun decreases because some mass is converted to energy" selected in part B. <p>A partial credit (1 point) response includes</p> <ul style="list-style-type: none"> • "decreased" selected for the first blank AND "increased" selected for the second blank in part A <p>OR</p> <ul style="list-style-type: none"> • "The total mass of the sun decreases because some mass is converted to energy" selected in part B.
<p>Exemplar</p>	<p>Follow the guidelines for the item type used for each part. If an item part is an MC, use MC style. If the item part is Grid, follow Grid style...etc.</p>
<p>Assertions</p>	<p>One assertion is written for each item part, regardless of score point. The exception: Assertions are not written for items where one part is the short answer item type.</p>

Table 5: Edit Task Inline Choice Items (ETC)

General	ETC Items have blanks with drop down lists of words, phrases, letters, numbers, or chemical formulas for students to select.
Task Statements	Task statements are directives that always include “Click each box and select a ...” or “...click each box and select a...”
Example(s)	<p>Click each box and select a word to describe how a mutation could result in a change to the sticky foot trait.</p> <p>A mutation changes the structure of the <input type="text"/>, which can change the structure and function of the <input type="text"/>.</p> <hr/> <p>Based on information from the Juan de Fuca Ridge diagram, click each box and select a word to complete the sentence.</p> <p>As the distance from the Juan de Fuca Ridge <input type="text"/>, the age of the oceanic crust in the Juan de Fuca Plate <input type="text"/>.</p> <hr/> <p>Click each box and select a word or phrase to describe the answer to part A.</p> <p>The model represents <input type="text"/> feedback, because as the air temperature increases over time, the amount of sea ice melting will <input type="text"/> over time, causing the ecosystem to <input type="text"/>.</p>
Guidelines	<ol style="list-style-type: none"> 1. There can be more than one combination of correct choices. 2. There should be no more than 3 dropdowns in an ETC item. 3. Each choice should be no more than 3-4 words. 4. The dropdowns can include numbers or chemical formulas in addition to words and phrases.
Human Readable Rubric (HRR)	<p>Examples:</p> <p>A full-credit (1 point) response includes:</p> <ul style="list-style-type: none"> • “increased” selected for the first blank; <p>AND</p> <ul style="list-style-type: none"> • “increased” selected for the second blank. <p>OR</p> <ul style="list-style-type: none"> • “decreased” selected for the first blank; <p>AND</p> <ul style="list-style-type: none"> • “decreased” selected for the second blank.
Exemplar	N/A
Assertions	The student selected “increased” for the first blank and “increased” for the second blank OR “decreased” for the first blank and “decreased” for the second blank.

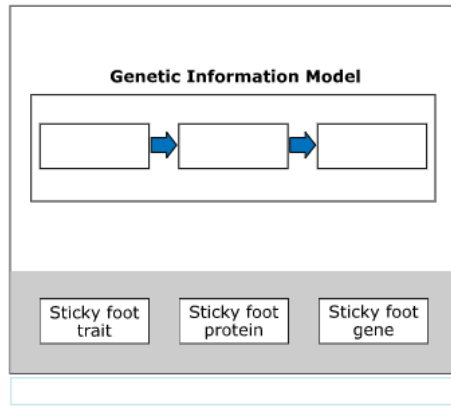
Table 6: Grid Items (GI)

<p>General</p>	<p>Grid items ask students to:</p> <ul style="list-style-type: none"> • Drag and Drop: Drag and drop labels or images in a specific answer space. Draggers may be refreshable or non-refreshable. The dragger palette may appear on the left, right, above, or below the answer space. • Hotspot: Select text/graphics/location, etc. on a background graphic, or make a bar graph. • Graph: Construct line graphs, plot points, or draw arrows. <p>Use Grid Item (GI) type for graphing and add arrow items. Use only for drag and drop items in which specific drop spots cannot be required. See 21728 as an example.</p> <p>See Appendix A for more information about layouts, dimensions, and utility.</p>
<p>Task Statements</p>	<p>Drag and Drop Items:</p> <ul style="list-style-type: none"> • Generic task statement: "Move the... into the... to..." • Example: "Move the labels into the boxes to show where each element is located in the periodic table." <p>Hotspot:</p> <ul style="list-style-type: none"> • Generic task statement: "Select the..." • Example: "Select the frog that is best camouflaged by the plants in the pond ecosystem." • Example: "Select the point on the Populations of Turtles graph where the top of each bar should be to identify the number of turtles in each population." <p>Graph: Requires the student to use the "Add Point," "Connect Line," and/or "Add Arrow" tools.</p> <ul style="list-style-type: none"> • Generic task statement: "Use..." • Example: "Use the Add Arrow tool to show the direction each object moves after the collision."

Example(s)

Drag and Drop:

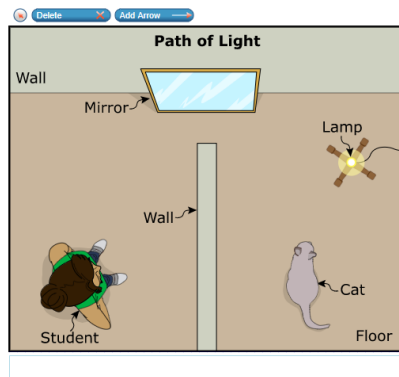
Move the labels into the boxes to show the flow of genetic information in the tube feet cells.



Graph:

A student uses a mirror to see a cat on the other side of a wall as shown in the Path of Light model. The model shows the view from above the wall.

Use the Add Arrow tool to show the path of light when the student sees the cat.

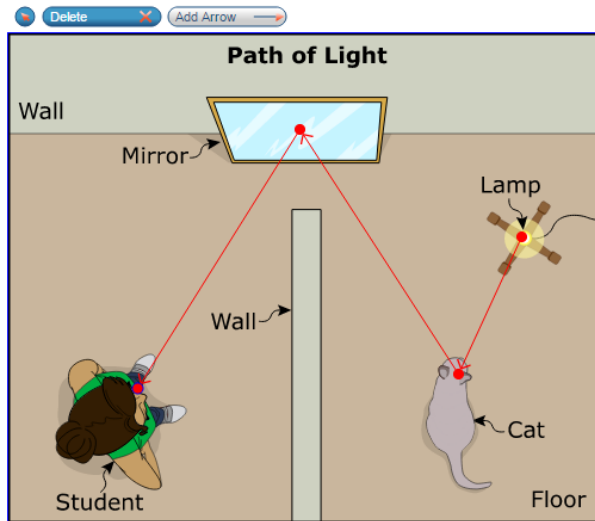


<p>Guidelines</p>	<ul style="list-style-type: none"> • Guideline statements: <ul style="list-style-type: none"> ○ The following can be included after the main task statement as needed: <ul style="list-style-type: none"> ▪ Move only one [...] into each box. ▪ [...] may be used once, more than once, or not at all. ▪ All [...] must be used. ▪ [...] may be used more than once. ▪ Not all [...] may be used. ○ Use specific references to the dragger (object, organism, label, etc.). ○ When there is only a task statement, the statement is left justified. ○ When there is a task statement plus one or more guideline statements, all of the statements are bulleted and indented. • Response boxes in the grid background are referred to as “boxes” in task statements. Do not refer to “correct,” “appropriate boxes,” etc. • Use consistent language in the stem, palette objects, and answer space to help the student navigate the various components of the item. <ul style="list-style-type: none"> ○ If the item is about Jupiter, the various components of the item should use the word “Jupiter” and not the more general “planet”. ○ If the palette objects are referred to as “birds” in the task statements, they should be referred to as “birds” in any additional guidelines. ○ Extend the consistency to rubrics and scoring assertions. • Whenever possible, refer to the material in the answer space in specific terms (“...in the model...”, “...in the table...”, “...in the graph”, etc.). Do not refer to “...answer space...” • References in the stem to diagram headings and grid background titles should have the same capitalization as headings and titles but are not bolded. For example: “Move the arrows into the boxes in the Forest Food Web diagram to model the flow of energy in a forest ecosystem.” • Whenever possible, refer to the palette objects and groups of palette objects in specific terms (e.g., “chemical elements,” “organisms,” etc.). • References to two or more palette objects should be lowercased. For example: “Move the objects into the boxes to complete the Timeline model.” • If the palette objects are images only, use lower case references to them in the stem. For example: “Move the organisms into the boxes to show one way energy flows in the desert ecosystem.” • When it’s not possible to refer to palette objects in specific terms: <ul style="list-style-type: none"> ○ A palette object that includes a picture, with or without a label, is referred to in the item as an “object/picture/diagram/etc.” ○ A palette object that is text only can be referred to as a “label/name/etc.” ○ A mixed collection of palette objects can be referred to as “object/label.” ○ Do not use the term “palette object.”
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<p>Human Readable Rubric (HRR)</p>	<ul style="list-style-type: none"> • It is not necessary to use quotes for references to palette objects or graphic labels in the written rubrics. • Palette objects with text are capitalized as their labels are capitalized and are not described as “the ‘Maple tree’ object”. • Palette objects or response box locations with no text should be described. Example: “the picture of a new moon.” <p>Drag and Drop A full-credit (1 point) response includes:</p> <ul style="list-style-type: none"> • "Sticky Foot Genes" moved to the left-most box; <p>AND</p> <ul style="list-style-type: none"> • "Sticky Foot Proteins" moved to the middle box; <p>AND</p> <ul style="list-style-type: none"> • "Sticky Foot Trait" moved to the right-most box. <p>Graph A full-credit (1 point) response includes:</p> <ul style="list-style-type: none"> • an arrow that starts at the lamp and ends at the cat; <p>AND</p> <ul style="list-style-type: none"> • an arrow that starts at the cat and ends at the mirror; <p>AND</p> <ul style="list-style-type: none"> • an arrow that starts at the mirror and ends at the student's eyes; <p>AND</p> <ul style="list-style-type: none"> • no other arrows drawn. <p>Drag and Drop A full-credit (2 point) response includes:</p> <ul style="list-style-type: none"> • the red bird moved to the smallest birdhouse region; <p>AND</p> <ul style="list-style-type: none"> • the black bird moved to the power lines. <p>OR</p> <ul style="list-style-type: none"> • the red bird moved to the smallest birdhouse region; <p>AND</p> <ul style="list-style-type: none"> • the black bird moved to the roof. <p>A partial credit (1 point) response includes:</p> <ul style="list-style-type: none"> • the red bird moved to the smallest birdhouse region; <p>OR</p> <ul style="list-style-type: none"> • the black bird moved to the power lines; <p>OR</p> <ul style="list-style-type: none"> • the black bird moved to the roof.
<p>Exemplar</p>	<p>Drag and Drop</p>



Graph



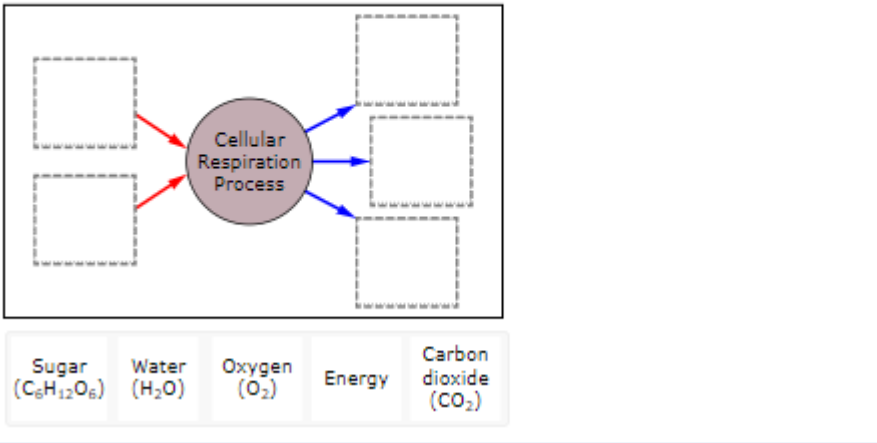
Assertions

Hotspot: The student selected the fifth box from the left.

Graph: The student drew one arrow from the lamp to the cat and one arrow from the cat to the mirror and one arrow from the mirror to the student's eyes.

Drag and Drop: The student moved "Sticky Foot Genes" into the left-most box and "Sticky Foot Proteins" into the middle box and "Sticky Foot Trait" into the right-most box.

Table 7: Graphic Gap Match (GGM)

<p>General</p>	<p>Graphic Gap Match items ask students to drag and drop labels or images in a specific answer space. Draggers may be refreshable or non-refreshable. The draggers may appear on the left, right, above, or below the answer space.</p> <p>GGM should always be used for drag and drop unless specific drop spots cannot be required. See 21728 as an example.</p> <p>See Appendix A for more information about layouts, dimensions, and utility.</p>
<p>Task Statements</p>	<p>Task statements are directives that always include “Move the... into the... to...”</p> <p>Example: “Move the labels into the boxes to show where each element is located in the periodic table.”</p>
<p>Example(s)</p>	<p>Move the labels into the boxes to show the inputs and outputs of cellular respiration.</p> <ul style="list-style-type: none"> • Move only one label into each box. • Labels may be used once, more than once, or not at all. 
<p>Guidelines</p>	<ul style="list-style-type: none"> • Guideline statements: <ul style="list-style-type: none"> ○ The following can be included after the main task statement as needed: <ul style="list-style-type: none"> ▪ Move only one [...] into each box. ▪ [...] may be used once, more than once, or not at all. ▪ All [...] must be used. ▪ [...] may be used more than once. ▪ Not all [...] may be used. ○ Use specific references to the dragger (object, organism, label, etc.). ○ When there is only a task statement, the statement is left justified. ○ When there is a task statement plus one or more guideline statements, all of the statements are bulleted and indented. • Response boxes in the grid background are referred to as “boxes” in task statements. Do not refer to “correct,” “appropriate boxes,” etc.

	<ul style="list-style-type: none"> • Use consistent language in the stem, draggers, and answer space to help the student navigate the various components of the item. <ul style="list-style-type: none"> ○ If the item is about Jupiter, the various components of the item should use the word “Jupiter” and not the more general “planet.” ○ If the draggers are referred to as “birds” in the task statements, they should be referred to as “birds” in any additional guidelines. ○ Extend the consistency to rubrics and scoring assertions. • Whenever possible, refer to the material in the answer space in specific terms (“...in the model...”, “...in the table...”, “...in the graph”, etc.). Do not refer to “...answer space...” • References in the stem to diagram headings and grid background titles should have the same capitalization as headings and titles but are not bolded. For example: “Move the arrows into the boxes in the Forest Food Web diagram to model the flow of energy in a forest ecosystem.” • Whenever possible, refer to the draggers in specific terms (e.g., “chemical elements,” “organisms,” etc.). • References to two or more draggers should be lowercased. For example: “Move the objects into the boxes to complete the Timeline model.” • If the draggers are images only, lower case references to them in the stem. For example: “Move the organisms into the boxes to show one-way energy flows in the desert ecosystem.” • When it’s not possible to refer to draggers in specific terms: <ul style="list-style-type: none"> ○ A dragger that includes a picture, with or without a label, is referred to in the item as an “object/picture/diagram/etc.” ○ A dragger that is text only can be referred to as a “label/name/etc.” ○ A mixed collection of draggers can be referred to as “object/label.” • Do not use the term “dragger.”
<p>Human Readable Rubric (HRR)</p>	<ul style="list-style-type: none"> • It is not necessary to use quotes for references to draggers or graphic labels in the written rubrics. • Draggers with text are capitalized as their labels are capitalized and are not described as “the ‘Maple tree’ object.” • Draggers or response box locations with no text should be described. Example: “the picture of a new moon.” <p>Example: A full-credit (2 point) response includes:</p> <ul style="list-style-type: none"> • “Sugar” and “Oxygen” placed on the left as inputs; <p>AND</p> <ul style="list-style-type: none"> • “Water,” “Carbon dioxide,” and “Energy” placed on the right as outputs in part A; <p>AND</p> <ul style="list-style-type: none"> • “The bonds between atoms in the input molecules are broken and new bonds are formed to produce the output molecules” selected in part B.

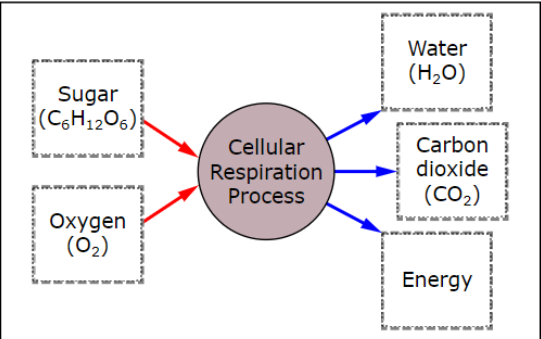
	<p>A partial-credit (1 point) response includes:</p> <ul style="list-style-type: none"> • “Sugar” and “Oxygen” placed on the left as inputs; <p>AND</p> <ul style="list-style-type: none"> • “Water,” “Carbon dioxide,” and “Energy” placed on the right as outputs in part A; <p>OR</p> <ul style="list-style-type: none"> • “The bonds between atoms in the input molecules are broken and new bonds are formed to produce the output molecules” selected in part B.
<p>Exemplar</p>	
<p>Assertions</p>	<p>The student placed “Sugar” and “Oxygen” on the left as inputs and “Water,” “Carbon dioxide,” and “Energy” on the right as outputs.</p>

Table 8: Hot Text Items (HT)

General	Hot text items ask students to move statements into a specific order.										
Task Statements	Task statements are directives that always include “Move the... into the order that...” Example: “Move the statements into the order that describes the steps of the water cycle.”										
Example(s)	<p>A student stood quietly in a field observing a rabbit eating grass. The student moved and stepped on a twig. The twig broke, which made a loud sound, and the rabbit ran away.</p> <p>Move the statements into the order that shows how a rabbit processes information after hearing a twig break.</p> <table border="1" data-bbox="708 564 1203 764"> <thead> <tr> <th>Order</th> <th>Statement</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>The rabbit hears a twig break.</td> </tr> <tr> <td>2</td> <td><input type="text"/></td> </tr> <tr> <td>3</td> <td><input type="text"/></td> </tr> <tr> <td>4</td> <td><input type="text"/></td> </tr> </tbody> </table> <p>The rabbit acts.</p> <p>The rabbit's brain processes information.</p> <p>The rabbit's brain sends a message to act.</p>	Order	Statement	1	The rabbit hears a twig break.	2	<input type="text"/>	3	<input type="text"/>	4	<input type="text"/>
Order	Statement										
1	The rabbit hears a twig break.										
2	<input type="text"/>										
3	<input type="text"/>										
4	<input type="text"/>										
Guidelines	<ul style="list-style-type: none"> • The first letter of a dragger statement is always capitalized. • The width of the answer spaces in the table is the same as the width of the longest dragger. • Text prepopulated in the table is written in the same font as the headers and left-aligned. • Guideline statements: <ul style="list-style-type: none"> ○ The following can be included after the main task statement as needed: <ul style="list-style-type: none"> ▪ [...] may be used once, more than once, or not at all. ▪ All [...] must be used. ▪ [...] may be used more than once. ▪ Not all [...] may be used. ○ Use specific references to the dragger (statement, object, organism, label, etc.). ○ When there is only a task statement, the statement is left justified. ○ When there is a task statement plus one or more guideline statements, all of the statements are bulleted and indented. 										
Human Readable Rubric (HRR)	<p>Example: A full-credit (1 point) response includes:</p> <ul style="list-style-type: none"> • “The rabbit’s brain processes information.” selected for “2.” <p>AND</p> <ul style="list-style-type: none"> • “The rabbit’s brain sends a message to act.” selected for “3.” <p>AND</p> <ul style="list-style-type: none"> • “The rabbit acts.” selected for “4.” 										

Exemplar	<table border="1"> <thead> <tr> <th data-bbox="651 201 740 254">Order</th> <th data-bbox="740 201 1273 254">Statement</th> </tr> </thead> <tbody> <tr> <td data-bbox="651 254 740 306">1</td> <td data-bbox="740 254 1273 306">The rabbit hears a twig break.</td> </tr> <tr> <td data-bbox="651 306 740 359">2</td> <td data-bbox="740 306 1273 359">The rabbit's brain processes information.</td> </tr> <tr> <td data-bbox="651 359 740 411">3</td> <td data-bbox="740 359 1273 411">The rabbit's brain sends a message to act.</td> </tr> <tr> <td data-bbox="651 411 740 464">4</td> <td data-bbox="740 411 1273 464">The rabbit acts.</td> </tr> </tbody> </table>	Order	Statement	1	The rabbit hears a twig break.	2	The rabbit's brain processes information.	3	The rabbit's brain sends a message to act.	4	The rabbit acts.
Order	Statement										
1	The rabbit hears a twig break.										
2	The rabbit's brain processes information.										
3	The rabbit's brain sends a message to act.										
4	The rabbit acts.										
Assertions	The student moved "The rabbit's brain processes the information" to row 2, "The rabbit's brain sends a message to act" to row 3, and "The rabbit acts" to row 4.										

Table 9: Multiple Choice (MC) and Multiple Select (MS)

<p>General</p>	<p>Multiple choice items typically have 4 answer options but can have more. Options are identified with consecutive, uppercase letters.</p> <p>Multiple select items typically have 5-6 answer options but can have more. Options are identified with consecutive open boxes. The number of correct answers is always</p>
<p>Task Statements</p>	<p>Multiple Choice</p> <p>Task statements are written as questions.</p> <p>Example: Which statement supports the claim that the universe is approximately 14.8 billion years old?</p> <p>Multiple Select</p> <p>Task statements are directives that always include "Select [number] ..." Spell out and bold the number.</p>
<p>Example(s)</p>	<p>What percentage of the offspring plants will most likely have red leaves?</p> <p>A 100%</p> <p>B 75%</p> <p>C 50%</p> <p>D 25%</p> <p>Based on information from the Distance vs. Time graph, how far did cart A travel in 10 seconds?</p>

How many liters of water evaporated during the first week of the investigation?

A $\frac{1}{4}$

B $1\frac{1}{4}$

C $2\frac{1}{4}$

D $3\frac{1}{4}$

When does the shadow have the longest length?

A 8:00 AM

B 11:30 AM

C 4:00 PM

D 8:30 PM

Which statement describes a purpose of ATP molecules in plant and animal cells?

A to pass genetic traits to offspring

B to store energy used for cell processes

C to decrease the rate of chemical reactions

D to increase the rate of diffusion across cell membranes

Which statement describes DNA?

A DNA is located in the nucleus.

B DNA is a macromolecule.

C DNA is non-living.

D DNA is a cell.

<p>Guidelines</p>	<p>Graphic options</p> <ul style="list-style-type: none"> • Arranged for best visual presentation (e.g. vertically, 2X2) and/or key balance. • Graphic: centered • Option letter: top-aligned <p>Numeric options</p> <ul style="list-style-type: none"> • Arranged in either ascending or descending numerical order unless a different order is needed to correspond to information from an associated table, graph, diagram, etc. Options are not arranged in the prescribed order when doing so clues the answer to the item. • Numbers: <ul style="list-style-type: none"> ○ stand-alone numbers are decimal aligned ○ decimal values are decimal aligned ○ numbers that precede or follow symbols are decimal aligned: 40 °C, \$20.00 ○ numbers that precede units of measure are decimal aligned: 15.5 kWh, 30 cm • Fractions: <ul style="list-style-type: none"> ○ Fractions centered vertically. ○ For mixed numbers, fractions align vertically. • Times of day: <ul style="list-style-type: none"> ○ Aligned on colon ○ Arranged in either ascending or descending numerical order unless a different order is needed to correspond to information from an associated table, graph, diagram, etc. ○ Options are not arranged in the prescribed order when doing so clues the answer to the item. <p>Text options</p> <ul style="list-style-type: none"> • Words, phrases, and sentences are arranged in ascending or descending order by length, unless a different order is needed to correspond to words, phrases or sentences from an associated table, graph, diagram, etc. Options are not arranged in the prescribed order when doing so clues the answer to the item. • Left-aligned • Options that are complete sentences or questions start with a capital letter and end with a period or question mark. • Options that are complete sentences have a subject. A command has an implied subject (e.g. <i>Collect data every day.</i>)
<p>Human Readable Rubric (HRR)</p>	<p>MS Example:</p> <p>A full-credit (1 point) response includes:</p> <ul style="list-style-type: none"> • "The flower is red" selected; <p>AND</p>

Exemplar	NA
Assertions	<p>MC Example: The student selected “DNA is located in the nucleus”.</p> <p>MS Example: The student selected “The flower is red” and “The flower is white”.</p>

Table 10: Table Match Items (MI)

General	Matching items provide students with a table and ask the students to select cells in a table to make identifications, classifications, or predictions.																
Task Statements	<p>Task statements are directives that always include “Select a box to...”</p> <p>Example: “Select a box to identify whether each organism is a consumer or a producer.”</p>																
Example(s)	<p>Based on the Student Solutions diagram, select a box to predict the effect of each solution.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Effect</th> <th style="text-align: center;">Solution 1: Dig the ditch deeper</th> <th style="text-align: center;">Solution 2: Place sandbags</th> <th style="text-align: center;">Solution 3: Add a gate</th> </tr> </thead> <tbody> <tr> <td>Provides more space in the ditch for water to flow</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Prevents water in the ditch from flowing past the playfield</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Blocks water flowing out of the ditch from reaching the playfield</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </tbody> </table>	Effect	Solution 1: Dig the ditch deeper	Solution 2: Place sandbags	Solution 3: Add a gate	Provides more space in the ditch for water to flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prevents water in the ditch from flowing past the playfield	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Blocks water flowing out of the ditch from reaching the playfield	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Guidelines	<ul style="list-style-type: none"> • Column and row headings may contain text, graphics, or text and graphics. When graphics are present, it is preferable for a text label or descriptor to be present. • In the directions, refer to the first column first (when possible). • If the text in the column or row headings is a complete sentence, begin the headings with a capital letter and end with the proper punctuation. • If a column or row heading is a phrase or one word, begin the heading with a capital letter and end without punctuation. • Column and row headings must all follow either title case/capitalization or sentence case. • Column and row headings should be in one of the following orders when they appear: <ul style="list-style-type: none"> ○ In the order they appear in a stem graphic or stem table ○ In ascending or descending order (for numeric options) ○ Alphabetically or ascending or descending order if all options are one word ○ By length (ascending or descending), if phrases ○ In the order that works best for the key ○ If graphics only, arrange in a logical order. • Column headings are bolded, centered, and have no shading. 																

	<ul style="list-style-type: none"> • Row headings are normal weight text (not bolded) and have no shading. • Left align row headings when one or more headings have more than one word. • Center row headings when all headings are a single word or number. • Guideline statements: <ul style="list-style-type: none"> ◦ The following can be included after the main task statement as needed: <ul style="list-style-type: none"> ▪ More than one [] may be selected for each []. ◦ When there is only a task statement, the statement is left justified. ◦ When there is a task statement plus one or more guideline statements, all of the statements are bulleted and indented. 																
<p>Human-Readable Rubric</p>	<p>Example: A full-credit (1 point) response includes:</p> <ul style="list-style-type: none"> • "Provides more space in the ditch for water to flow" for "Solution 1: Digging"; <p>AND</p> <ul style="list-style-type: none"> • "Blocks water flowing out of the ditch from reaching the playfield" for "Solution 2: Sandbag"; <p>AND</p> <ul style="list-style-type: none"> • "Prevents water in the ditch from flowing past the playfield" for "Solution 3: Gate". 																
<p>Exemplar</p>	<table border="1"> <thead> <tr> <th data-bbox="527 940 782 1003">Effect</th> <th data-bbox="782 940 1057 1003">Solution 1: Dig the ditch deeper</th> <th data-bbox="1057 940 1268 1003">Solution 2: Place sandbags</th> <th data-bbox="1268 940 1430 1003">Solution 3: Add a gate</th> </tr> </thead> <tbody> <tr> <td data-bbox="527 1003 782 1098">Provides more space in the ditch for water to flow</td> <td data-bbox="782 1003 1057 1098" style="text-align: center;"><input checked="" type="checkbox"/></td> <td data-bbox="1057 1003 1268 1098" style="text-align: center;"><input type="checkbox"/></td> <td data-bbox="1268 1003 1430 1098" style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td data-bbox="527 1098 782 1224">Prevents water in the ditch from flowing past the playfield</td> <td data-bbox="782 1098 1057 1224" style="text-align: center;"><input type="checkbox"/></td> <td data-bbox="1057 1098 1268 1224" style="text-align: center;"><input type="checkbox"/></td> <td data-bbox="1268 1098 1430 1224" style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td data-bbox="527 1224 782 1350">Blocks water flowing out of the ditch from reaching the playfield</td> <td data-bbox="782 1224 1057 1350" style="text-align: center;"><input type="checkbox"/></td> <td data-bbox="1057 1224 1268 1350" style="text-align: center;"><input checked="" type="checkbox"/></td> <td data-bbox="1268 1224 1430 1350" style="text-align: center;"><input type="checkbox"/></td> </tr> </tbody> </table>	Effect	Solution 1: Dig the ditch deeper	Solution 2: Place sandbags	Solution 3: Add a gate	Provides more space in the ditch for water to flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prevents water in the ditch from flowing past the playfield	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Blocks water flowing out of the ditch from reaching the playfield	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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<p>Assertions</p>	<p>The student selected “Solution 1” for “Provides more space in the ditch for water to flow,” “Solution 3” for “Prevents water in the ditch from flowing past the playfield” and “Solution 2” for “Blocks water flowing out of the ditch from reaching the playfield.”</p>																

Table 11: Short Answer Items (SA)

<p>General</p>	<p>SA items ask students to construct a written response to a question. Some SA items include additional guidelines for responding. Some SA items first ask students to choose from a list of options before constructing the response.</p>
<p>Task Statements</p>	<p>Without options/additional guidelines: Describe... <input type="text"/></p> <p>Without options/additional guidelines: Describe... In your description, be sure to:</p> <ul style="list-style-type: none"> • Identify/Describe... • Identify/Describe... <input type="text"/> <p>With options: Choose one [...]:</p> <p><input type="radio"/> [...]:</p> <p><input type="radio"/> [...]:</p> <p>Describe... <input type="text"/></p> <p>With options and additional guidelines: Choose one [...]:</p> <p><input type="radio"/> [...]</p> <p><input type="radio"/> [...]</p> <p>In your description, be sure to:</p> <ul style="list-style-type: none"> • Identify/Describe... • Identify/Describe... <input type="text"/>

<p>Example(s)</p>	<p>None of the solutions meet all three criteria. However, the school principal asks the students to recommend one solution that could keep water from flowing onto the playfield.</p> <p>Describe a solution that best meets the criteria to recommend to the school principal.</p> <p>Choose one solution:</p> <ul style="list-style-type: none"> <input type="radio"/> Dig a ditch deeper <input type="radio"/> Place sandbags <input type="radio"/> Add a gate <p>Describe how well that solution meets the three criteria for the solution.</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> <p>The Number of Mice in Desert Habitats table shows the average number of light-colored mice and dark-colored mice counted in each habitat during the ten years.</p> <p>Describe what might have caused the difference in the numbers of light-colored mice and dark-colored mice in one of the habitats.</p> <p>Choose one habitat:</p> <ul style="list-style-type: none"> <input type="radio"/> Sand <input type="radio"/> Volcanic rock <p>In your description, be sure to:</p> <ul style="list-style-type: none"> • Describe how the number of light-colored mice is different from the number of dark-colored mice in that habitat. • Describe what might have caused the difference. <div style="border: 1px solid black; height: 40px; width: 100%;"></div>
<p>Guidelines</p>	<ul style="list-style-type: none"> • Short answer response boxes are 6 lines tall. • Radio Button Options: <ul style="list-style-type: none"> ○ Capitalize the option. Do not use any punctuation if the option is not a complete sentence. ○ Option Order: <ul style="list-style-type: none"> ▪ In the order the options appear in a stem graphic or stem table. ▪ In ascending order, if options are numbers. ▪ Alphabetically or in ascending or descending order by length. ▪ In an order that makes logical sense within the item.
<p>Human Readable Rubric (HRR)</p>	<p>Example with Options:</p> <p>A full-credit (1 point) response describes a solution that best meets the criteria to recommend to the school principal by:</p> <ul style="list-style-type: none"> • Choosing one solution; <p>AND</p> <ul style="list-style-type: none"> • Describing how well the chosen solution meets the three criteria: low cost, fast installation, and long-lasting solution.

	<p>Note: The official OSPI rubrics used for hand-scoring will be provided to CAI for ITSx upload after field test rangefinding and then again after they are updated for operational rangefinding.</p>								
<p>Exemplar</p>	<table border="1"> <thead> <tr> <th data-bbox="423 327 594 359">Solution:</th> <th data-bbox="594 327 1520 359">How solution meets the criteria:</th> </tr> </thead> <tbody> <tr> <td data-bbox="423 359 594 478">Dig the ditch deeper</td> <td data-bbox="594 359 1520 478"> <ul style="list-style-type: none"> ▪ Although the ditch takes the most time to install, the ditch lasts longer than the sandbags but not as long as a gate. The ditch costs more than the sandbags but less than the gate. </td> </tr> <tr> <td data-bbox="423 478 594 657">Place sandbags</td> <td data-bbox="594 478 1520 657"> <ul style="list-style-type: none"> ▪ The sandbags were lower in cost than the gate and the same as the digging and were also fastest to build. The only constraint the sandbags don't meet is how long they last which is only one year. ▪ The sand bags are faster and cheaper to install than the other two solutions but don't last as long. </td> </tr> <tr> <td data-bbox="423 657 594 720">Add a gate</td> <td data-bbox="594 657 1520 720"> <ul style="list-style-type: none"> ▪ The gate had the highest cost and the middle amount of time to build but lasts the longest of any solution. </td> </tr> </tbody> </table>	Solution:	How solution meets the criteria:	Dig the ditch deeper	<ul style="list-style-type: none"> ▪ Although the ditch takes the most time to install, the ditch lasts longer than the sandbags but not as long as a gate. The ditch costs more than the sandbags but less than the gate. 	Place sandbags	<ul style="list-style-type: none"> ▪ The sandbags were lower in cost than the gate and the same as the digging and were also fastest to build. The only constraint the sandbags don't meet is how long they last which is only one year. ▪ The sand bags are faster and cheaper to install than the other two solutions but don't last as long. 	Add a gate	<ul style="list-style-type: none"> ▪ The gate had the highest cost and the middle amount of time to build but lasts the longest of any solution.
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Add a gate	<ul style="list-style-type: none"> ▪ The gate had the highest cost and the middle amount of time to build but lasts the longest of any solution. 								
<p>Assertions</p>	<p>The assertion for SA items is autogenerated by ITS.</p>								

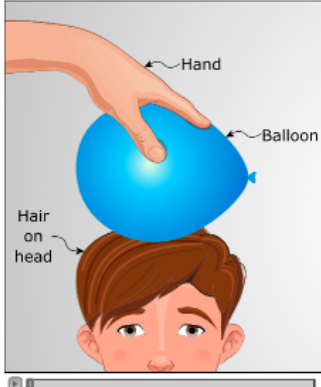


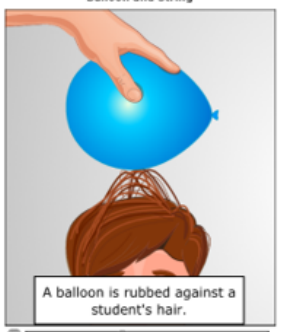
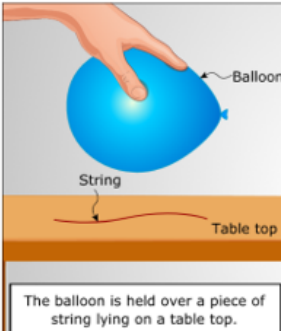
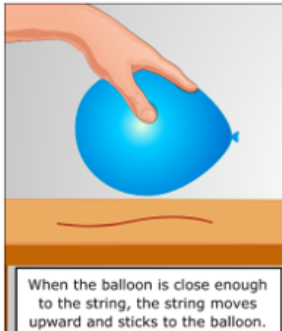
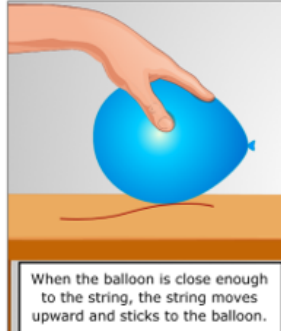


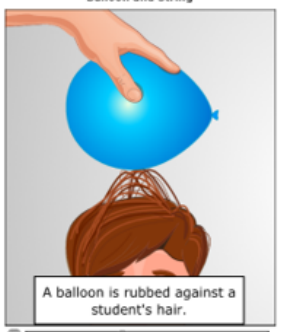
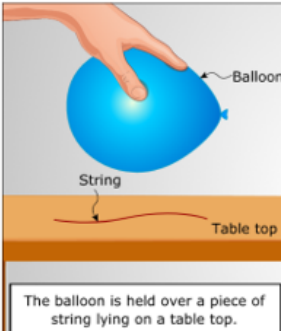
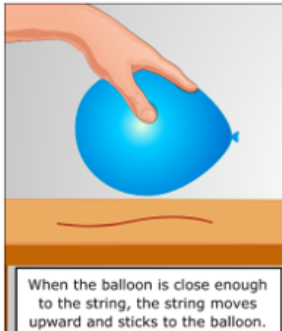
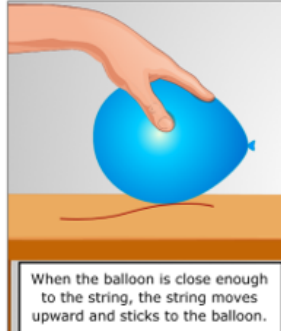


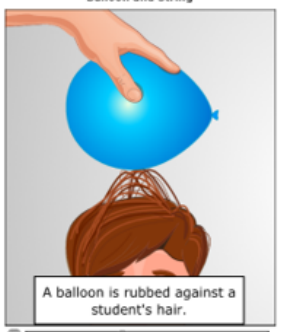
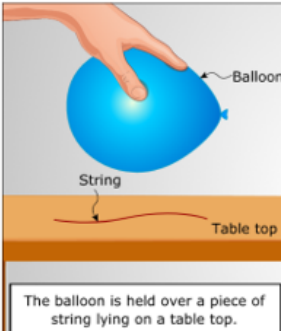
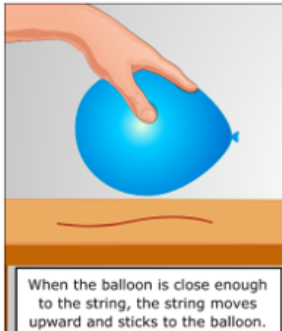
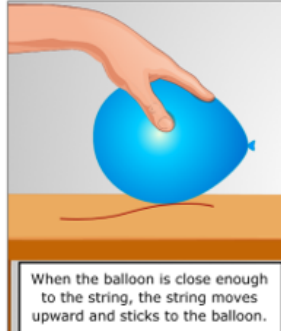
Table 12: Embedded Text Entry Interactions (TI)

General	TI items provide students with a table that has one or more values missing. Students type their responses into the table cell(s).													
Task Statements	Task statements direct students to type their responses into the table cell(s). Example: "Complete the table to show..." Example: "Enter the [...] in the box."													
Example(s)	<p>Hydrogen (H₂) is used as a fuel in some cars. The balanced chemical equation for a process that produces H₂ is shown in the Chemical Equation diagram.</p> <p style="text-align: center;">Chemical Equation</p> <div style="text-align: center; border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> $\text{CH}_4 + \text{H}_2\text{O} \rightarrow \text{CO} + 3 \text{H}_2$ </div> <p>The Reaction Masses table shows the masses of some of the substances for one trial of the reaction.</p> <p>Calculate the mass of H₂ produced. Enter the mass in the box.</p> <p style="text-align: center;">Reaction Masses</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Substance</th> <th>Mass (grams)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Reactants</td> <td>H₂O</td> <td>1802</td> </tr> <tr> <td>CH₄</td> <td>1605</td> </tr> <tr> <td rowspan="2">Products</td> <td>CO</td> <td>2801</td> </tr> <tr> <td>H₂</td> <td><input type="text"/></td> </tr> </tbody> </table>		Substance	Mass (grams)	Reactants	H ₂ O	1802	CH ₄	1605	Products	CO	2801	H ₂	<input type="text"/>
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Reactants	H ₂ O	1802												
	CH ₄	1605												
Products	CO	2801												
	H ₂	<input type="text"/>												
Guidelines	Set table width based on length of content.													
Human Readable Rubric (HRR)	Example: A full credit (1 point) response includes 606 (or 606. or 0606 or 0606. or 00606 or 606.0)													
Exemplar	<p style="text-align: center;">Reaction Masses</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Substance</th> <th>Mass (grams)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Reactants</td> <td>H₂O</td> <td>1802</td> </tr> <tr> <td>CH₄</td> <td>1605</td> </tr> <tr> <td rowspan="2">Products</td> <td>CO</td> <td>2801</td> </tr> <tr> <td>H₂</td> <td><input type="text" value="606"/></td> </tr> </tbody> </table>		Substance	Mass (grams)	Reactants	H ₂ O	1802	CH ₄	1605	Products	CO	2801	H ₂	<input type="text" value="606"/>
	Substance	Mass (grams)												
Reactants	H ₂ O	1802												
	CH ₄	1605												
Products	CO	2801												
	H ₂	<input type="text" value="606"/>												
Assertions	The student entered "606" in the last box.													

Table 13: Simulation Items (SIM)

General	Students populate a data table by setting values for variables and running a simulation.
Task Statements	<p>Use the [title] simulation to...</p> <ul style="list-style-type: none"> • Select the [list of variable the students must set]. • Click the [start icon] button to collect data. • To remove a row of data, click the [trashcan icon] button. <p>Separate bullets can be used for the “Select the...” direction, or all variables can be listed in the same bullet.</p> <p>For a scored simulation add an additional bullet:</p> <ul style="list-style-type: none"> • Be sure the final data table includes [number] rows of data that answer the student’s question.
Example(s)	See item 20403, item 21044, or item 20716.
Guidelines	<ul style="list-style-type: none"> • Variables are set by choosing a radio buttons or selecting from an ETC-like dropdown menu. • The “Start” button is below the radio button options. • There is a trashcan icon to the right of every row and a “Clear all rows” icon below the right corner of the data table. • The number of rows in the data table before the simulation and the maximum number of rows the table can have during the simulation depend on the item. • The timing of when each cell in the data table is populated is determined by the item. Timing options are “immediately after clicking Start” or “after animation completes”.
Human Readable Rubric-Scored Simulations only	<p>Example:</p> <p>For this item a full credit (1 point) response includes: Mass was held constant, position was changed, AND three different times were run as conditions of the independent variable.</p>
Exemplar	List the options and correct values.
Assertions	Refer to the HRR when developing the assertion. Based on the HRR, the assertion may be generalized (“The student understands how to develop an investigation plan to collect and record data...”) or more specific (“The student chose X for the first variable, X for the second variable, and X for the third variable.”)

Section 4: Animation Style

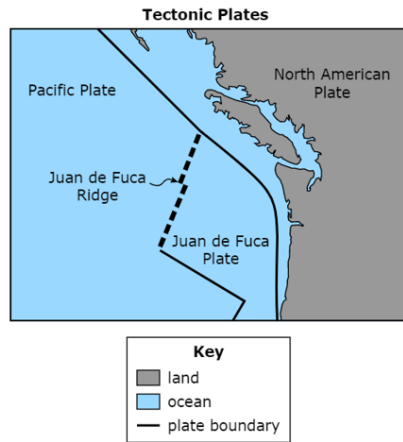
<p>General</p>							
<p>Example(s)</p>	<div style="text-align: center;"> <p>Competing Forces</p> <p>Read the information and answer the questions.</p> <p>A balloon is rubbed against a student's hair. Then, the balloon is held over a piece of string lying on a table top. Watch the Balloon and String demonstration to see the interaction between the balloon and the string. Click the arrow to the left of the gray line to begin the demonstration.</p> <p>Balloon and String</p>  </div> <p>Storyboard:</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td data-bbox="427 1031 745 1402"> <p>Balloon and String</p>  </td> <td data-bbox="751 1031 1070 1402"> <p>Balloon and String</p>  <p>A balloon is rubbed against a student's hair.</p> </td> <td data-bbox="1076 1031 1395 1402"> <p>Balloon and String</p>  <p>A balloon is rubbed against a student's hair.</p> </td> </tr> <tr> <td data-bbox="427 1411 745 1818"> <p>Balloon and String</p>  <p>The balloon is held over a piece of string lying on a table top.</p> </td> <td data-bbox="751 1411 1070 1818"> <p>Balloon and String</p>  <p>When the balloon is close enough to the string, the string moves upward and sticks to the balloon.</p> </td> <td data-bbox="1076 1411 1395 1818"> <p>Balloon and String</p>  <p>When the balloon is close enough to the string, the string moves upward and sticks to the balloon.</p> </td> </tr> </table>	<p>Balloon and String</p> 	<p>Balloon and String</p>  <p>A balloon is rubbed against a student's hair.</p>	<p>Balloon and String</p>  <p>A balloon is rubbed against a student's hair.</p>	<p>Balloon and String</p>  <p>The balloon is held over a piece of string lying on a table top.</p>	<p>Balloon and String</p>  <p>When the balloon is close enough to the string, the string moves upward and sticks to the balloon.</p>	<p>Balloon and String</p>  <p>When the balloon is close enough to the string, the string moves upward and sticks to the balloon.</p>
<p>Balloon and String</p> 	<p>Balloon and String</p>  <p>A balloon is rubbed against a student's hair.</p>	<p>Balloon and String</p>  <p>A balloon is rubbed against a student's hair.</p>					
<p>Balloon and String</p>  <p>The balloon is held over a piece of string lying on a table top.</p>	<p>Balloon and String</p>  <p>When the balloon is close enough to the string, the string moves upward and sticks to the balloon.</p>	<p>Balloon and String</p>  <p>When the balloon is close enough to the string, the string moves upward and sticks to the balloon.</p>					

Guidelines	<ul style="list-style-type: none"> • The labels on the animation poster typically fade out when the arrow is clicked. The scene typically fades back to the labeled animation poster at the end of the animation. • When used, the “Diagram not to scale” label goes under the animation poster and above the gray line, and it fades in and out with the animation poster labels. • If used, the script box is inside the animation box. • If used, a script should appear long enough for an adult reader to read the script out loud at a normal speed.
Dimensions	See Appendix B

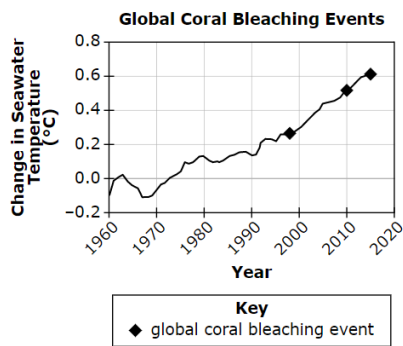
Section 5: Graphic Style (Diagrams and Graphs)

<p>Color Considerations</p> <p>Diagrams and Graphs</p>	<ul style="list-style-type: none"> • Use RGB color mode and RGB colors in graphics. Use grayscale for black color (100%K) and grays. • Common RGB colors used in graphics. OSPI has final decision on all colors. <ul style="list-style-type: none"> ○ Strokes/outline/arrows: 100%K grayscale black ○ OSPI table top color: #D1BA9B ○ Line graphs and bar charts <ul style="list-style-type: none"> ▪ Navy blue: #000094 ▪ Orange: #D3672D ○ Maps: <ul style="list-style-type: none"> ▪ Bodies of water: #C4E2F8 ▪ Landmass gray: 25% grayscale black in Illustrator (75% in Word) ▪ Landmass green: #E4F4DD ▪ Landmass tan: #D8CFBF ▪ Rivers: # 3D70B0 • Gradients <ul style="list-style-type: none"> ○ Use a gradient for above and below ground areas, darkest color of each gradient aligned with the dividing line (where above ground meets below ground). ○ Colors selected for a gradient should be chosen so that text and important graphic elements on top of the gradient have adequate color contrast. • Colorblindness: Graphics should pass colorblind checks, ensuring adequate color differentiation of main elements for deuteranopia, protanopia, and tritanopia colorblindness. <ul style="list-style-type: none"> ○ Color contrast: <ul style="list-style-type: none"> ▪ Black text (preferred) is used on lighter colors (contrast ratio of 7:1) <ul style="list-style-type: none"> - 100%K grayscale black ▪ White text ○ Preference is to use black text in most cases.
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	<ul style="list-style-type: none"> ▪ Lighten the color behind the text for adequate color contrast with black text. ▪ Move the text to an area with adequate color contrast when appropriate. ○ White text may be used on darker colors (rare, and must be approved by OSPI). • Protons and neutrons: <ul style="list-style-type: none"> ○ Use a blue circle for protons, may include the lowercase letter p in the circle. ○ Use an orange circle for neutrons, may include the lowercase letter n in the circle. ○ See item 21582.
<p>Referencing Diagrams and Graphs</p>	<p>In item clusters:</p> <ul style="list-style-type: none"> • A graphic in a stimulus is referred to by title at least once within the stimulus and always within associated items. <ul style="list-style-type: none"> ○ Correct: "The student's setup is shown in the Plant Investigation diagram." ○ Incorrect: "The student's setup is shown in the diagram." ○ Correct: "Which evidence from the Plant Height vs. Amount of Light graph supports the student's claim?" ○ Incorrect: "Which evidence from the graph supports the claim?" • A graphic within an item only is referred to once by title in the introductory information and thereafter with a descriptive term within the item (e.g., "Which evidence from the diagram supports the claim?"). <p>In standalone items:</p> <ul style="list-style-type: none"> • A graphic within the item is referred to once by title in the introductory information and thereafter with a descriptive term (e.g., "Which evidence from the diagram supports the claim?"). • If there is more than one table and or graphic in the introductory information, a table and/or graphic is referred to by title throughout the item. • Phrases that are never used to refer to a graphic: <ul style="list-style-type: none"> ○ "...the following diagram/graph...." ○ "...the diagram/graph below..." ○ "...the diagram/graph above..."
<p>Keys for Diagrams and Graphs</p>	<ul style="list-style-type: none"> • Keys provide information to help identify parts of a graphic or interpret information in a graphic. • A Key is typically centered beneath the main graphic. Exceptions can be made in standalone items when vertical scrolling is an issue or when a graphic requires the key to the right. • When a Key accompanies a diagram, the line weight around the Key is lighter than the line weight around the diagram. (Key border = 1 pt. and diagram border = 1.5 pt.)



- When a Key accompanies a graph, the line weight around the Key is the same as the line weight of the graph axes. (axes and key borders = 1 pt.)
Example:

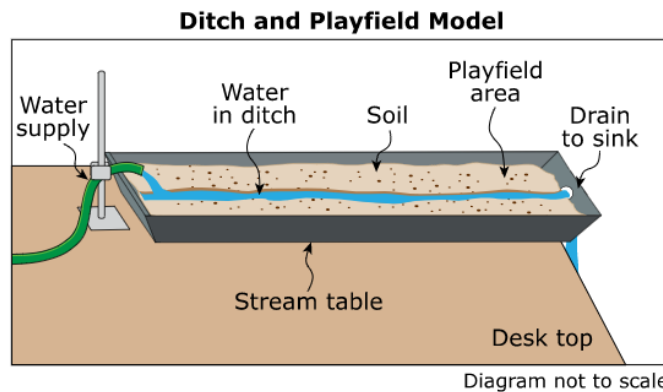


General Information for Diagrams

- Graphics are created post-item writing by a vendor’s graphic team. The graphics are edited during review rounds. Post-content review rounds, approved art is delivered to OSPI, along with approved standalone items and item clusters. All graphics are delivered as SVG and EPS files.
- Graphics should:
 - maximize white space;
 - be large enough for students to read text and view content;
 - minimize horizontal and vertical scrolling;
 - be condensed (file size) without compromising legibility and font size; and
 - be centered in stimuli and items, except for GGI and GGM answer space graphics.
- A graphic describes a scientific system; therefore, the graphic must be scientifically accurate, in realistic perspective, and to scale unless otherwise indicated by “Diagram not to scale”. For tables that incorporate more than one graphic, do not pluralize “Diagram.”
- A table top is typically labeled as “Table top” without an arrow. If art is in color, the table top must have a fill of an approved table top color.

- Graphics describing a controlled investigation setup should show the system being investigated with both the manipulated and responding variables.
 - All materials used in an investigation do not need to be in the graphic.
 - Avoid using students in graphics. If included the students must be realistic, representative of the students of Washington, and grade appropriate.
 - Text in graphics should be phrases, not sentences.
 - Any graphic in an item that is derived from a graphic in the stimulus should be almost identical to the graphic in the stimulus.
 - Create diagrams using minimal points and objects to keep the file size low. Graphics may have to sacrifice details to save disk space. Content should be cognizant of graphic limitations when requesting diagrams.
- Example:

The students used a stream table to model the ditch and the playfield. The stream table is shown in the Ditch and Playfield Model diagram.



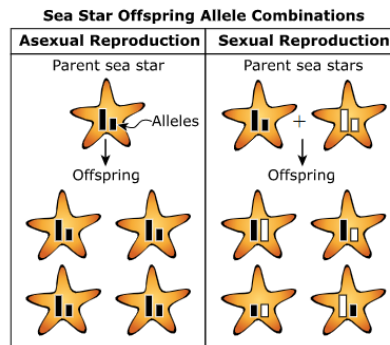
The students used the stream table to test each solution. All three solutions kept water from flowing out of the ditch onto the playfield.

Capitalization for Diagrams

- Use the following guidelines to determine whether to capitalize when referencing labels or other text from graphics:
 - Lowercase references to labels that are common nouns.
 - Lowercase references to a label that precedes letters or numerals, even if the label is capitalized in the graphic (e.g. organism A, battery 1).
 - Capitalize reference to labels that are proper nouns.
- Example:

Section 2—Sea Star Reproduction

The Sea Star Offspring Allele Combinations model shows the possible allele combinations in the sea star offspring for asexual reproduction and sexual reproduction.



Font Specifications for Diagrams

- Text within graphics is typically not enclosed in quotation marks, italicized, or bolded.
- Titles/labels/normal text should be created with 18.67 pt. Verdana. The image shrinks to 14 pt. Verdana in Web preview.
- Subscript and superscript numerals (13 pt. font with a +7/-4 pt. baseline shift in Illustrator)
- "Diagram not to scale" should be created with 16 pt. Verdana. (The image shrinks to 12 pt. Verdana in Web preview.)
- Table 5A summarizes font specifications for graphics. The specifications reflect the online view; increase by 133.33% in Illustrator.

Table 5A: Font Specifications for Graphics

Graphic Text Element	Font
Title	- 14 pt. Verdana Bold - Title case
Headings (e.g., axes headings, column headings)	- 14 pt. Verdana Bold - Title case
Labels and text	- 14 pt. Verdana - Sentence case
Credit lines	- 10 pt. Verdana - Lowercase
Diagram not to scale	- 12 pt. Verdana - Sentence Case
Graphic boxes	- 1.5 pt. black border

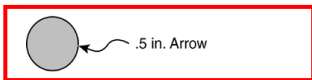
Strokes

- Minimum stroke weight = 0.5 pt.
- Average stroke weight = 1 pt.
- Color = 100%K black. Color strokes allowed if approved by OSPI to enhance content
-

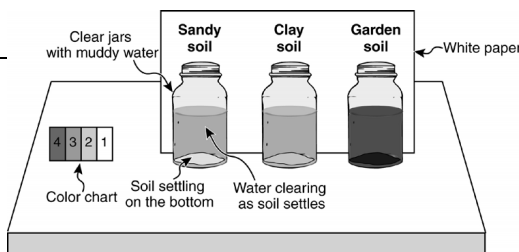
Note: Text size in Word file PNGs matches surrounding text. The graphics inserted into Word are reduced by 64% to mimic 12 pt. font in the item cards. The native files are created with 18.67 pt. font.

**Labelling
Arrows
for Diagrams**

- Use number 5 arrowhead in Illustrator.
- The arrowhead of the leader from the label to the object being labeled should touch the outer rim of the object being labeled, not inside the object unless what is being labeled is inside an object.
- The distance between the text of the label and the start of the arrow should be consistent throughout the labels in a diagram.
- Minimize use of long (greater than 0.5 in) and short (0.25 in) arrows.
- Labels should be placed as close to the object as possible.
- Label background should be white when possible. Block out any shaded art to make the background white or use white text/leader arrows over dark areas.
- Make sure labels do not overlap complex areas of art as directed by OSPI.
- The line of each arrow will have only 2 curves in it.
- Arrows may be any size or shape as needed in a specific diagram but as close to the following examples as possible. The 0.5 inch arrow is the preferred length in most cases.



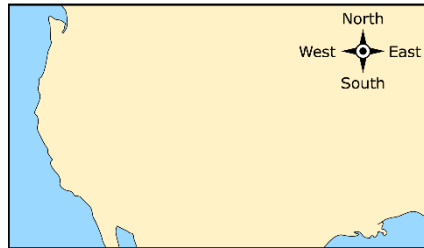
Example:



	<ul style="list-style-type: none"> Arrows used to indicate direction of motion, direction and/or size of force, a sequence of events, etc. can be straight or have a single curve. Size and other specifications are at the discretion of OSPI. 		
<p>Specifics for Before/After Diagrams</p>	<ul style="list-style-type: none"> Before/After diagrams are set up as tables with side-by-side, equal-width columns. Before and After are bold headers with a 1.5 pt. dividing line below the header and between the columns. Interior labels should only appear one time unless otherwise specified by OSPI. Interior labels have regular font weight unless otherwise specified by OSPI. 		
<p>Compass Rose for Diagrams</p>	<ul style="list-style-type: none"> Only use when necessary to answer item or items(s) or to understand stimulus. Full names of directions are used (e.g., North, East, South, West) Black and white used Can be placed in Key (preference) or in map graphic <div data-bbox="548 1083 1040 1220" data-label="Image"> <p style="text-align: center;">Key</p> <table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> land ocean plate boundary </td> <td style="vertical-align: middle; text-align: center;"> <p>North</p> <p>West East</p> <p>South</p> </td> </tr> </table> </div> <ul style="list-style-type: none"> In the map proper, bottom right, 10 px space from bottom and right map of box <div data-bbox="513 1346 927 1608" data-label="Image"> <p style="text-align: center;">Map 1</p> </div>	<ul style="list-style-type: none"> land ocean plate boundary 	<p>North</p> <p>West East</p> <p>South</p>
<ul style="list-style-type: none"> land ocean plate boundary 	<p>North</p> <p>West East</p> <p>South</p>		

- In the map proper, top right, 10 px space from top and right of map box

Map 2



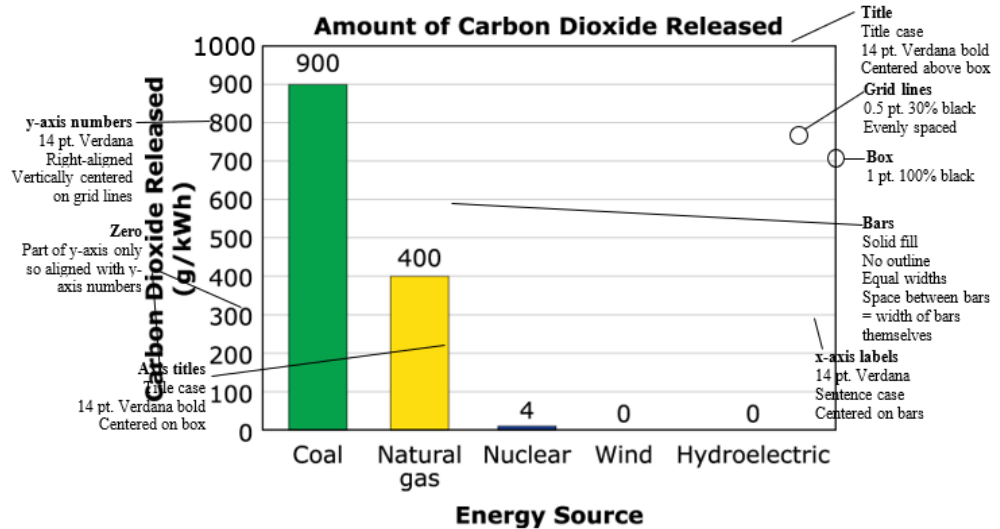
NOTE: If a compass rose is placed in the map proper and not in the Key, the compass rose must be in a solid, single-color area of ocean or land mass without encroaching on or overlapping any strokes/lines representing political boundaries, latitude/longitude lines, geographic data, etc.

General Information for Graphs

- On all axes with units in the axis title, there is a hard return before the units so that the units are always on their own line.
- Axes titles and units are bold font.
- Units are enclosed in parentheses.
- Text within graphics is typically not enclosed in quotation marks, italicized, or bolded.
- Titles/labels/normal text should be created with 18.67 pt. Verdana. The image shrinks to 14 pt. Verdana in Web preview.
- Subscript and superscript numerals (13 pt. font with a +7/-4 pt. baseline shift in Illustrator)

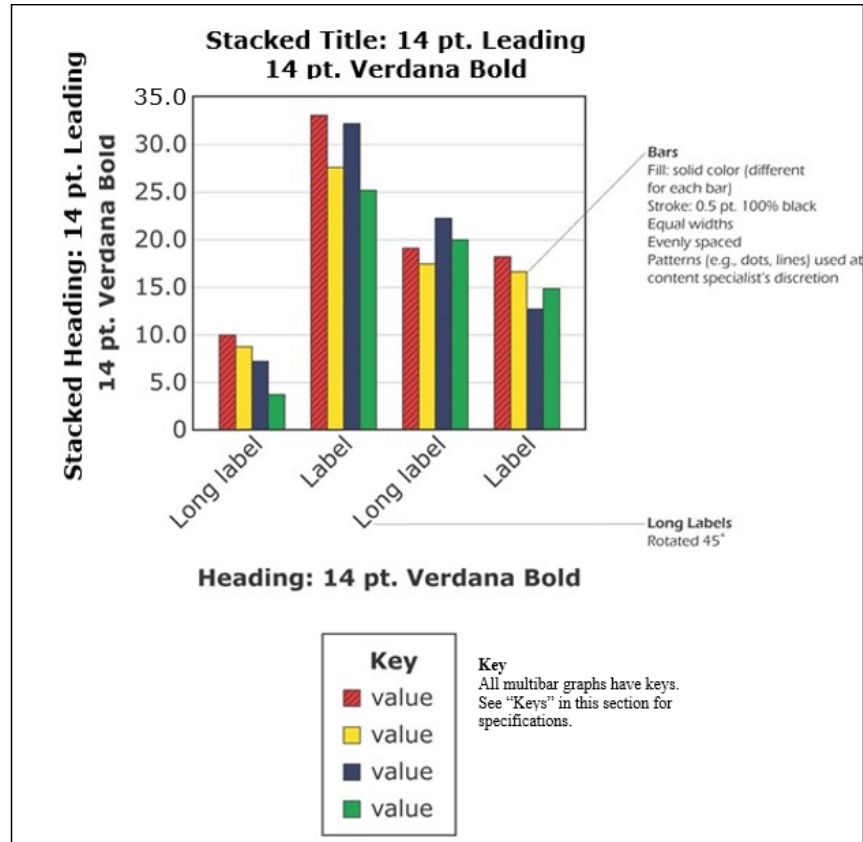
Graph Example 1

Bar



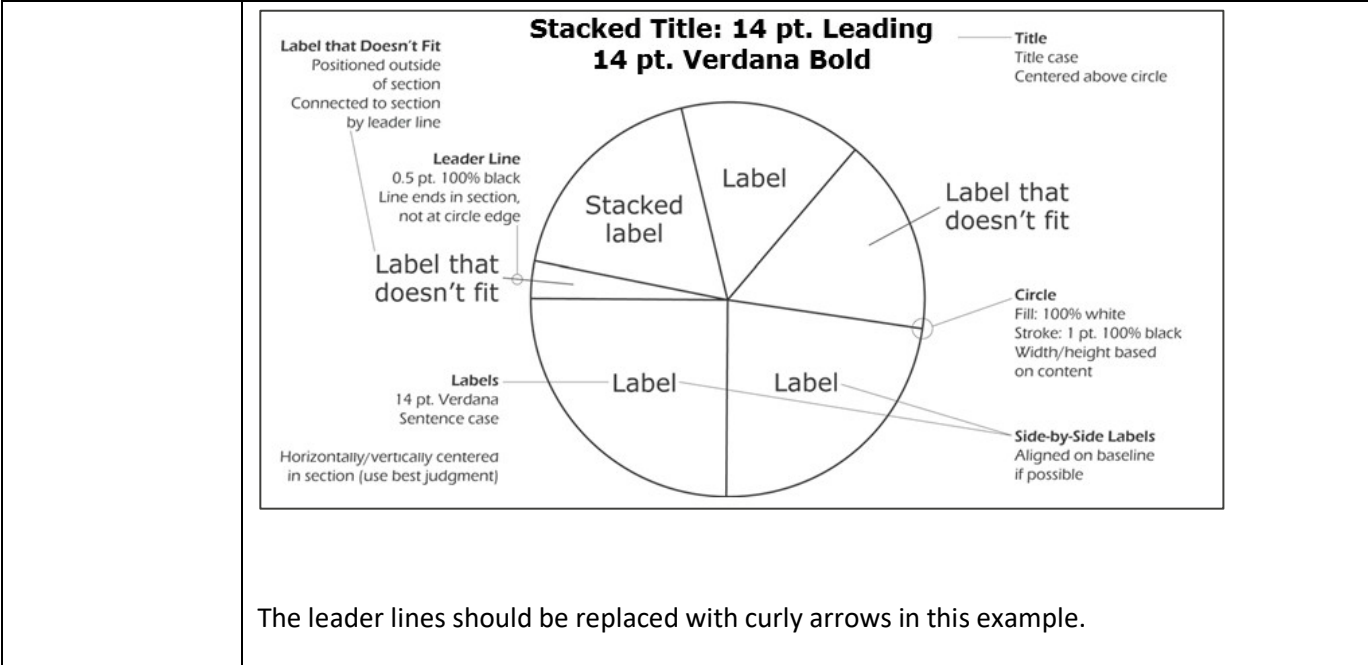
Graph
Example 2

Multi-Bar



Graph
Example 3

Circle

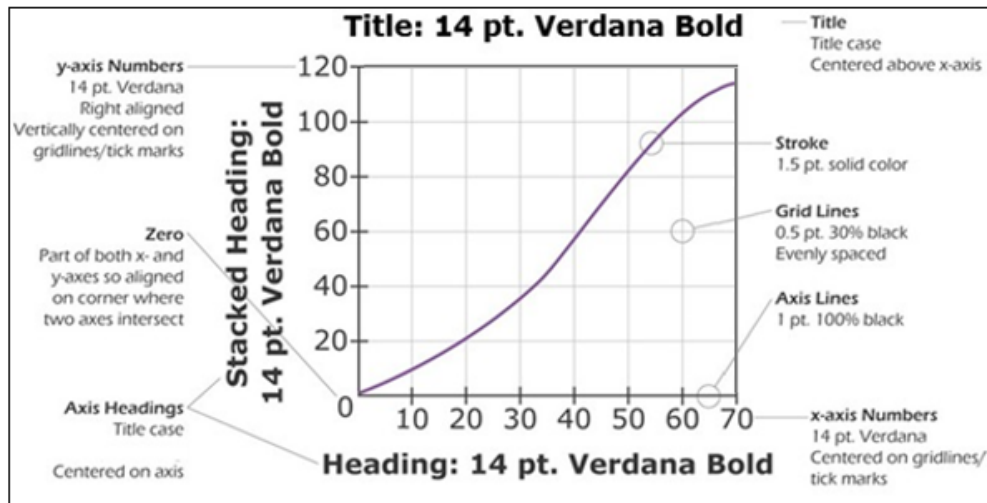
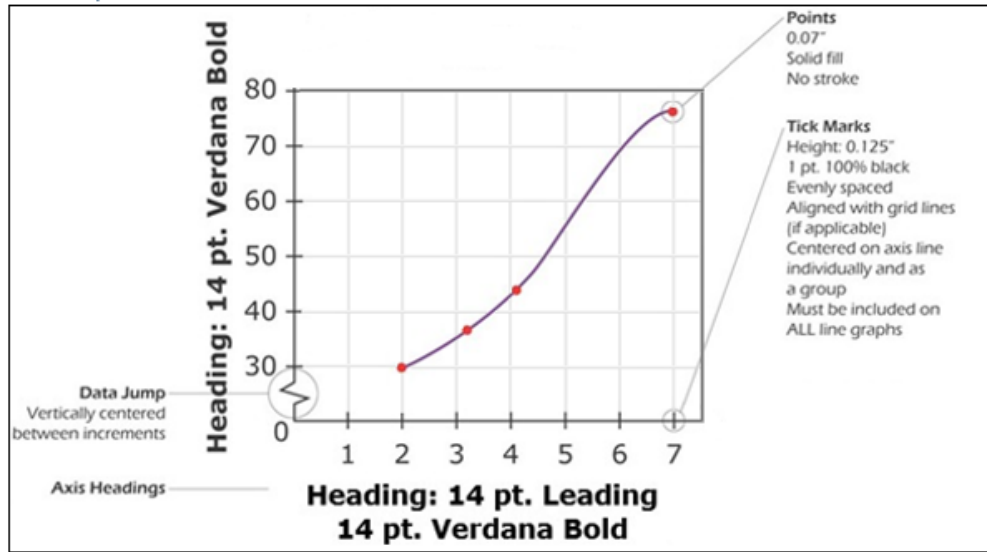


The leader lines should be replaced with curly arrows in this example.

Graph

Example 4

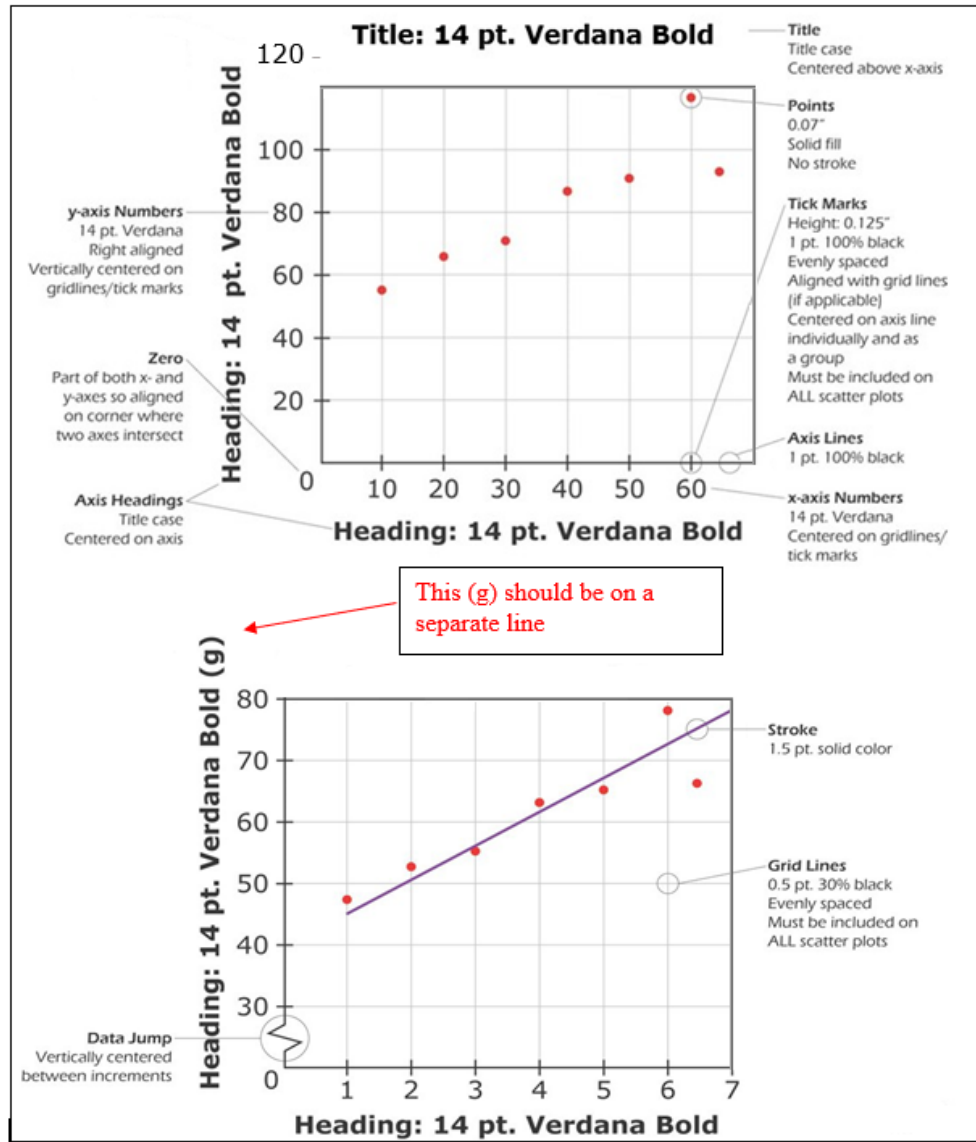
Line



Graph

Example 5

Scatter Plot



Section 6: Table Style

General Information	<ul style="list-style-type: none">• Tables are produced in Word during item development and then recreated in the online system using Rich Text Editor. Tables should be produced as true tables with text, rather than a graphic of a table. Some tables (e.g., chemical equations or other non-standard text, tables with diagrams) are produced as art. These specifications are for the online system. Use the sample tables provided in the Word item templates for item development.• The title is bold, centered and is separated from the table below by ½ the font size above the horizontal border of the table.• In all headers with units, there is a soft return before the units so that the units are always on their own line and centered under the heading text. Units are not bolded and usually not abbreviated, except for °C and %.• Text in main column headings is bold except for units. Text in sub-headings is bold.• Row headings are vertically centered in the table cell and not bold.• Text Alignment:<ul style="list-style-type: none">○ For row headings that contain more than one word, text is left justified.○ For row headings that contain one word or number, text is centered.○ Numbers are centered on the widest number; other numbers are aligned by decimal point or last digit if no decimal point.○ If text wraps in at least one table cell, everything is left justified, with the widest entry having 0.15 padding between the text and the left side of the table cell and 0.15 padding between the text and the right side of the table cell.• Line weights around the outside of the table, under the first row, and to the right of the first column are typically 1.5 pt. All other line weights are typically 0.5 pt.*• Bulleted phrases in tables have 0.15 vertical padding.• Ensure plenty of white space in each data cell.• For capitalization in the title, header text, and subhead text please adhere to <i>The Chicago Manual of Style</i> (17th edition) 8.157 headline capitalization rules, which state the following:<ul style="list-style-type: none">○ Capitalize the first and last words in titles○ Lowercase articles the, a, and an○ Lowercase prepositions, regardless of length○ Lowercase to as a preposition and as an infinitive
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<p>Example 1</p>	<p>Shows alignment of phrases in first column row headers and words within cells.</p> <p style="text-align: center;">Criteria Information</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Criteria</th> <th colspan="3">Solution</th> </tr> <tr> <th>Dig a Ditch Deeper</th> <th>Place Sandbags</th> <th>Add a Gate</th> </tr> </thead> <tbody> <tr> <td>Cost</td> <td>Medium</td> <td>Low</td> <td>High</td> </tr> <tr> <td>Time to install</td> <td>Slow</td> <td>Fast</td> <td>Medium</td> </tr> <tr> <td>How long solution lasts</td> <td>10 years</td> <td>1 year</td> <td>100 years</td> </tr> </tbody> </table>	Criteria	Solution			Dig a Ditch Deeper	Place Sandbags	Add a Gate	Cost	Medium	Low	High	Time to install	Slow	Fast	Medium	How long solution lasts	10 years	1 year	100 years					
Criteria	Solution																								
	Dig a Ditch Deeper	Place Sandbags	Add a Gate																						
Cost	Medium	Low	High																						
Time to install	Slow	Fast	Medium																						
How long solution lasts	10 years	1 year	100 years																						
<p>Example 2</p>	<p>Shows formatting of sub headers with units and alignment of numbers in cells.</p> <p style="text-align: center;">Substance vs. Mass</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Substance</th> <th colspan="4">Mass (grams)</th> </tr> <tr> <th>Trial 1</th> <th>Trial 2</th> <th>Trial 3</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>11</td> <td>10</td> <td>9</td> <td>10</td> </tr> <tr> <td>2</td> <td>10</td> <td>12</td> <td>11</td> <td>11</td> </tr> <tr> <td>3</td> <td>9</td> <td>10</td> <td>11</td> <td>11</td> </tr> </tbody> </table>	Substance	Mass (grams)				Trial 1	Trial 2	Trial 3	Average	1	11	10	9	10	2	10	12	11	11	3	9	10	11	11
Substance	Mass (grams)																								
	Trial 1	Trial 2	Trial 3	Average																					
1	11	10	9	10																					
2	10	12	11	11																					
3	9	10	11	11																					
<p>Example 3</p>	<p>Shows bulleting of phrases within cells.</p> <p style="text-align: center;">Investigation 3</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Week</th> <th>Observations</th> </tr> </thead> <tbody> <tr> <td>1</td> <td> <ul style="list-style-type: none"> • The soil is undisturbed. • The air is warm and moist. • The sky is cloudy. </td> </tr> <tr> <td>2</td> <td> <ul style="list-style-type: none"> • A green leaf is emerging through the top of the soil. • The air is cool. • The sky is cloudy. </td> </tr> </tbody> </table>	Week	Observations	1	<ul style="list-style-type: none"> • The soil is undisturbed. • The air is warm and moist. • The sky is cloudy. 	2	<ul style="list-style-type: none"> • A green leaf is emerging through the top of the soil. • The air is cool. • The sky is cloudy. 																		
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<p>Example 4</p>	<p>Shows specifications for lines weights and padding in the online system.</p> <div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center;">Stacked Title: 14 pt. Leading 14 pt. Verdana Bold</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Heading</th> <th>Stacked Heading: 14 pt. Verdana Bold</th> </tr> </thead> <tbody> <tr> <td>14 pt. Verdana</td> <td>\$ 10.00</td> </tr> <tr> <td>Sentence case</td> <td>\$ 40.00</td> </tr> <tr> <td>Stacked text entry</td> <td>\$100.00</td> </tr> </tbody> </table> <p style="font-size: small;"> Title Title case Centered above table Column Headings Title case Stacked: 18 pt. leading Horizontally/vertically centered in cell Stroke 1 pt. 100% black </p> <p style="font-size: x-small;"> Text/Numbers See "Text Alignment in Tables" in this section for specifications. </p> <p style="font-size: x-small;"> Column Width +0.15" between widest entry in column and table rules See "Text Alignment in Tables" for row height specifications. </p> </div>	Heading	Stacked Heading: 14 pt. Verdana Bold	14 pt. Verdana	\$ 10.00	Sentence case	\$ 40.00	Stacked text entry	\$100.00																
Heading	Stacked Heading: 14 pt. Verdana Bold																								
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Sentence case	\$ 40.00																								
Stacked text entry	\$100.00																								
<p>Example 5</p>	<p>Shows specifications for table row heights.</p> <p style="text-align: center;">Table Row Heights</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="text-align: center;">0.40"</td> <td style="text-align: center;">One line</td> </tr> <tr> <td style="text-align: center;">0.60"</td> <td style="text-align: center;">Cell with two lines</td> </tr> <tr> <td style="text-align: center;">0.90"</td> <td style="text-align: center;">Cell with three lines of text</td> </tr> <tr> <td style="text-align: center;">1.10"</td> <td style="text-align: center;">Cell with four lines of regular text</td> </tr> </tbody> </table> <p style="font-size: x-small;"> Row Heights Based on number of lines of text All Text Vertically centered </p>	0.40"	One line	0.60"	Cell with two lines	0.90"	Cell with three lines of text	1.10"	Cell with four lines of regular text																
0.40"	One line																								
0.60"	Cell with two lines																								
0.90"	Cell with three lines of text																								
1.10"	Cell with four lines of regular text																								

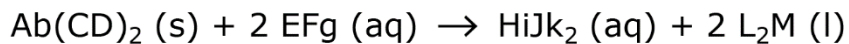
Section 7: Global Style Conventions

Abbreviations	<ul style="list-style-type: none"> • Abbreviations based on the initial letters of a term and pronounced by spelling out each letter (e.g. ATP, DNA) are set in all capital letters without periods. • Some abbreviated terms can be defined and the abbreviation can be used thereafter; (e.g., genetically modified organism, GMO). • State names are not abbreviated. • Month names are not abbreviated in items and stimuli but may be abbreviated to three letters without a period on graph axes. • Days of the week are not abbreviated. • Mount (Mt.) is not abbreviated.
Bullets and Lists	<ul style="list-style-type: none"> • Lists can be designated by bullets or numbers. <ul style="list-style-type: none"> ○ Use bullets for lists that provide students with information in stimuli and items. ○ Use numbers for lists when there is a need to indicate the order of the list items, suggest relative importance among the items, or clearly separate the items. ○ To avoid confusion with option and part letters, do not use letters for lists. ○ The first word of a bulleted statement is always capitalized. This includes sentences, phrases, and single words. ○ Bullets are used for some guideline statements for some item types (e.g., GGM, GI, HT). See specific Item Type Styles for more information. • In vertical lists, bullets/numbers should be indented 0.25 inch. Text should be indented 0.25 inch from the bullet/number.
Capitalization (Miscellaneous)	<ul style="list-style-type: none"> • Capitalize the proper names of planets. “The” does not proceed the term (e.g., “How old is Earth?”). • Capitalize Washington State. • For a hyphenated compound in a title, capitalize both elements of the hyphenated compound unless they are articles, e.g., Short-Term Effect, Step-on Scale, Heights of Sixth-Grade Students. • Capitalize title and bold titles of numbered lists like “Procedure:”

<p>Chemical Formulas and Reactions</p>	<p>General Information</p> <ul style="list-style-type: none"> • Typically, the first time an element or compound is mentioned, the element or compound is named, and the abbreviation or chemical formula is given in parentheses after the name [e.g., sodium (Na), methane (CH₄)]. • Chemical formulas used in mathematical division expressions will be displayed at 100% the base text size. • Use double arrows for equilibrium reactions. <p>General Chemical Formula and Reactions Default</p> <ul style="list-style-type: none"> • Average Font Specs (Using creation size specs -Illustrator): <ul style="list-style-type: none"> ○ General: 18.67 pt Verdana ○ Titles: 18.67 pt Verdana bold, 10 px above box <ul style="list-style-type: none"> ▪ Cannot exceed bounding box width ▪ Max lines of text for titles = 2 lines of text (one carriage return only) ○ Subscripts: 13 pt. Verdana, -4 pt baseline shift ○ Superscripts (ions): 13 pt Verdana, +7 baseline shift; tighten kerning as needed to get ion closer to element (by specific content/client request only) <ul style="list-style-type: none"> ▪ Use + or - when the charge is 1; use n+ or n- if charge is greater than 1. ○ If labels are used beneath elements, should be initial cap (Sentence case) • Characters and Spaces <ul style="list-style-type: none"> ○ Double arrow spacing (see exceptions below) ○ 1-character space between operators and elements/compounds ○ Must use the same number of spaces within a single graphic or across reactions in the same item/cluster ○ 1 space between number of elements/compounds and the element/compound itself (e.g., 6 CO₂ vs. 6CO₂) ○ 1 space between compound and state [e.g., CO (g) vs. CO(g)] • Bounding box <ul style="list-style-type: none"> ○ Reaction centered horizontally and vertically within box ○ 2 pt 100% K stroke ○ Average height (no labels beneath elements): 76 px ○ Box width determined by length of reaction and max width specs ○ Average cell padding (top and bottom): 28 px ○ Left and right cell padding: start at 28 px, reduce as needed for max width dimension specifications <ul style="list-style-type: none"> ▪ Reduce number of spaces used before reducing cell padding. • Key <ul style="list-style-type: none"> ○ State labels ["(s)"] centered vertically ○ Labels right-aligned and lowercase ○ Key box 1.35 pt 100% K stroke and 20 px below box
---	--

- Example of Default Chemical Reaction:

Chemical Reaction 2

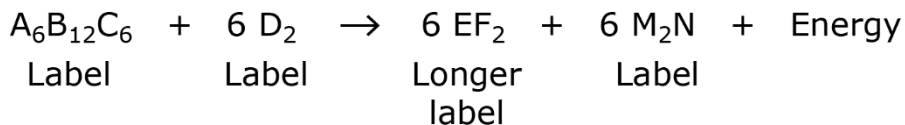


Key

(s) solid
(aq) aqueous solution
(l) liquid

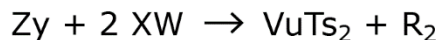
- Exceptions to Default Style:
 - Maximum width with labels
 - Extra space(s) (up to 3-character spaces) between each numerator and operator to allow for labels beneath.
 - There may be reduced cell padding on the left and right when max width is reached.

Generic Title



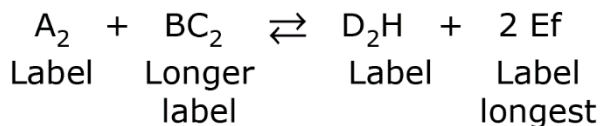
- Two-line title
 - In instances where the title is too long and will hang over the left and right sides of the border the title will be placed on two lines.

Chemical Reaction with Two-line Title



- With Reversible arrows
 - In instances when the chemical reaction has double arrows there will be additional spaces between each numerator and operator to account for the double arrows.

Reaction System



- With Ions
 - Additional cell padding due to superscript of ions.

Chemical Reaction with Ions	
	$\text{AbCd}_2 + \text{E}_2\text{FG}_3 \rightarrow \text{H}_2\text{IJ}_3 + \text{Kl}^- + 2 \text{M}^+$
Commas	<p>Commas are usually used to separate the elements in a series of three or more elements. Include a serial comma before the conjunction (e.g., and, or, but) joining the last two elements in the series.</p> <p>Example: The student observed rabbits, deer, and bluebirds in the forest habitat.</p>
Comparisons	<p>Between Amounts Take care to distinguish the use of “greater than” from “as great as,” “farther from” from “as far as,” and the like. The use of greater than or farther from suggests adding the amount to the original, such that “The orbital period of Object X is 8 times greater than the orbital period of Object Y” suggests the operation: (orbital period + 8 times the orbital period). Another way to think of this is: 15 is 10 (or, 2 times) greater than 5, but is 3 times as great as 5.</p> <p>Incomplete comparisons-Do Not Use To be complete, a comparison must include both items that are being compared. An incomplete comparison often involves a comparative adjective or adverb with no point of reference for comparison.</p> <p style="padding-left: 40px;">Incomplete: The red marble will roll more quickly. Complete: The red marble will roll more quickly than the blue marble.</p> <p>The first sentence indicates that a comparison is being made, but the comparison is incomplete because the reader doesn’t know what is being compared. (The red marble will roll more quickly than what?) The second sentence completes the comparison.</p> <p>Illogical Comparisons-Do Not Use Illogical comparisons occur when the items being compared do not belong to the same category.</p> <p style="padding-left: 40px;">Illogical: The interest on a money market account is usually higher than a savings account. Logical: The interest on a money market account is usually higher than the interest on a savings account. Logical: The interest on a money market account is usually higher than that on a savings account.</p> <p>The first sentence compares two items that are not in the same category: interest and a savings account. The second and third sentences show different ways to revise the sentence so that the comparison is logical.</p>
Compound Modifiers	Avoid using compound modifiers. For example, instead of “a fish-eating hawk” use “a hawk that eats fish.”
Consistent Language	Consistent language from the scenario must be used throughout the scenario set. For example, if “parachute system” is used on first reference, “parachute system” must be used on each reference; not “parachute” or “system.”
Directional Nouns	Directional nouns are lowercase, when used to indicate direction, but capitalized when referring to a distinct region.

	<p>Examples:</p> <p>A north wind; North African countries; in northern Africa A southern climate; Southern Ohio; South America Eastern Illinois; the East Coast; travelling east</p>												
<p>Emphasis Terms</p>	<p>In items, emphasis terms are bolded at all grade levels. The use of emphasis terms is minimized.</p> <p>Examples:</p> <p>Which statement describes the most likely reason for the increase? Which evidence best supports the conclusion?</p>												
<p>Mathematical Formulas</p>	<p>Mathematical formulas may be given in table form as a graphic. The first column will show the formula or relationship, the second column will identify variables and include units and values for physical constants if needed.</p> <p>Example:</p> <p style="text-align: center;">Force Formulas</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Formula</th> <th style="text-align: center;">Information</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">$F_e = k \frac{q_1 q_2}{d^2}$</td> <td>$F_e$ represents electrostatic force</td> </tr> <tr> <td>k represents Coulomb’s constant</td> </tr> <tr> <td>q represents charge</td> </tr> <tr> <td>d represents distance</td> </tr> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">$F_g = -G \frac{m_1 m_2}{d^2}$</td> <td>$F_g$ represents gravitational force</td> </tr> <tr> <td>G represents the gravitational constant</td> </tr> <tr> <td>m represents mass</td> </tr> <tr> <td>d represents distance</td> </tr> </tbody> </table>	Formula	Information	$F_e = k \frac{q_1 q_2}{d^2}$	F_e represents electrostatic force	k represents Coulomb’s constant	q represents charge	d represents distance	$F_g = -G \frac{m_1 m_2}{d^2}$	F_g represents gravitational force	G represents the gravitational constant	m represents mass	d represents distance
Formula	Information												
$F_e = k \frac{q_1 q_2}{d^2}$	F_e represents electrostatic force												
	k represents Coulomb’s constant												
	q represents charge												
	d represents distance												
$F_g = -G \frac{m_1 m_2}{d^2}$	F_g represents gravitational force												
	G represents the gravitational constant												
	m represents mass												
	d represents distance												
<p>Numbers</p>	<p>General</p> <ul style="list-style-type: none"> • Use numerals for: <ul style="list-style-type: none"> ○ Numbers 10 and above ○ Referencing measurements and trials ○ Numbers that precede or follow symbols (e.g., 10%, \$20.00) ○ Numbers that appear in equations ○ Numbers used to solve mathematical problems • Spell out any number that begins a sentence, but try to rewrite the sentence, so it starts with another word. • Include a leading zero for all decimals (e.g., 0.37 not .37) • Commas <ul style="list-style-type: none"> ○ Use a comma in: <ul style="list-style-type: none"> ▪ numbers with five or more digits: 50,000 ▪ numbers with four digits only if other numbers in the item have five or more digits. 												

	<ul style="list-style-type: none"> ▪ numbers written as words: one million, eighty-seven thousand, three hundred twenty-two. ○ Do not use a comma in: <ul style="list-style-type: none"> ▪ numbers with four digits, unless other numbers in the item have five or more digits. ▪ compound measures, such as height measurements: "5 meters 9 centimeters tall" not "5 meters, 9 centimeters tall" • Use a mid-point en dash to indicate negative numbers • Fractions <ul style="list-style-type: none"> ○ As words, fractions are hyphenated as nouns, adjectives, and verbs. Example: Two-thirds of the eggs successfully hatched. ○ As numerals, fractions are stacked vertically and appear at 90% of the base text size :14 pt = 12.6 pt. Example: The student gave $\frac{1}{2}$ of the mice to her friend. • Exponents and subscripts are scaled to 70% of the base text size: 14 pt. = 9.8 pt. • Hyphenate units and numbers when used as adjectives. Example: Measure a 5-meter-by-5-meter plot. • Multiplication dot font specs in graphics: 15 pt Verdana regular, +1 baseline shift <p>Temperature</p> <ul style="list-style-type: none"> • Use the objective words "higher/lower" and "increase/decrease" instead of "warm/cold" and "raise/lower." • There is one space between the number and ° but there is no space between ° and C (e.g., 32 °C). <p>Times of Day</p> <p>The following conventions should be applied based on the presentation selected:</p> <ul style="list-style-type: none"> • Use numerals with the abbreviations AM and PM (Note that the abbreviations are regular caps) It is redundant to include phrases such as "in the morning," "in the afternoon," or "at night" after AM and PM. Example: The student began gathering data at 4:10 PM. • Spell out numbers used with the term o'clock: Example: The student observed the moon at eight o'clock. • To avoid confusion, spell out the terms noon and midnight (in place of 12 AM or 12 PM). Example: One bat species usually hunts for food from 7:00 PM to midnight.
People	People are referred to as students, scientists, teachers. Proper names are not used.
Plurals	<p>The plurals of capital letters used as words, numerals used as nouns, and abbreviations are usually formed by adding s. To avoid confusion, the plurals of lowercase letters are formed by adding an apostrophe and an s.</p> <p>Examples:</p> <p style="padding-left: 40px;">The students researched information about GMOs.</p> <p style="padding-left: 40px;">The 1880s were the best decade to grow corn.</p> <p style="padding-left: 40px;">The chromosomes were identified using x's and y's</p>
Tense	Past tense is the default tense.

Variables in Investigations	Grade 5: Changed (Manipulated), Measured (Responding), and Kept the Same Grade 8: Independent (Manipulated), Dependent (Responding), and Controlled (Kept the Same) Grade 11: Independent (Manipulated), Dependent (Responding), and Controlled (Kept the Same)
Verbs	The default is active verbs.
Spacing	<ul style="list-style-type: none"> • One space after a period. • One space after a colon. • One space between a number and unit of measure (5 °C, 10 g). • No space between a number and the percentage symbol (%). • No space between a whole number and fraction. • Two spaces after a bold letter for answer choice in an MC item.
Units	<ul style="list-style-type: none"> • Use singular units of measure with values less than one: e.g., 0.25 gram, not 0.25 grams. • Units of measure: <ul style="list-style-type: none"> ○ On first reference at all grade levels, units are written out and the abbreviation follows it in parentheses: 5 newtons (N), then 5 N on subsequent references. ○ Use only metric units. ○ Do not add an s for plurals of abbreviated units. ○ Use a singular verb with physical quantities. ○ Non-abbreviated units which include a mathematical operation should not include the mathematical symbol. For example, use “kilogram meters per second”, not “kilogram·meters/second” ○ Refer to the National Institute of Standards and Technology (NIST) for units not listed in Table 7.A <div style="background-color: #f0f0f0; padding: 10px; margin-top: 20px; text-align: center;"> <p>Table 7.A Units and Abbreviations</p> </div>

Unit	Abbreviation
centimeter	cm
gram	g
kilogram	kg
kilogram meter per second	kg·m/s
kilojoule	kJ
kilometer	km
kilometer per hour	km/h
liter	L
meter	m
milligram	mg
milliliter	mL
millimeter	mm
newton	N
degrees Celsius	°C
kelvin	K
day	day
minute	min
second	s
hour	hr
month	mo
year	yr

- Punctuation and Spacing
 - Do not include periods in abbreviated units: cm, s, m/s²
 - Include a space between numerals and abbreviated units: 30 cm, 90 °C
 - Use a middle dot in compound units involving multiplication: kg·m/s
- Square and Cubic Units
 - When units are spelled out, spell out the terms square and cubic.

	<ul style="list-style-type: none"> ○ When metric units are abbreviated, use superscript to show square and cubic units. <p>Example: The student drew a square with a side length of 6 centimeters (cm). What is the area, in square centimeters (cm²), of the student’s square?</p> <p>A 15 cm² B 30 cm² C 36 cm² D 54 cm²</p>
<p>Word Usage-Preferred</p>	<ul style="list-style-type: none"> ● Among vs. Between: use among to refer to a relationship shared by three or more people or things (among students); use between to refer to a relationship shared by two people or things (between a teacher and a student) ● Amount vs. Number: use amount to refer to something uncountable (the amount of snow); use number to refer to something countable (the number of pencils) ● Between: does not include two numbers on either side of the range (e.g., “The graph shows the population between 1990 and 2000.”). To include the beginning and ending years, the words from and to or an en-dash should be used. ● Fresh water vs. freshwater: freshwater is an adjective; fresh water is an adjective and a noun. Example: A freshwater lake is a lake with fresh water. ● Groundwater: this is always used: do not use ground water. ● Percent vs. Percentage <ul style="list-style-type: none"> ○ Use the word “percent” after a number word: e.g., Five percent of dogs have spots. ○ Use “percentage” as a stand-alone term: e.g., What percentage of the cats are white? ○ Use percentage for graph axes. ○ Use the % symbol after a numeral: e.g., Of the marbles in the jar, 40% are blue and 60% are red. ● Salt water vs. saltwater: saltwater is an adjective; salt water is an adjective and a noun. Example: A saltwater body of water is a body of water with salt water. ● Which vs. What: When all possible answers are included in the options, “What” is used to start the question. When more answers are possible outside of the options, “Which” is used to start the question ● Use Above Ground and Below Ground. Do not use aboveground or belowground or above-ground or below-ground. ● Forbidden Words <ul style="list-style-type: none"> ○ a lot ○ believe ○ correct ○ create ○ explain why ○ it/its ○ truth

- | | |
|--|---|
| | <ul style="list-style-type: none">○ why○ via○ destroy |
|--|---|

Appendices:

Appendix A Grid and Graphic Match Item Types

This section provides additional information for the Grid and Graphic Gap Match item types.

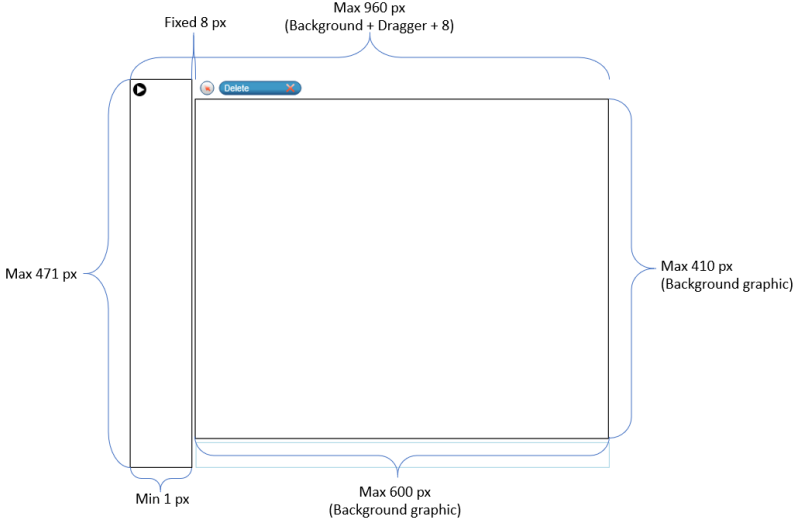
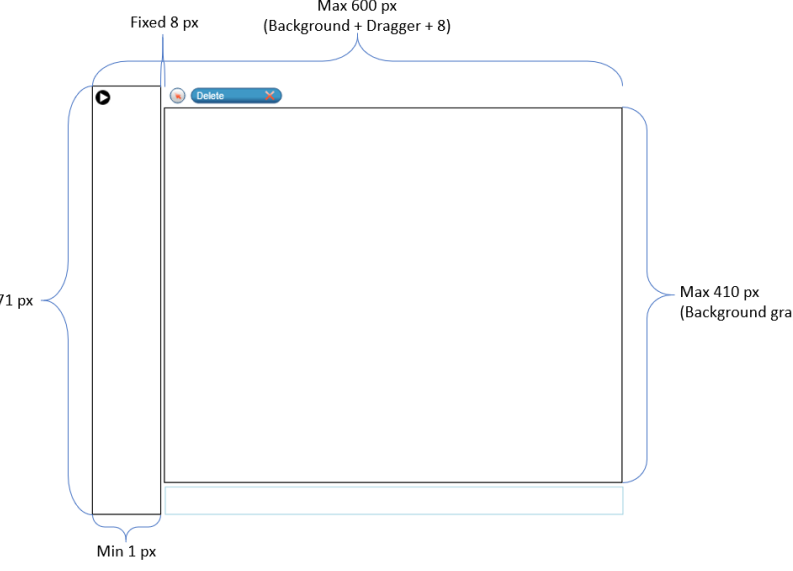
Table A.1 compares the general layout and utility of the two item types.

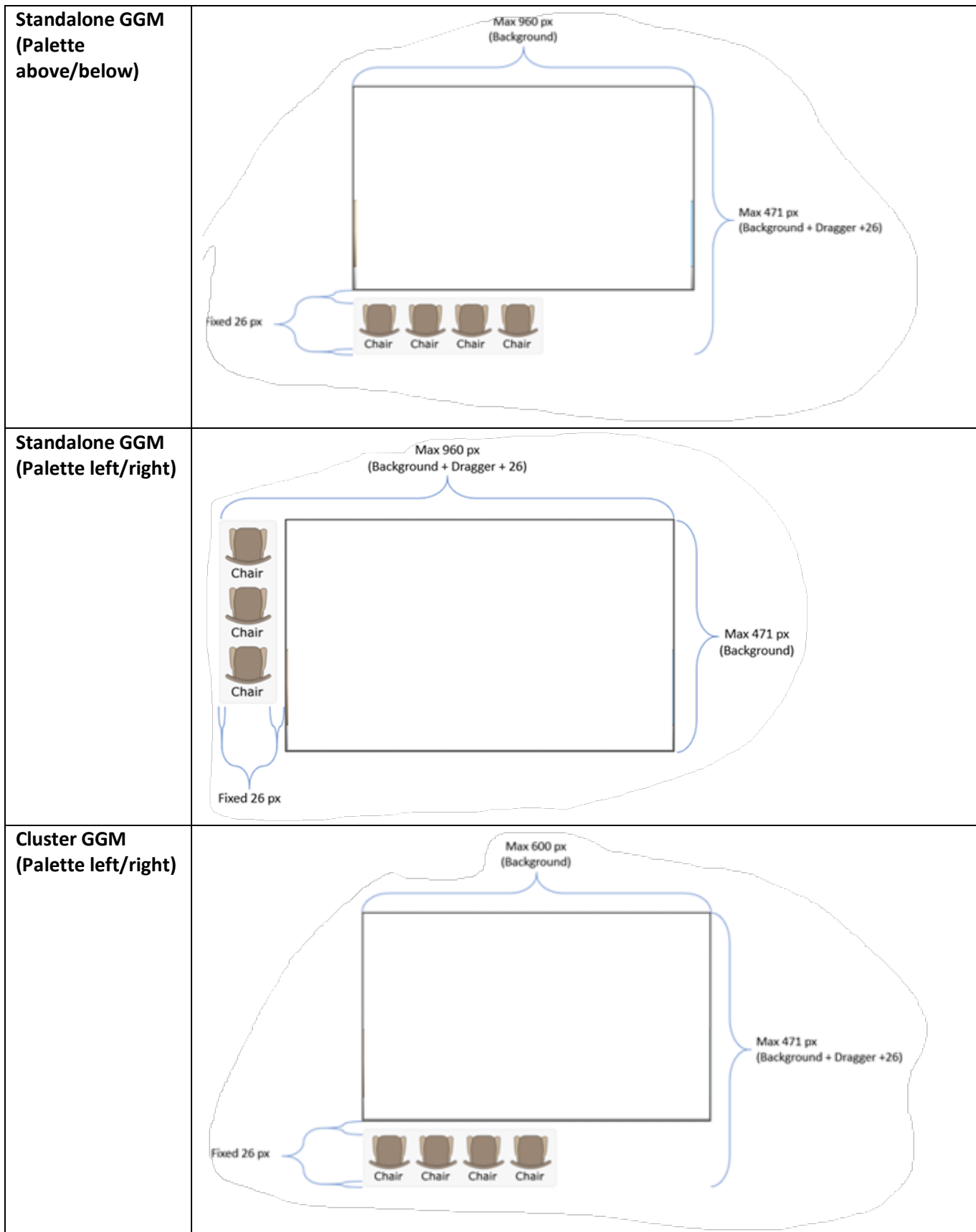
Table A.1 GI/GGM Comparison

	Graphic Gap Match (GGM)	Grid Item
Possible Uses		
Drag and drop	<input checked="" type="checkbox"/> Defined areas	<input checked="" type="checkbox"/> Anywhere or “snap”
Hotspot		<input checked="" type="checkbox"/>
Graphing		<input checked="" type="checkbox"/>
Drawing arrows		<input checked="" type="checkbox"/>
Drag and Drop Format		
Palette area can be left or right of placement area	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Palette area can be below or above placement area	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Non-refreshable draggers allowed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Refreshable draggers allowed	<input checked="" type="checkbox"/>	Infinite uses for refreshable
External palette area	<input checked="" type="checkbox"/> Cannot be titled	<input checked="" type="checkbox"/>
Internal palette area		<input checked="" type="checkbox"/>
Palette area does not require a fill	<input checked="" type="checkbox"/>	
Palette area may have a title		<input checked="" type="checkbox"/>
Target bays accept more than one dragger		<input checked="" type="checkbox"/>
Draggers cannot be placed on top of each other in the target bays	<input checked="" type="checkbox"/>	
Drag and drop functionality can be combined with hotspot and/or drawing functionality		<input checked="" type="checkbox"/>

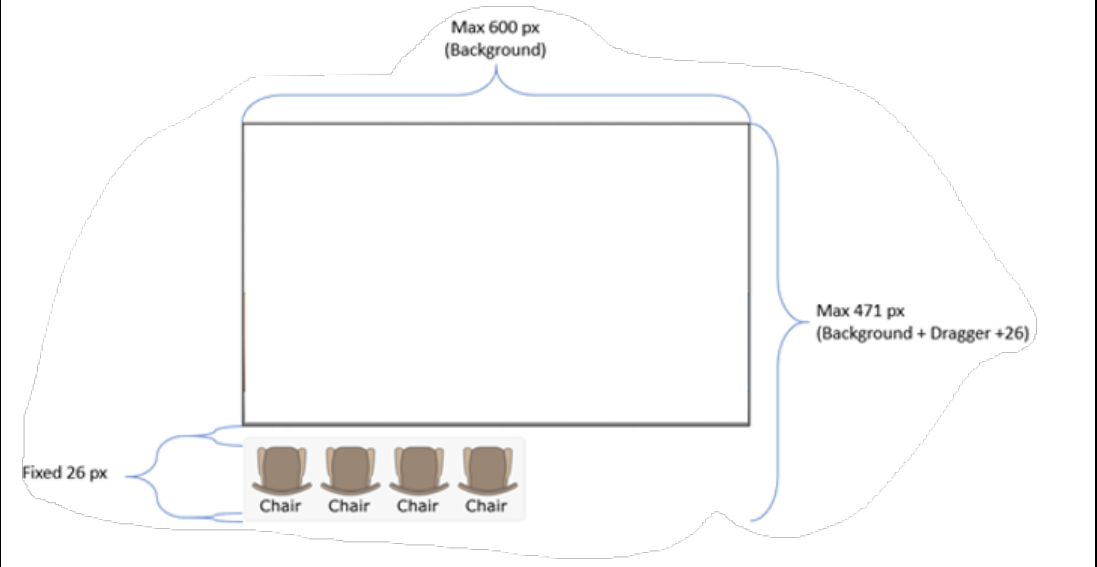
Table A.2 provides layouts and dimensions for the two item types.

Table A.2 GI/GGM Layouts and Dimensions

<p>Standalone Grid</p>	 <p>Fixed 8 px</p> <p>Max 960 px (Background + Dragger + 8)</p> <p>Max 471 px</p> <p>Min 1 px</p> <p>Max 600 px (Background graphic)</p> <p>Max 410 px (Background graphic)</p>
<p>Cluster Grid</p>	 <p>Fixed 8 px</p> <p>Max 600 px (Background + Dragger + 8)</p> <p>Max 471 px</p> <p>Min 1 px</p> <p>Max 410 px (Background graphic)</p>



**Cluster GGM
(Palette
above/below)**



Appendix B Specifications for Animations and Simulations

Animation Notes	Specs and Guidelines	Value
<p>Guidelines on File Formats</p>	<ul style="list-style-type: none"> • If an animation has an embedded audio or image, please refer to Table 1 for a list of respective specifications. • Animations may only have a single audio clip: either OGG or M4A. If both types of audio are supported, there must be a separate copy of the animation with OGG audio and another with M4A audio. • Embedded images within the animation should be using optimized SVG files. • The output for every animation must be a single HTML document. Therefore, all assets (such as JavaScript, HTML5, Bitmaps, and audio) must be encoded directly into the document. • The JavaScript embedded into the animation should only be the animation-specific JavaScript. No libraries (like jQuery, CreateJS, etc.) should be included in the animation. • No video of any kind can be embedded within an animation. • These files need to be portable across our supported platforms; i.e., any CSS or JavaScript used within the animations should be compatible with the <i>lowest</i> version of webview (iOS/iPadOS) or browser that CAI supports. 	<p>OGG, M4A</p> <p>Optimized SVG</p> <p>HTML</p> <p>See example JavaScript code on page 20, illustrating how to pass the base path in for the animation to link to the required libraries.</p>

Animation Notes	Specs and Guidelines	Value
Number of frames on single timeline	If you are using Flash to create the animation and then generate HTML5 files from it, then Flash can only allow one frame on the main timeline for the animation shell (API) to grab the animation in that frame.	1 frame
Number of movie clips	The entire animation should be contained in a single movie clip, and you must name it timelineAnimation so that the API can read it.	1 movie clip
Space at bottom of canvas	Leave an empty space at the bottom of your canvas for the animation controls, such as play, pause, and the scrubber.	25 px (height)
Canvas Size	The maximum dimension of an animation is dictated by what can fit inside the tutorial window and within a stimulus.	550 px (width) x 400 px (height) max
Maximum length of one animation	The maximum playing time is determined by content, not the test system. However, animation should stop at the end instead of looping.	10 seconds

Animations in Simulations	Description	Value
Acceptable formats	Simulation animations must adhere to all format constraints specified in “Acceptable Formats” in the table above, as well as any additional constraints specified in this table.	See “Acceptable Formats” in the Animation table above.
Canvas Size	Maximum dimension supported for HTML 5 animations within a simulation. It conforms to the maximum size for standalone animations specified above.	550 px (width) x 400 px (height) maximum
Animation Accessibility		
<p>Interactive Animation</p> <p>An interactive animation contains user interface controls embedded within the animation. Thus, the student interacts directly with the animation.</p> <p>There is no concept of run time in an interactive animation.</p>	<ul style="list-style-type: none"> • Visually Impaired <p>Interactive animations in simulations are not supported for visually impaired.</p>	N/A
	<ul style="list-style-type: none"> • Motor Impaired <p>All embedded UI controls are manipulated via keyboard mappings.</p> <p>In visual accessibility mode, each interactive element in an animation is annotated (overlaid) with a small, unique letter in the upper left corner of the element. These letters are used to specify which letter key is used to directly select the element.</p>	<ul style="list-style-type: none"> • Tab Key: Browse from one element to another. • Enter Key: Select the element with focus. • A . . . Z Keys (Case insensitive): Move to and select a specific element based on its accessibility annotation. • Space Key: Execute the pending action. • Backspace Key: Delete the selected element. • Arrow keys: Modify the position of the selected element.
	<ul style="list-style-type: none"> • Hearing Impaired <p>Embedded speech</p>	Closed captioning
<p>Simulation Animations & Time-based Animation</p> <p>A time-based interaction begins playing and runs until it ends.</p>	<ul style="list-style-type: none"> • Visually Impaired <p>Embedded speech</p>	Embedded text is sent to a window for screen reading. Output to window for screen reader must be synced with animation.
	<ul style="list-style-type: none"> • Motor Impaired Animation <p>Control</p>	Keys mapped to animation scrubber control, if present
	<ul style="list-style-type: none"> • Hearing Impaired <p>Embedded speech</p>	Closed captioning

Animations in Simulations	Description	Value
<p>Stand-alone Animations & Time-based Animation</p> <p>A standalone animation is not associated with a simulation but stands on its own.</p> <p>Currently, standalone interactive animations are not supported.</p>	<ul style="list-style-type: none"> • Visually Impaired Embedded speech 	<p>Embedded text is sent to a window for screen reading. Output to window for screen reader must be synched with animation.</p>
	<ul style="list-style-type: none"> • Motor Impaired Animation Control 	<p>Keys mapped to animation scrubber control, if present</p>
	<ul style="list-style-type: none"> • Hearing Impaired Embedded speech 	<p>Closed captioning</p>

Example JavaScript Linking an Animation to Required Libraries

```
var urlParams;

(window.onpopstate = function () {

    var match,

        pl = /\+/g, // Regex for replacing addition symbol with a space
        search = /(?:[&=]+)=?(?:[&]*)/g,

        decode = function (s) { return decodeURIComponent(s.replace(pl, " ")); },
        query = window.location.search.substring(1);    urlParams = {};

        while (match = search.exec(query))
urlParams[decode(match[1])] = decode(match[2]);

})();

    var sUrl = urlParams["scriptUrl"];    var cid = urlParams["cid"];    if (sUrl != undefined) {
document.write('<script src="'+ sUrl +'\CreateJS\easejs-0.8.2.min.js"></script>');
document.write('<script src="'+ sUrl +'\CreateJS\easejs-0.6.0.min.js"></script>');
document.write('<script src="'+ sUrl +'\CreateJS\tweenjs-0.4.0.min.js"></script>');
document.write('<script src="'+ sUrl +'\CreateJS\movieclip-0.6.0.min.js"></script>');
document.write('<script src="'+ sUrl +'\CreateJS\AnimationController.js?cid='+ cid
+'"></script>');

    }
}
```