Smarter Balanced QTI Implementation Guide

Version History

Date	Version	Updated By	Description of Updates
January 31, 2022	1.0	Peter Flores, Alex Dean	Initial Release
July 21, 2022	1.1	Alex Dean, Peter Flores	Content Updates • 3.10 - GI Images Added • 5.1 - Text to Speech New Sections • 5.2 - MathML and TTS Markup • 7.3 - CSS Table Cell Widths • 10 - Packaging • 10.1 - Language Variant
April 5, 2023	1.2	Alex Dean	New Section • 4.3 - Slideshow
April 26, 2023	1.3	Alex Dean	Information update • TI input identifiers in section 3.8.3 • TTS VI for images section 5.1
June 27, 2024	1.4	Alex Dean	Information update • Changed qti-height-lines-# to sbac-height-lines-# styles for SA and WER item types in section 3.7 and 3.9

Table of Contents

Version History

Table of Contents

1 Purpose

2 Smarter Balanced Item Types

3 Item Type Interaction Details

3.1 Multiple Choice (MC)

3.1.1 MC Layout Overview

3.1.2 MC User Interaction

Mouse Interaction

Keyboard Interaction
3.1.3 MC Attributes
Interaction Attributes
Choice Attribute
Interaction Code Sample
3.2 Multiple Select (MS)
3.2.1 MS Layout Overview
3.2.2 MS User Interaction
Mouse Interaction
Keyboard Interaction
3.2.3 MS Attributes
Interaction Attribute
Choice Attribute
Interaction Code Sample
3.3 Evidence Based Selected Response (EBSR)
3.3.1 EBSR Layout Overview
3.3.2 EBSR User Interaction
Mouse Interaction
Keyboard Interaction
3.3.3 EBSR Attributes
Interaction Attribute
Choice Attribute
Interaction Code Sample
3.4 Equation (EQ)
3.4.1 EQ Layout Overview
3.4.2 EQ User Interaction
Mouse Interaction
Keyboard Interaction
3.4.3 EQ Attributes
Interaction Attribute
Choice Attribute
Interaction Code Sample
3.5 Hot Text Question - Selectable (HTQ, HTQS)
3.5.1 HTQS Layout Overview
3.5.2 HTQS User Interaction

Mouse Interaction
Keyboard Interaction
3.5.3 HTQS Attributes
Interaction Attribute
Choice Attribute
Interaction Code Sample
3.6 Match Interaction (MI)
3.6.1 MI Layout Overview
3.6.2 MI User Interaction
Mouse Interaction
Keyboard Interaction
3.6.3 MI Attributes
Interaction Attribute
Choice Attribute
Interaction Code Sample
3.7 Short Answer (SA)
3.7.1 SA Layout Overview
3.7.2 SA User Interaction
Mouse Interaction
Keyboard Interaction
3.7.3 SA Attributes
Interaction Attribute
Choice Attribute
Interaction Code Sample
3.8 Table Interaction (TI)
3.8.1 TI Layout Overview
3.8.2 TI User Interaction
Mouse Interaction
Keyboard Interaction
3.8.3 TI Attributes
Interaction Attribute
Choice Attribute
Interaction Code Sample
3.9 Writing Extended Response (WER)
3.9.1 WER Layout Overview

3.9.2 WER User Interaction
Mouse Interaction
Keyboard Interaction
3.9.3 WER Attributes
Interaction Attribute
Choice Attribute
Interaction Code Sample
3.10 Grid Interaction (GI)
3.10.1 GI Layout Overview
3.10.2 GI User Interaction
Mouse Interaction - Drag and Drop
Mouse Interaction - Hot Spot
Mouse Interaction - Graphing
Keyboard Interaction
3.10.3 GI Attributes
Interaction Attribute
Interaction Code Sample
4 Shared Stimulus (Stim)
4.1 Overview
4.2 Shared Stimulus
4.3 Slideshow
5 Catalog
5.1 Text to Speech: Screen Reader and Computer Read Aloud
5.2 MathML and TTS Markup
6 QTI Stylesheet Element
7 CSS
7.1 QTI Shared CSS
7.2 SBAC CSS Styles
7.3 SBAC CSS Table Cell Width Styles
8 Rubric Block
9 Response Processing and Outcome Declarations
10 Packaging
10.1 Language Variant Content

1 Purpose

This document is designed to be complementary to the IMS Best Practices and Implementation Guide and used to assist test implementation teams when implementing Smarter Balanced (SB) QTI 3.0 content. It should also be used in conjunction with the Smarter Balanced QTI 3.0 Certification Content Package as references to specific items and examples are available within the Certification Content Package.

Disclaimer

This document and the resources linked here-in are intended to be used with the understanding that they represent a subset of the necessary resources Members and Service Providers should utilize within the planning, implementation, delivery, and reporting of Smarter Balanced Assessments. It is an active, dynamically changing document that will be updated as new information or resources become available. This document should not be considered as comprehensive or exhaustive of the information necessary for successful implementation and does not replace the IMS Best Practices and Implementation Guide**.**

Relationship to SmarterApp Assessment Item Format

Content delivered in QTI 3.0 should be considered new.

Documenting the difference between QTI 3.0 and content developed in the SmarterApp Assessment Item Format (SAAIF) is captured within the SAAIF to QTI Item Mapping document.

2 Smarter Balanced Item Types

This section provides a list of the item types and their abbreviation or initials for reference. These are the items that are certified QTI 3.0 by IMS, unless noted otherwise, and delivered by Smarter Balanced. See Item Type Interaction Detail Section for more details.

Smarter Balanced Items Types:

- Multiple Choice (MC)
- Multiple Select (MS)
- Evidence-Based Selected Response (EBSR)
- Hot Text Question - Selectable (HTQS)*
- Equation (EQ)
- Match Interaction (MI)
- Short Answer (SA)
- Table Interaction (TI)
- Written Extended Response (WER)
- Grid Interaction (GI)

Stimulus (Stim) are not included in the Item Types list, but can be considered items within the QTI context. These are addressed in the Shared Stimulus Section.

* Hot Text Question - Orderable (HTQO) items are no longer supported.

For reference: SAAIF item types

3 Item Type Interaction Details

3.1 Multiple Choice (MC)

3.1.1 MC Layout Overview

For multiple choice items, single cardinality, there is a prompt area followed by a set of three to four options accompanied by radio buttons. Options are displayed vertically. Option letter (e.g. A, B, C, D) is rendered within the radio button. Radio button is larger to increase accessibility. The candidate's task is to select one choice. Expected rendering and behaviors of Choice Interactions are driven by the cardinality attribute of the associated response declaration; i.e., single or multiple, and further supported by the interaction's class attribute.

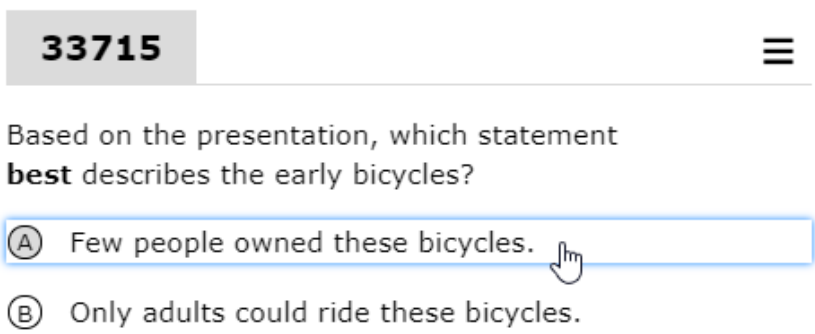
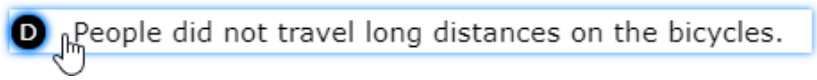
Example Item QTI specific link will be provided at a later date.

SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-33715

3.1.2 MC User Interaction

The items used to provide visual representations of interactions may or may not coincide with the Code Sample in later sections.

Mouse Interaction

Interaction Description	Visual Example (if available)
When a user hovers over an answer option, the entire answer option is outlined in blue and the radio button is highlighted in gray to show the mouse focus.	
Once an answer is selected, the radio button is filled.	

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)

On tab key press, a blue reticle highlights the selection, upon subsequent tab key presses navigation proceeds top-down through the document object model (DOM) until the option list is encountered.	**33715** Based on the presentation, which statement **best** describes the early bicycles? Ⓐ Few people owned these bicycles. Ⓑ Only adults could ride these bicycles. Ⓒ They were easier to ride than modern bicycles. Ⓓ People did not travel long distances on the bicycles. **33715** Based on the presentation, which statement **best** describes the early bicycles? Ⓐ Few people owned these bicycles. Ⓑ Only adults could ride these bicycles. Ⓒ They were easier to ride than modern bicycles. Ⓓ People did not travel long distances on the bicycles.
On subsequent tab presses, navigation proceeds through the option list, highlighting each option. Options are selected upon space-bar press. On tab key press, option remains selected, and option list is exited.	Based on the presentation, which statement **best** describes the early bicycles? Ⓐ Few people owned these bicycles. Ⓑ Only adults could ride these bicycles. Ⓒ They were easier to ride than modern bicycles. Ⓓ People did not travel long distances on the bicycles.

	Ⓐ Few people owned these bicycles. Ⓑ Only adults could ride these bicycles. Ⓒ They were easier to ride than modern bicycles. Ⓓ People did not travel long distances on the bicycles.

Additional notes: Response option(s) must support down-arrow navigation for screen readers. Additionally, up/down-arrow navigation between response options must not auto-select an option. Response option(s) can be selected/de-selected with the spacebar and/or (optionally) the enter key.

3.1.3 MC Attributes

Interaction Attributes

MC items use the Choice Interaction attribute; these are mapped to **qti-choice-interaction (single cardinality)**. The Choice Interaction attribute presents a collection of choices to the candidate in the form of radio buttons. The Choice Interaction is made up of Choices, which use the **qti-simple-choice** element to present an ordered list of choices to the candidate.

Name	Usage	Value	Default
class	Optional	"sbac"	
response-identifier	Required	"RESPONSE"	
min-choices	Optional	Non-negative integer greater than zero	1
max-choices	Optional	Non-negative integer greater than zero	1

Smarter Balanced does not utilize the "orientation" or "shuffle" attributes of the Choice Interaction. Consequently, delivery platforms should interpret the absence of these attributes as having their default QTI 3 values; i.e., orientation="vertical" and shuffle="false".

Choice Attribute

Name	Usage	Value	Default
identifier	Required	A valid QTI Identifier: e.g. "ChoiceB"	N/A

Smarter Balanced **does not** utilize any of the following Choice attributes: "template-identifier", "show-hide", and "fixed".

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
  xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
  xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
  xmlns:m3="http://www.w3.org/1998/Math/MathML"
  xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
  xmlns:xi="http://www.w3.org/2001/XInclude"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="choice-mc"
title="choice-single-cardinality" xml:lang="en" time-dependent="false">
  <qti-response-declaration identifier="RESPONSE" cardinality="single" base-
type="identifier">
    <qti-correct-response>
      <qti-value>ChoiceA</qti-value>
    </qti-correct-response>
  </qti-response-declaration>
  <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
normal-maximum="1.0" normal-minimum="0.0">
    <qti-default-value>
      <qti-value>0</qti-value>
    </qti-default-value>
  </qti-outcome-declaration>
  <qti-item-body class="sbac">
    <div class="qti-layout-row">
      <div class="qti-layout-col8 qti-layout-offset2">
        <qti-choice-interaction class="sbac" response-identifier="RESPONSE"
max-choices="1" min-choices="1">
        <qti-prompt>
          Multiple Choice interaction, single cardinality (radio buttons), with SBAC rendering
and behaviors.
        </qti-prompt>
        <qti-simple-choice identifier="ChoiceA">
          <p>You must stay with your luggage at all times.</p>
        </qti-simple-choice>
        <qti-simple-choice identifier="ChoiceB">
          <p>Do not let someone else look after your luggage.</p>
        </qti-simple-choice>
        <qti-simple-choice identifier="ChoiceC">
          <p>Remember your luggage when you leave.</p>
        </qti-simple-choice>
      </qti-choice-interaction>
      </div>
    </div>
```

```
  </qti-item-body>
</qti-assessment-item>
```

3.2 Multiple Select (MS)

3.2.1 MS Layout Overview

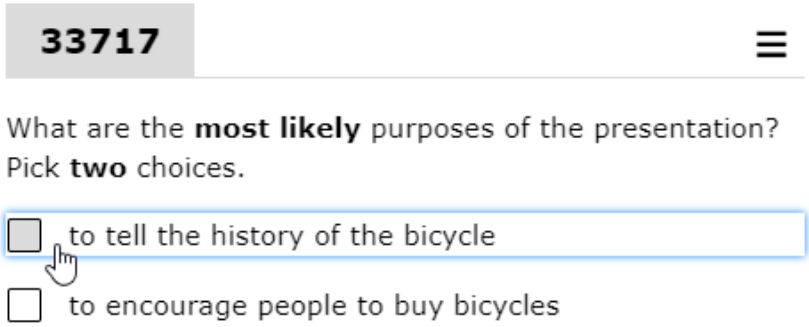
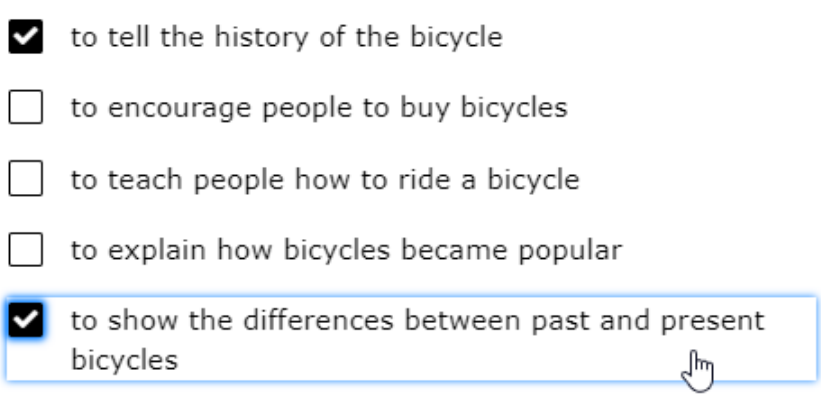
Multiple select or Multi-select (MS) items include a prompt area followed by 4-7 answer options. Response options appear vertically. Once an option is selected, a check mark appears in the box. Users may select one or multiple options depending on the question set up.

Example Item: QTI specific link will be provided at a later date.

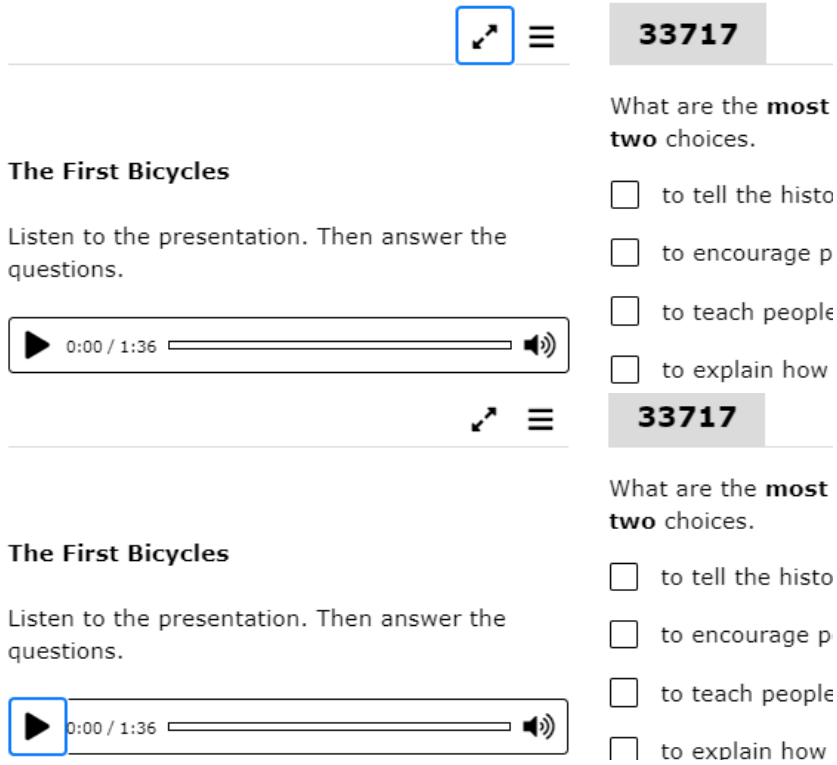
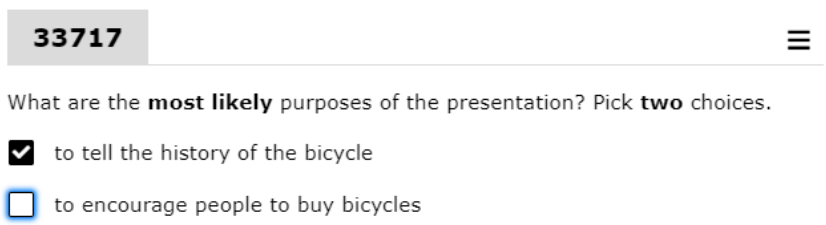
SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-33717

3.2.2 MS User Interaction

Mouse Interaction

Interaction Description	Visual Example (if available or applicable)
Upon hover-over of the selection-box option(s), the mouse cursor changes to a hand with a pointer-finger and the option is highlighted in blue and shades the checkbox gray.	
Upon selection, the box converts to a checkmark displayed on a contrasted background.	

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)
On tab key press, a blue reticle highlights the selection, upon subsequent tab key presses navigation proceeds top-down, left-right through the stimulus, then to the top of the response section until the option list is encountered. Shift+Tab allows a user to proceed upwards.	
Options are selected by pressing the space-bar. Upon selection, the box converts to a checkmark displayed on a contrasted background.	

3.2.3 MS Attributes

Interaction Attribute

MS items use the Choice Interaction attribute; these are mapped to **qti-choice-interaction (multiple cardinality)**. The Choice Interaction attribute presents a collection of choices to the candidate in the form of checkboxes. The Choice Interaction is made up of Choices, which use the **qti-simple-choice** element to present an ordered list of choices to the candidate.

Name	Usage	Value	Default

class	Optional	“sbac”	
response-identifier	Required	“RESPONSE”	
min-choices	Optional	Non-negative integer	
max-choices	Optional	Non-negative integer less than max number of options	

Smarter Balanced does not utilize the “orientation” or “shuffle” attributes of the Choice Interaction. Consequently, delivery platforms should interpret the absence of these attributes as having their default QTI 3 values; i.e., orientation=”vertical” and shuffle=”false”.

Choice Attribute

Name	Usage	Value	Default
identifier	Required	“choice-ms”	

Smarter Balanced **does not** utilize any of the following Choice attributes: “template-identifier”, “show-hide”, and “fixed”.

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
  xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
  xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
  xmlns:m3="http://www.w3.org/1998/Math/MathML"
  xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
  xmlns:xi="http://www.w3.org/2001/XInclude"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="choice-ms"
title="choice-multiple-cardinality" xml:lang="en" time-dependent="false">
  <qti-response-declaration identifier="RESPONSE" cardinality="multiple" base-
type="identifier">
    <qti-correct-response>
      <qti-value>O</qti-value>
      <qti-value>H</qti-value>
    </qti-correct-response>
  </qti-response-declaration>
  <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
normal-maximum="1.0" normal-minimum="0.0">
    <qti-default-value>
```

```
      <qti-value>0</qti-value>
    </qti-default-value>
  </qti-outcome-declaration>
  <qti-item-body class="sbac">
    <div class="qti-layout-row">
      <div class="qti-layout-col8 qti-layout-offset2">
          <qti-choice-interaction class="sbac" response-identifier="RESPONSE"
max-choices="2" min-choices="1">
          <qti-prompt>
            Multiple Choice interaction, multiple cardinality (checkboxes), with SBAC
rendering and behaviors.
          </qti-prompt>
          <qti-simple-choice identifier="H">Hydrogen</qti-simple-choice>
          <qti-simple-choice identifier="He">Helium</qti-simple-choice>
          <qti-simple-choice identifier="C">Carbon</qti-simple-choice>
          <qti-simple-choice identifier="O">Oxygen</qti-simple-choice>
          <qti-simple-choice identifier="N">Nitrogen</qti-simple-choice>
          <qti-simple-choice identifier="Cl">Chlorine</qti-simple-choice>
        </qti-choice-interaction>
      </div>
    </div>
  </qti-item-body>
</qti-assessment-item>
```

3.3 Evidence Based Selected Response (EBSR)

3.3.1 EBSR Layout Overview

EBSR items combine two sets of stems and response options into a single item.

The layout provides a stimulus on the left side. On the right side, a vertical display of response options.

First set of response options are multiple choice where only one answer can be selected.

Second set of response options can include either multiple choice, where only one answer can be selected, or a multi-select set where more than one answer can be selected.

For multiple choice, letter options are rendered within the radio buttons.

Example Link: QTI specific link will be provided at a later date.

SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-27965

3.3.2 EBSR User Interaction

EBSR item interactions are identical to MC and MS items, however EBSR items can have MC, MS, or both interaction types within a single EBSR item. Please refer to Multiple Choice User Interaction and Multi-Select User Interaction sections for more information.

Mouse Interaction

Interaction Description	Visual Example (if available or applicable)

On mouse hover, the option is highlighted in a blue rectangle. Upon option selection, radio button inner color is darkened, radio button and answer option is highlighted. Please refer to Multiple Choice User Interaction and Multi-Select User Interaction sections for more information.	**Part A** Why did people see the Hoover Dam as a "source of hope"? Ⓐ It tamed the Colorado River. Ⓑ It led to the creation of a town. Ⓒ It provided jobs for many people. Ⓓ It generated electricity for three different states. **Part A** Why did people see the Hoover Dam as a "source of hope"? Ⓐ It tamed the Colorado River. Ⓑ It led to the creation of a town. Ⓒ It provided jobs for many people. Ⓓ It generated electricity for three different states.
On option loose-focus, selected radio button retains darker inner color and highlight. Option with focus has the same visual cues as above. Please refer to Multiple Choice User Interaction and Multi-Select User Interaction sections for more information.	**Part A** Why did people see the Hoover Dam as a "source of hope"? Ⓐ It tamed the Colorado River. Ⓑ It led to the creation of a town. Ⓒ It provided jobs for many people. Ⓓ It generated electricity for three different states.

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)

On tab key press, a blue reticle highlights the selection, upon subsequent tab key presses navigation proceeds top-down, left-right through the stimulus, then to the top of the response section until the option list is encountered. Shift+Tab allows a user to proceed upwards. Please refer to Multiple Choice User Interaction and Multi-Select User Interaction sections for more information.	**27965** The following question has two parts. First, answer part A. Then, answer part B. **Part A** Why did people see the Hoover Dam as a "source of hope"? Ⓐ It tamed the Colorado River. Ⓑ It led to the creation of a town. Ⓒ It provided jobs for many people. Ⓓ It generated electricity for three different states. **Part A** Why did people see the Hoover Dam as a "source of hope"? Ⓐ It tamed the Colorado River. Ⓑ It led to the creation of a town. Ⓒ It provided jobs for many people. Ⓓ It generated electricity for three different states.

For EBSR containing multiple choice (shown): On subsequent tab presses, navigation proceeds through the option list, highlighting each option. Options are selected upon space-bar press. For EBSR containing multiple select: Options are selected by pressing the space-bar. Upon selection, the box converts to a checkmark displayed on a contrasted background. A mix of these interactions will occur if an item contains both interaction types. Please refer to Multiple Choice User Interaction and Multi-Select User Interaction sections for more information.	**Part A** Why did people see the Hoover Dam as a "source of hope"? Ⓐ It tamed the Colorado River. Ⓑ It led to the creation of a town. Ⓒ It provided jobs for many people. Ⓓ It generated electricity for three different states. **Part B** Which detail from the presentation **best** supports your answer in part A? Ⓐ On October 9, 1936, the dam began to generate electricity for people in three different states. **Part A** Why did people see the Hoover Dam as a "source of hope"? Ⓐ It tamed the Colorado River. Ⓑ It led to the creation of a town. Ⓒ It provided jobs for many people. Ⓓ It generated electricity for three different states. **Part B** Which detail from the presentation **best** supports your answer in part A? Ⓐ On October 9, 1936, the dam began to generate electricity for people in three different states.

On tab key press, option remains selected, and user is taken to the next set of options, or if no further option lists exist navigation exists the option selection. Please refer to Multiple Choice User Interaction and Multi-Select User Interaction sections for more information.	**Part A** Why did people see the Hoover Dam as a "source of hope"? Ⓐ It tamed the Colorado River. Ⓑ It led to the creation of a town. Ⓒ It provided jobs for many people. Ⓓ It generated electricity for three different states. **Part B** Which detail from the presentation **best** supports your answer in part A? Ⓐ On October 9, 1936, the dam began to generate electricity for people in three different states. Ⓑ Many dams were built to control flooding, but the Hoover Dam used water to produce electricity.

3.3.3 EBSR Attributes

Interaction Attribute

SB utilizes the following tags when authoring items for the following QTI 3.x interactions. Note that SB EBSR items are "composite" items - meaning that they contain two different types of interactions within a single item - containing MC and MS interactions.

- qti-choice-interaction (single cardinality)
- qti-choice-interaction (multiple cardinality)

Please see sections for Multiple Choice and Multi-Select items for details.

Choice Attribute

Please see sections for Multiple Choice and Multi-Select items for details.

Name	Usage	Value	Default
identifier	Required* *May contain multiple, varying	A valid QTI Identifier: e.g. "ChoiceB"	N/A

	values	“choice-ms”	

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
 xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
 xmlns:m3="http://www.w3.org/1998/Math/MathML"
 xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="sbac-200-27965"
title="27965" xml:lang="en" tool-name="TIMS QTI 3.0 Export" tool-version="5.10.2"
time-dependent="false">
 <qti-response-declaration identifier="RESPONSE-PART-A" cardinality="single" base-
type="identifier">
 <qti-correct-response>
 <qti-value>C</qti-value>
 </qti-correct-response>
 </qti-response-declaration>
 <qti-response-declaration identifier="RESPONSE-PART-B" cardinality="single" base-
type="identifier">
 <qti-correct-response>
 <qti-value>C</qti-value>
 </qti-correct-response>
 </qti-response-declaration>
 <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
normal-maximum="1.0" normal-minimum="0.0">
 <qti-default-value>
 <qti-value>0</qti-value>
 </qti-default-value>
 </qti-outcome-declaration>
 <qti-assessment-stimulus-ref identifier="sbac-200-170720" href="../sbac-200-
170720/sbac-200-170720.xml" />
 <qti-stylesheet href="sbac-qti-assessment.css" type="text/css" />
 <qti-item-body class="sbac">
 <div data-catalog-idref="item-27965-global" class="sbac-global-item-catalog-ref" />
 <div class="qti-layout-row sbac-pane-scrolling">
 <div class="qti-layout-col5 sbac-left-pane">
 <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-
aloud">Passage</h2>
```

<h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Question</h2>

The following question has two parts. First, answer part A. Then, answer part B.

<h3 class="choicePart">Part A</h3>

Why did people see the Hoover Dam as a “source“source of hope?”hope”?

<qti-choice-interaction **class="sbac" response-identifier="RESPONSE-PART-A"** max-choices="1" min-choices="1">
<**qti-simple-choice identifier="A"**>
It tamed the Colorado River.
</qti-simple-choice>
<qti-simple-choice identifier="B">
It led to the creation of a town.
</qti-simple-choice>
<qti-simple-choice identifier="C">
It provided jobs for many people.
</qti-simple-choice>
<**qti-simple-choice identifier="D"**>
It generated electricity for three different states.
</qti-simple-choice>
</qti-choice-interaction>

<h3 class="choicePart">Part B</h3>

Which detail from the presentation best bestsupports your answer in part AA?

<qti-choice-interaction **class="sbac" response-identifier="RESPONSE-PART-B"** max-choices="1" min-choices="1">
<qti-simple-choice identifier="A">
On October 9,9,<span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-

aloud">1936,1936,
the dam began to generate electricity for people in three different states.
</qti-simple-choice>
<qti-simple-choice identifier="B">
Many dams were built to control flooding, but the Hoover Dam used water to
produce electricity.
</qti-simple-choice>
<qti-simple-choice identifier="C">
Many Americans did not have jobs and the construction of the dam created work for
thousands of people.
</qti-simple-choice>
<qti-simple-choice identifier="D">
The federal government created an entire town called Boulder City to provide a place
to stay for workers and their families.
</qti-simple-choice>
</qti-choice-interaction>

</qti-item-body>
</qti-assessment-item>

3.4 Equation (EQ)

3.4.1 EQ Layout Overview

The Equation item type consists of a prompt followed by one or more entry boxes and an on-screen keypad that contains numbers, text variables, and necessary mathematical symbols.

Equation items are 769 pixels wide or use 100% of the available response area width (whichever is smaller). The default height is 254 pixels. The item indicates which of 11 pre-defined layouts should be used for the math input key panel. The answer space might include text to the left, right or both sides.

Within the CDATA, implementation partners should present the "entrybox" element before the keypad entry tool.

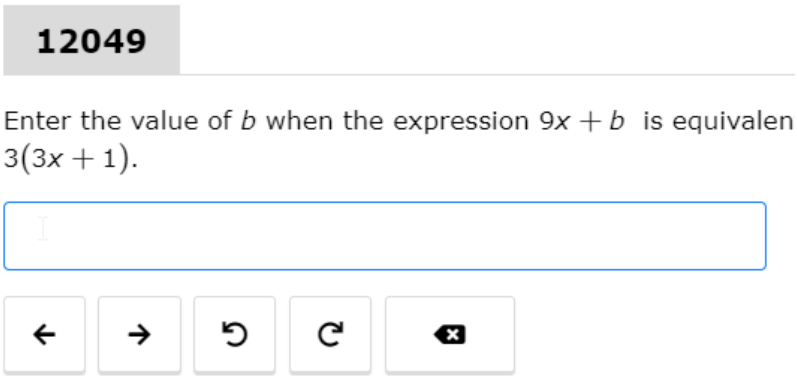
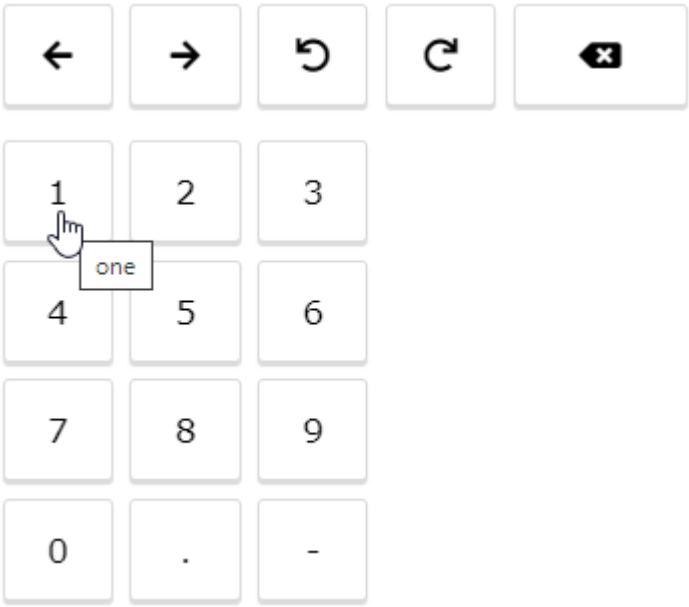
Example Link: QTI specific link will be provided at a later date.

SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-12049

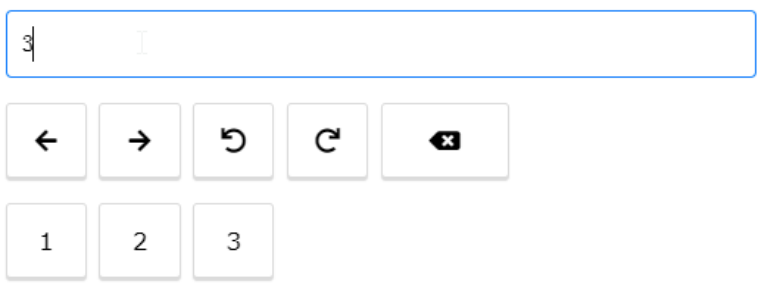
3.4.2 EQ User Interaction

Mouse Interaction

Interaction Description	Visual Example (if available or applicable)

When the user hovers over the response entry section a mouseover event changes the pointer into text cursor. Upon left mouse-click, the field entry is selected and highlighted by a blue reticle.	
When the pointer hovers over the on-screen keypad, a mouseover event changes the pointer into a hand with an outstretched index finger and an ARIA label will display the numerical selection in text form. Upon left mouse click, the selection will turn solid blue.	

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)
On tab key press, navigation proceeds top-down through the DOM until the answer entry box is selected. Keyboard numbers keys are then used to enter in response. Please note that advanced equation keyboard functions are included in items within the "custom-option" element surrounded by CDATA.	Enter the value of b when the expression $9x + b$ is equivalent to $3(3x + 1)$. 

3.4.3 EQ Attributes

Interaction Attribute

EQ items use the Custom Interaction attribute; these are mapped to **qti-custom-interaction**. The Custom Interaction attribute presents an entry field for responses.

Name	Usage	Value	Default
class	Optional	"tei-sbee"	

response-identifier	Required	“RESPONSE”	

Choice Attribute

Given that this is a response entry item, there is no choice attribute.

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
 xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
 xmlns:m3="http://www.w3.org/1998/Math/MathML"
 xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="sbac-200-
183216" title="183216" xml:lang="en" tool-name="TIMS QTI 3.0 Export" tool-
version="5.10.4" time-dependent="false">
 <qti-response-declaration identifier="RESPONSE" cardinality="single" base-type="string"
/>
 <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
normal-maximum="1.0" normal-minimum="0.0">
 <qti-default-value>
 <qti-value>0</qti-value>
 </qti-default-value>
 </qti-outcome-declaration>
 <qti-outcome-declaration identifier="Responses" cardinality="ordered" base-
type="string" />
 <qti-outcome-declaration identifier="Response1" cardinality="single" base-type="string"
/>
 <qti-stylesheet href="sbac-qti-assessment.css" type="text/css" />
 <qti-item-body class="sbac">
 <div data-catalog-idref="item-183216-global" class="sbac-global-item-catalog-ref" />
 <div class="qti-layout-row">
 <div class="qti-layout-col8 qti-layout-offset2">
 <div class="prompt">
 <p>The line plot shows the distances, in miles, Rex <span data-catalog-idref="glossary-
term-4" data-sbac-term="walked">walked</span> on seven days.</p>
 <br />
 <p><img aria-describedby="img-descript-0"
src="item_183216_v0_graphics1_png256.png" alt="" /></p>
 <p id="img-descript-0" class="qti-visually-hidden" data-qti-suppress-tts="computer-
read-aloud">The line plot is titled: Distances Rex Walked (mi). Each X represents one
```

day. The line plot has a range from 1 1/4 to 3 1/4, increasing in increments of 2/4. The data points are: 1 3/4: X; 2: X; 2 1/2: X X X; 3: X; 3 1/4 X.

Enter the total distance, in miles, Rex walked for all seven days.days.

<**qti-custom-interaction response-identifier="RESPONSE" class="tei-sbee"**>
<custom-option><![CDATA[<editorconfig>
<tabConfig>
<tab xmlns="http://www.w3.org/1999/xhtml" title="Basic">
<grid cols="3" title="Numbers">
<item title="one" aria-label="one">1</item>
<item title="two" aria-label="two">2</item>
<item title="three" aria-label="three">3</item>
<item title="four" aria-label="four">4</item>
<item title="five" aria-label="five">5</item>
<item title="six" aria-label="six">6</item>
<item title="seven" aria-label="seven">7</item>
<item title="eight" aria-label="eight">8</item>
<item title="nine" aria-label="nine">9</item>
<item title="zero" aria-label="zero">0</item>
<item title="period" aria-label="period">.</item>
<item title="fraction" aria-label="fraction" cmd="/" class="mje_button_fraction"/>
</grid>
</tab>
</tabConfig>
<editorRow>
<math xmlns="http://www.w3.org/1998/Math/MathML" title="">
<mstyle>
<mo>##</mo>
</mstyle>
</math>
</editorRow>
</editorconfig>]]></custom-option>
</qti-custom-interaction>

</qti-item-body>
</qti-assessment-item>

3.5 Hot Text Question - Selectable (HTQ, HTQS)

3.5.1 HTQS Layout Overview

HTQS items provide a prompt that requests the action(s) of the student to answer the question. HTQS items can have a stimulus that provides additional content. The student will then select the answer that best answers the prompt.

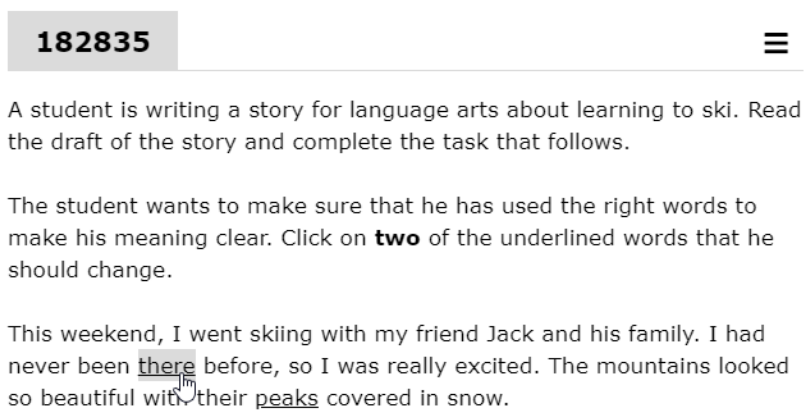
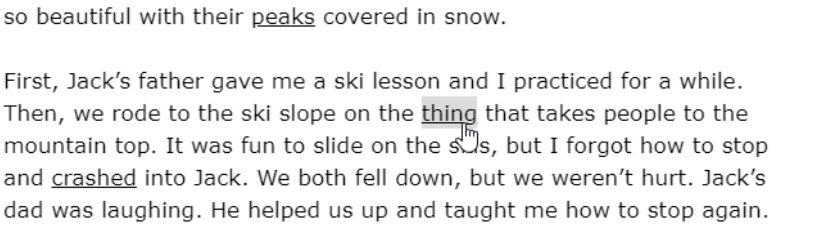
Hot Text items consist of a prompt followed by a section of text containing interactive words or phrases that students can select.

Example Link: QTI specific link will be provided at a later date.

SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-182835

3.5.2 HTQS User Interaction

Mouse Interaction

Interaction Description	Visual Example (if available or applicable)
When a user hovers over selectable text, the cursor changes to a hand with an extended pointer finger as the text is highlighted in gray.	
When the selectable text is selected, it is highlighted in blue.	

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)

User can tab through options to select appropriate response. A blue box highlights the option being focused on.	**182835** A student is writing a story for language arts about learning to ski. Read the draft of the story and complete the task that follows. The student wants to make sure that he has used the right words to make his meaning clear. Click on **two** of the underlined words that he should change. **182835** A student is writing a story for language arts about learning to ski. Read the draft of the story and complete the task that follows. The student wants to make sure that he has used the right words to make his meaning clear. Click on **two** of the underlined words that he should change. This weekend, I went skiing with my friend Jack and his family. I had never been there before, so I was really excited. The mountains looked so beautiful with their peaks covered in snow.
The space-bar can be used to select/de-select options.	This weekend, I went skiing with my friend Jack and his family. I had never been there before, so I was really excited. The mountains looked so beautiful with their peaks covered in snow.

3.5.3 HTQS Attributes

Interaction Attribute

HTQS items use the Hot Text Interaction attribute; these are mapped to **qti-hottext-interaction**. The Hot Text Interaction attribute presents choices to the candidate in the form of selectable underlined words.

Name	Usage	Value	Default
class	Optional	"qti-underline"	
response-identifier	Optional	“RESPONSE”	

Choice Attribute

Name	Usage	Value	Default
identifier	Required	Example: "a”	

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
 xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
 xmlns:m3="http://www.w3.org/1998/Math/MathML"
 xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="sbac-200-
182835" title="182835" xml:lang="en" tool-name="TIMS QTI 3.0 Export" tool-
version="5.10.4" time-dependent="false">
 <qti-response-declaration identifier="RESPONSE" cardinality="multiple" base-
type="identifier">
 <qti-correct-response>
 <qti-value>a</qti-value>
 <qti-value>c</qti-value>
 </qti-correct-response>
 </qti-response-declaration>
 <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
normal-maximum="1.0" normal-minimum="0.0">
 <qti-default-value>
 <qti-value>0</qti-value>
 </qti-default-value>
 </qti-outcome-declaration>
 <qti-stylesheet href="sbac-qti-assessment.css" type="text/css" />
 <qti-item-body class="sbac">
 <div data-catalog-idref="item-182835-global" class="sbac-global-item-catalog-ref" />
 <div class="qti-layout-row">
 <div class="qti-layout-col12">
 <div class="prompt">
 <p>A student is writing a story for language arts about learning to ski. <span class="qti-
visually-hidden" data-qti-suppress-tts="computer-read-aloud">Reed</span><span aria-
hidden="true" data-catalog-idref="item-182835-catalog-0">Read</span> the draft of the
story and complete the task that follows. </p>
 <p><br />The student wants to make sure that he has used the right words to make his
meaning clear. Click on <strong><span class="qti-visually-hidden" data-qti-suppress-
tts="computer-read-aloud">two,</span><span aria-hidden="true" data-catalog-
idref="item-182835-catalog-1">two</span></strong> of the underlined words that he
should change. </p>
 </div>
 <qti-hottext-interaction response-identifier="RESPONSE" max-choices="0">
```

```
<div>
<br />
<p>This weekend, I went skiing with my friend Jack and his family. I had never been
<qti-hottext identifier="a"><span class="qti-visually-hidden" data-qti-suppress-
tts="computer-read-aloud">there</span><span data-catalog-idref="item-182835-
catalog-2" aria-hidden="true" class="qti-underline">there</span></qti-hottext>
before, so I was really <span data-catalog-idref="glossary-term-1" data-sbac-
term="excited">excited</span>. The mountains looked so beautiful with their <qti-
hottext identifier="b"><span class="qti-visually-hidden" data-qti-suppress-
tts="computer-read-aloud">peaks</span><span data-catalog-idref="item-182835-
catalog-3" aria-hidden="true" class="qti-underline">peaks</span></qti-hottext>
covered in snow.</p>
<br />
<p>First, Jack's father gave me a ski lesson and I <span data-catalog-idref="glossary-
term-2" data-sbac-term="practiced">practiced</span> for a while. Then, we rode to the
ski slope on the <qti-hottext identifier="c"><span class="qti-visually-hidden" data-qti-
suppress-tts="computer-read-aloud">thing</span><span data-catalog-idref="item-
182835-catalog-4" aria-hidden="true" class="qti-underline">thing</span></qti-hottext>
that takes people to the mountain top. It was fun to slide on the skis, but I forgot how to
stop and <qti-hottext identifier="d"><span class="qti-visually-hidden" data-qti-suppress-
tts="computer-read-aloud">crashed</span><span data-catalog-idref="item-182835-
catalog-5" aria-hidden="true" class="qti-underline">crashed</span></qti-hottext> into
Jack. We both fell down, but we weren't hurt. Jack's dad was laughing. He helped us up
and taught me how to stop again.</p>
</div>
</qti-hottext-interaction>
</div>
</div>
</qti-item-body>
</qti-assessment-item>
```

3.6 Match Interaction (MI)

3.6.1 MI Layout Overview

The Match Interaction (MI) item types include a prompt followed by a table with text or images. The first column and/or row of the table presents a set of statements and corresponding references for the statements' sources. The candidate selects a box to represent a value or values in the columns. The candidate selects the boxes where a match is valid.

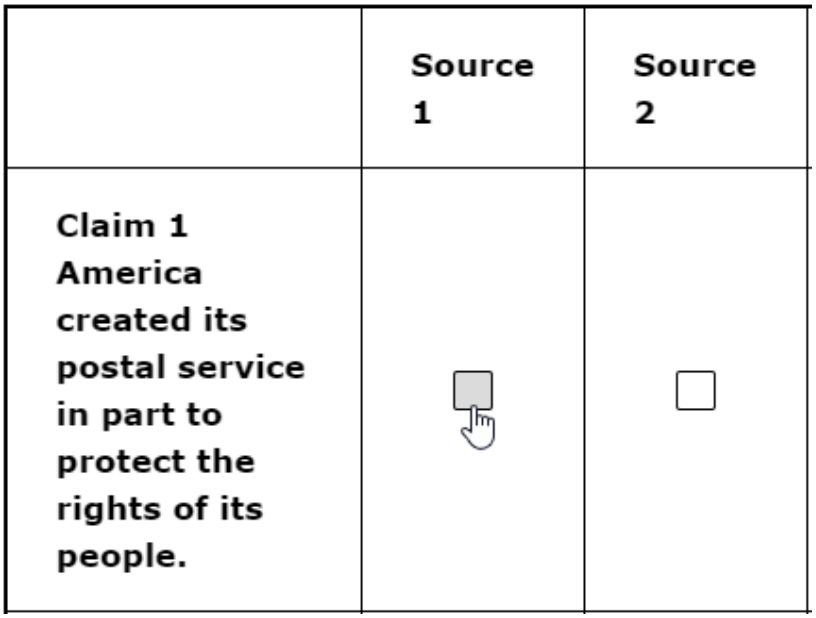
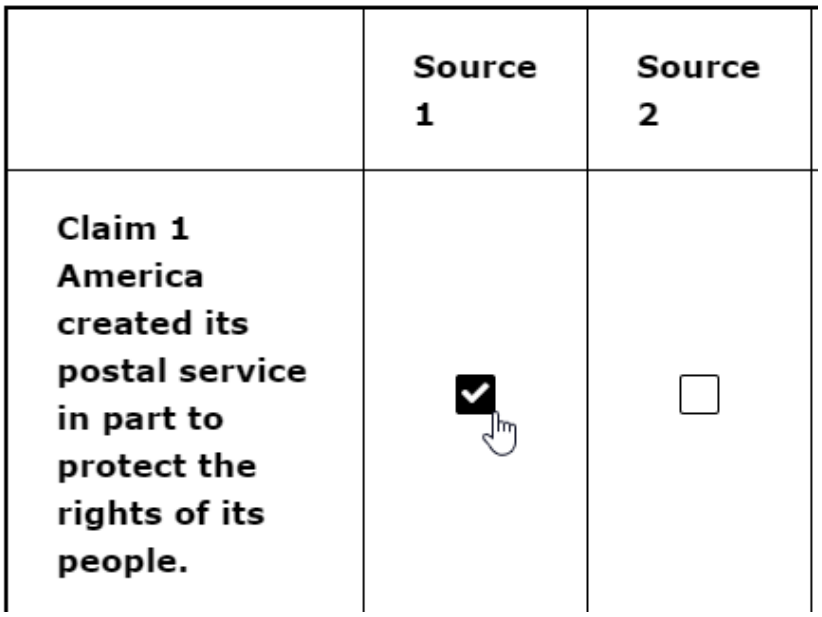
Example Link: QTI specific link will be provided at a later date.

SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-182944

3.6.2 MI User Interaction

Mouse Interaction

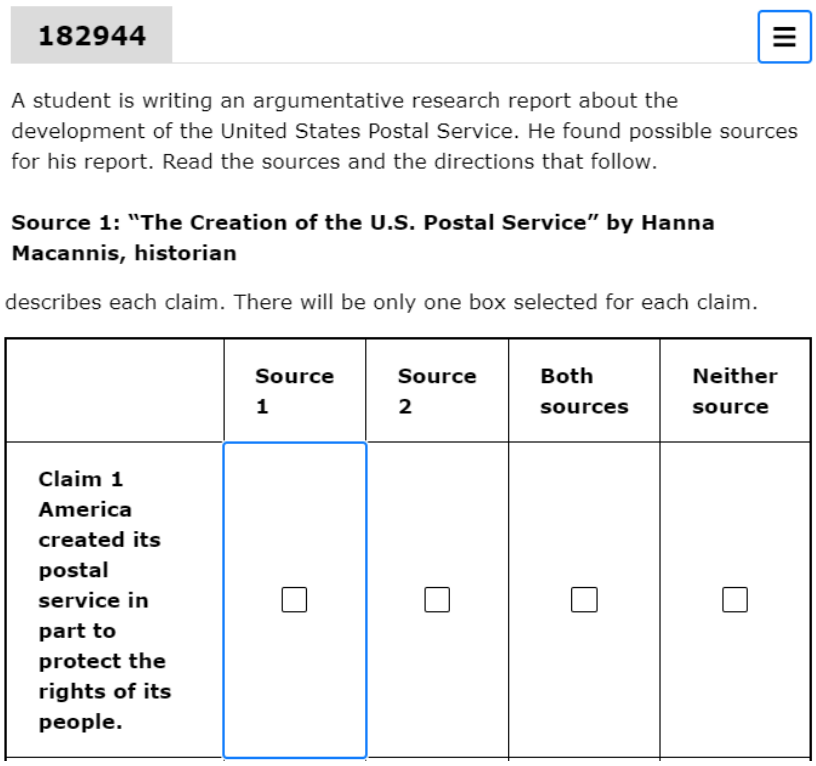
Interaction Description	Visual Example (if available or applicable)

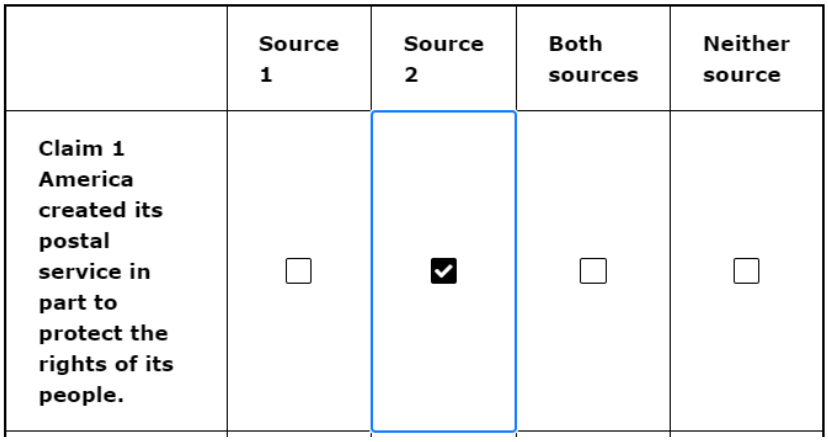
Upon hover-over selection box option(s), mouse cursor changes to a hand with a pointer-finger and the selection box color changes to a gray-shaded color.	
Upon selection, the box converts to a checkmark displayed on a contrasted background.	

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)

<table>
<tr>
<td>On tab key press, navigation proceeds top-down through the DOM until the option table is encountered. A blue box highlights the option being focused on.

Arrow navigation is not supported within the table.</td>
<td>


</td>
</tr>
<tr>
<td>The space-bar can be used to select/de-select options.</td>
<td>


</td>
</tr>
</table>

3.6.3 MI Attributes

Interaction Attribute

MI items use the Match Interaction attribute; these are mapped to "qti-match-tabular". The Match Interaction attribute presents choices to the candidate in the form of selectable underlined words.

Name	Usage	Value	Default
class	Optional	"qti-match-tabular" "sbac" (e.g. "qti-	

		match-tabular sbac")	
response-identifier	Optional	“RESPONSE”	
min-associations	Optional	Non-negative integer	1
max-associations	Optional	Non-negative integer	

Choice Attribute

Name	Usage	Value	Default
identifier	Optional	Coordinates associated with table location	
match-max	Optional	Non-negative integer	

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
 xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
 xmlns:m3="http://www.w3.org/1998/Math/MathML"
 xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="sbac-200-
182830" title="182830" xml:lang="en" tool-name="TIMS QTI 3.0 Export" tool-
version="5.10.4" time-dependent="false">
 <qti-response-declaration identifier="RESPONSE" cardinality="multiple" base-
type="directedPair">
 <qti-correct-response>
 <qti-value>set-1-a set-2-a</qti-value>
 <qti-value>set-1-b set-2-b</qti-value>
 <qti-value>set-1-c set-2-a</qti-value>
 <qti-value>set-1-d set-2-b</qti-value>
 </qti-correct-response>
 </qti-response-declaration>
 <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
normal-maximum="1.0" normal-minimum="0.0">
 <qti-default-value>
 <qti-value>0</qti-value>
```

```
 </qti-default-value>
 </qti-outcome-declaration>
 <qti-assessment-stimulus-ref identifier="sbac-200-193773" href="../sbac-200-193773/sbac-200-193773.xml" />
 <qti-stylesheet href="sbac-qti-assessment.css" type="text/css" />
 <qti-item-body class="sbac">
 <div data-catalog-idref="item-182830-global" class="sbac-global-item-catalog-ref" />
 <div class="qti-layout-row sbac-pane-scrolling">
 <div class="qti-layout-col5 sbac-left-pane">
 <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Passage</h2>
 <div data-stimulus-idref="sbac-200-193773" class="qti-shared-stimulus" />
 </div>
 <div class="qti-layout-col7 sbac-right-pane">
 <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Question</h2>
 <div class="prompt">
 <p>The presentation gives information about the balloons used in the Thanksgiving parade in New York City as well as information about other parts of the parade. Complete the chart by clicking in the boxes next to the information column that match whether the information describes balloons or other parts of the <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">parade.</span><span aria-hidden="true" data-catalog-idref="item-182830-catalog-0">parade.</span></p>
 </div>
 <qti-match-interaction response-identifier="RESPONSE" max-associations="0" min-associations="1" class="qti-match-tabular sbac">
 <qti-simple-match-set>
 <qti-simple-associable-choice identifier="set-1-a" match-max="0">
 <p><strong><strong>Famous Characters</strong></strong></p>
 </qti-simple-associable-choice>
 <qti-simple-associable-choice identifier="set-1-b" match-max="0">
 <p><strong><strong>Funny Clowns</strong></strong></p>
 </qti-simple-associable-choice>
 <qti-simple-associable-choice identifier="set-1-c" match-max="0">
 <p><strong><strong>Long and Tall</strong></strong></p>
 </qti-simple-associable-choice>
 <qti-simple-associable-choice identifier="set-1-d" match-max="0">
 <p><strong><strong>Colorful Floats</strong></strong></p>
 </qti-simple-associable-choice>
 </qti-simple-match-set>
 <qti-simple-match-set>
 <qti-simple-associable-choice identifier="set-2-a" match-max="0">
 <p class="qti-align-center"><strong><strong>Balloons</strong></strong></p>
 </qti-simple-associable-choice>
 <qti-simple-associable-choice identifier="set-2-b" match-max="0">
 <p class="qti-align-center"><strong><strong>Parade</strong></strong></p>
 </qti-simple-associable-choice>
 </qti-simple-match-set>
 </qti-match-interaction>
 </div>
 </div>
```

```
</qti-item-body>
</qti-assessment-item>
```

3.7 Short Answer (SA)

3.7.1 SA Layout Overview

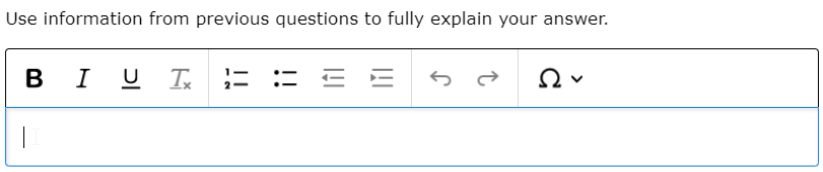
The Short Answer (SA) items include a prompt followed by either a plain text or html editor. For Smarter Balanced assessments, the SA items that appear in the ELA/literacy assessments use a plain text editor; 5 lines of available text entry is provided before scrolling. The SA items that appear on the mathematics assessment use the html editor; 24 lines of text entry is available before scrolling is activated. One can configure the character limit for both iterations, Smarter Balanced does not have a recommended character limit in both ELA/literacy and mathematics.

Example Link: QTI specific link will be provided at a later date.

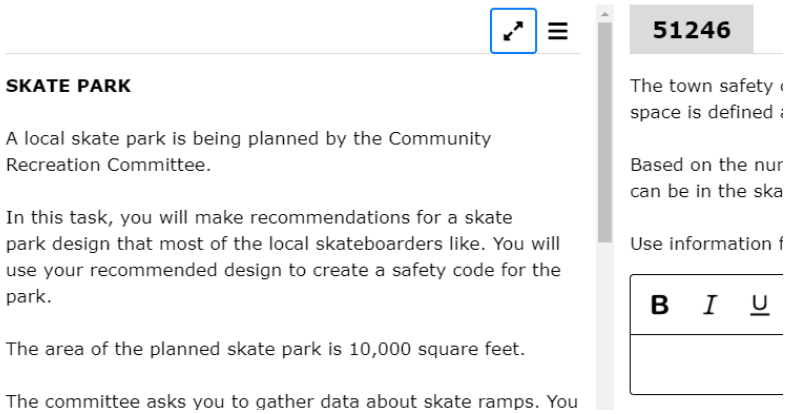
SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-51246

3.7.2 SA User Interaction

Mouse Interaction

Interaction Description	Visual Example (if available or applicable)
Mouse is used to select answer box where answer is composed. The use must click to begin text entry.	

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)
On tab key press, navigation proceeds top-down, left-right through the DOM until the entry box is selected. A blue box highlights the option being focused on.	

3.7.3 SA Attributes

Interaction Attribute

SA items use the Extended Text Interaction attribute; these are mapped to **"qti-extended-text-interaction”**. The Extended Text Interaction attribute presents a response box intended for a typed response to the stimulus provided.

Name	Usage	Value	Default
class	Optional	“sbac” “sbac-height-lines-8” (Plain) “sbac-height-lines-95” (XHTML)	
format	Optional	“plain” or “xhtml”	
response-identifier	Optional	“RESPONSE”	

Choice Attribute

Not applicable.

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
  xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
  xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
  xmlns:m3="http://www.w3.org/1998/Math/MathML"
  xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
  xmlns:xi="http://www.w3.org/2001/XInclude"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  identifier="sbac-200-183173" title="183173" xml:lang="en" tool-name="TIMS QTI 3.0
Export"
  tool-version="5.10.4" time-dependent="false">
  <qti-response-declaration identifier="RESPONSE" cardinality="single" base-
type="string"/>
  <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
  normal-maximum="2.0" normal-minimum="0.0" external-scored="human">
  <qti-default-value>
  <qti-value>0</qti-value>
  </qti-default-value>
```

```
  </qti-outcome-declaration>
  <qti-assessment-stimulus-ref identifier="sbac-200-193797"
  href="../sbac-200-193797/sbac-200-193797.xml"/>
  <qti-stylesheet href="sbac-qti-assessment.css" type="text/css"/>
  <qti-item-body class="sbac">
  <div data-catalog-idref="item-183173-global" class="sbac-global-item-catalog-
ref"/>
  <div class="qti-layout-row sbac-pane-scrolling">
  <div class="qti-layout-col5 sbac-left-pane">
  <h2 class="qti-visually-hidden semantic-marker"
  data-qti-suppress-tts="computer-read-aloud">Passage</h2>
  <div data-stimulus-idref="sbac-200-193797" class="qti-shared-stimulus"/>
  </div>
  <div class="qti-layout-col7 sbac-right-pane">
  <h2 class="qti-visually-hidden semantic-marker"
  data-qti-suppress-tts="computer-read-aloud">Question</h2>
  <div class="prompt">
  <p>What <span data-catalog-idref="glossary-term-1" data-sbac-term="inference"
  >inference</span> can be made about Jim's feelings toward Father Time?
  Support your answer with details from the text.</p>
  </div>
  <qti-extended-text-interaction response-identifier="RESPONSE"
format="plain"
  class="sbac-height-lines-8"/>
  </div>
  </div>
  </qti-item-body>
 </qti-assessment-item>
```

3.8 Table Interaction (TI)

3.8.1 TI Layout Overview

For Table Interaction (TI) item types, students are provided with a prompt area followed by a table that includes one or more cells in which students may enter numbers or text. The student uses a keyboard to enter their answer into the answer table.

Example Link: QTI specific link will be provided at a later date.

SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-77981

3.8.2 TI User Interaction

Mouse Interaction

Interaction Description	Visual Example (if available or applicable)

Mouse is used to select sections of the table where answer(s) are entered. Upon selection, the entrybox border will highlight blue to indicate that it is active.	**77981** Max is estimating the amount of each ingredient needed to make 4 cakes. Use the information listed in **Table 1** and **Table 2** to help you fill in the chart. • Fill in the number of cups of flour and sugar, and the number of eggs needed to make 4 cakes. • Then fill in the number of cups of flour and sugar, and the number of eggs that remain after making 4 cakes. **Ingredient** / **Amount Needed for 4 Cakes** / **Amount of Ingredient Remaining** Cups of Flour / _ / [ ] Cups of Sugar / /

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)
On tab key press, navigation proceeds top-down, left-right through the DOM table until the entry box is selected. A blue box highlights the option being focused on. Entrybox border will highlight to indicate that it is active.	***MAKING CAKES*** You, Max, and Tonya will plan the number of cakes your class will make for a community celebration. Your task is to decide how many cakes can be made using the available ingredients. **Ingredient** / **Amount Needed for 4 Cakes** / **Amount of Ingredient Remaining** Cups of Flour / _ / Cups of Sugar / [ ] /

3.8.3 TI Attributes

Interaction Attribute

TI items use the Custom Interaction attribute; these are mapped to **"qti-custom-interaction”**. The Custom Interaction attribute presents a response table intended for a typed response to the stimulus provided.

Name	Usage	Value	Default
class	Optional	"tei-sbti" data-table-sub-type="TableInputExt" may be present to indicate textarea elements instead of input elements	
identifier	Optional	“RESPONSE”	

Table Cell Input Attribute

TI items use an HTML table structure with standard <tr> and <td> elements. Each <td> element contains a class attribute that identifies the type of markup intended for the browser.

Name	Usage	Value	Default
class	required	"ti-label". Used to signify that the content should be treated as text, or a label "ti-numeric-input". Used to signify that the content should allow ONLY numeric input. "ti-text-input". Used to signify that the content should allow any character input.	

Choice Attribute

Not applicable.

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
 xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
 xmlns:m3="http://www.w3.org/1998/Math/MathML"
 xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="sbac-200-77981"
title="77981" xml:lang="en" tool-name="TIMS QTI 3.0 Export" tool-version="5.10.4"
time-dependent="false">
 <qti-response-declaration identifier="RESPONSE" cardinality="single" base-type="string"
/>
 <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
external-scored="human" variable-identifier-ref="RESPONSE" normal-maximum="2.0"
normal-minimum="0.0">
 <qti-default-value>
 <qti-value>0</qti-value>
 </qti-default-value>
 </qti-outcome-declaration>
 <qti-outcome-declaration identifier="Responses" cardinality="ordered" base-
type="string" />
 <qti-outcome-declaration identifier="Row1Col3Response" cardinality="single" base-
type="float" />
 <qti-outcome-declaration identifier="Row2Col2Response" cardinality="single" base-
type="float" />
 <qti-outcome-declaration identifier="Row2Col3Response" cardinality="single" base-
type="float" />
 <qti-outcome-declaration identifier="Row3Col2Response" cardinality="single" base-
type="float" />
 <qti-outcome-declaration identifier="Row3Col3Response" cardinality="single" base-
type="float" />
 <qti-outcome-declaration identifier="col3" cardinality="single" base-type="string" />
 <qti-outcome-declaration identifier="col2" cardinality="single" base-type="string" />
 <qti-assessment-stimulus-ref identifier="sbac-200-172081" href="../sbac-200-
172081/sbac-200-172081.xml" />
 <qti-stylesheet href="sbac-qti-assessment.css" type="text/css" />
 <qti-item-body class="sbac">
 <div data-catalog-idref="item-77981-global" class="sbac-global-item-catalog-ref" />
 <div class="qti-layout-row sbac-pane-scrolling">
 <div class="qti-layout-col5 sbac-left-pane">
 <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-
aloud">Passage</h2>
```

<h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Question</h2>

Max is estimating the amount of each ingredient needed to make 4 cakes.

Use the information listed in Table 11 and Table 22 to help you fill in the chart.
<ul>
<li> Fill in the number of cups of flour and sugar, and the number of eggs needed to make 4 cakes. </li>
</ul>
<ul>
<li> Then fill in the number of cups of flour and sugar, and the number of eggs that remain after making 4 cakes.cakes. </li>
</ul>

<**qti-custom-interaction response-identifier="RESPONSE**" **data-table-sub-type="TableInput" class="tei-sbti**">
<custom-option><![CDATA[

<table class="tableItem">
<thead>
<tr>
<th data-ti-column-identifier="col0" data-its-identifier="col0">
Ingredient

```
 </th>
 <th data-ti-column-identifier="col1" data-its-identifier="col1">
 <p class="qti-align-center"><strong>Amount Needed for 4 <span data-catalog-
idref="glossary-term-9">Cakes</span></strong></p>
 </th>
 <th data-ti-column-identifier="col2" data-its-identifier="col2">
 <p class="qti-align-center"><strong>Amount of <span data-catalog-idref="glossary-
term-2">Ingredient</span> Remaining</strong></p>
 </th>
 </tr>
 </thead>
 <tbody>
 <tr>
 <td class="ti-label">
 <p><span data-catalog-idref="glossary-term-6">Cups</span> of <span data-catalog-
idref="glossary-term-7">Flour</span></p>
 </td>
 <td class="ti-label">
 <p class="qti-align-center"><span data-its-input="true" data-its-
validationrule="numericOnly">_</span></p>
 </td>
 <td class="ti-text-input"></td>
 </tr>
 <tr>
 <td class="ti-label">
 <p><span data-catalog-idref="glossary-term-6">Cups</span> of <span data-catalog-
idref="glossary-term-10">Sugar</span></p>
 </td>
 <td class="ti-text-input"></td>
 <td class="ti-numeric-input"></td>
 </tr>
 <tr>
 <td class="ti-label"><p>Number of <span data-catalog-idref="glossary-term-
4">Eggs</span></p></td>
 <td class="ti-numeric-input"></td>
 <td class="ti-text-input"></td>
 </tr>
 </tbody>
 </table>
 ]]></custom-option>
 </qti-custom-interaction>
 </div>
 </div>
 </qti-item-body>
 </qti-assessment-item>
```

3.9 Writing Extended Response (WER)

3.9.1 WER Layout Overview

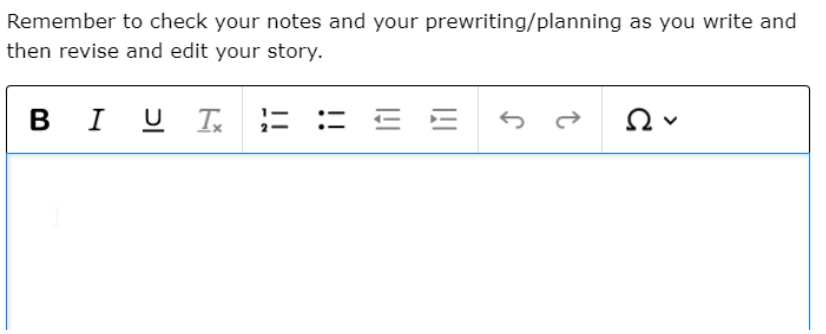
Writing Extended Response (WER) item types include a prompt area followed by a larger (than SA) space for students to input a written response. It also allows for rich-text entry (bold, underline, italic, numbered and bulleted lists, indentation, clipboard, undo, redo, and spell checking). The default space will be larger than SA and

Example Link: QTI specific link will be provided at a later date.

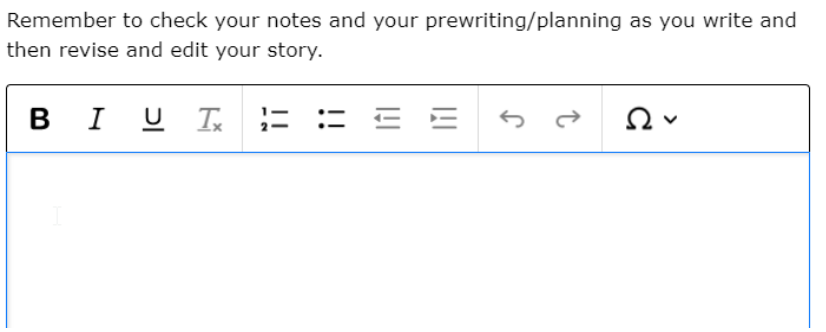
SAAIF Version: http://sampleitems.smarterbalanced.org/Item/200-54697

3.9.2 WER User Interaction

Mouse Interaction

Interaction Description	Visual Example (if available or applicable)
Mouse is used to select the answer box where the answer is composed.	

Keyboard Interaction

Interaction Description	Visual Example (if available or applicable)
On tab key press, navigation proceeds top-down, left-right through the DOM until the entry box is selected. Keyboard is used to enter response.	

3.9.3 WER Attributes

Interaction Attribute

WER items, similar to SA, use the Extended Text Interaction attribute; these are mapped to **"qti-extended-text-interaction”**. The Extended Text Interaction attribute presents a response box intended for a typed response to the stimulus provided.

Name	Usage	Value	Default
class	Optional	“sbac” “sbac-height-lines-95” "sbac-global-item-catalog-ref"	
format	Optional	“xhtml”	
identifier	Option	“RESPONSE”	

Choice Attribute

Name	Usage	Value	Default
N/A			

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
 xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
 xmlns:m3="http://www.w3.org/1998/Math/MathML"
 xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="sbac-200-54697"
title="54697" xml:lang="en" tool-name="TIMS QTI 3.0 Export" tool-version="5.10.2"
time-dependent="false">
 <qti-response-declaration identifier="RESPONSE" cardinality="single" base-type="string"
/>
 <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
normal-maximum="10.0" normal-minimum="0.0" external-scored="human">
 <qti-default-value>
 <qti-value>0</qti-value>
```

```
 </qti-default-value>
 </qti-outcome-declaration>
 <qti-assessment-stimulus-ref identifier="sbac-200-171819" href="../sbac-200-171819/sbac-200-171819.xml" />
 <qti-stylesheet href="sbac-qti-assessment.css" type="text/css" />
 <qti-item-body class="sbac">
 <div data-catalog-idref="item-54697-global" class="sbac-global-item-catalog-ref" />
 <div class="qti-layout-row sbac-pane-scrolling">
 <div class="qti-layout-col5 sbac-left-pane">
 <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Passage</h2>
 <div data-stimulus-idref="sbac-200-171819" class="qti-shared-stimulus" /></div>
 <div class="qti-layout-col7 sbac-right-pane">
 <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Question</h2>
 <div class="prompt">
 <p><strong>Student Directions for Part <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">2</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-8">2</span></strong></p>
 <p><br />You will now review your notes and sources, and plan, draft, revise, and edit your story. You may use your notes and refer to the sources. Now <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">read</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-0">read</span> your assignment and the information about how your story will be <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">scored;</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-1">scored;</span> then begin your work.</p>
 <p><br /><strong>Your </strong><strong><span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">assignment:</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-9">assignment:</span></strong></p>
 <p><br />A book author comes to your class and talks about his latest book of short stories. After his talk, he asks your class to write their own short stories and says he will come back to the class and listen to all of the stories being <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">read.</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-2">read.</span></p>
 <p><br />You decide to do research on ants to write a story about what happens when you <span data-catalog-idref="glossary-term-1" data-sbac-term="shrink">shrink</span>, fall into a hole in the ground, and find yourself as part of an ant <span data-catalog-idref="glossary-term-2" data-sbac-term="colony">colony</span>. The story should be several paragraphs long.</p>
 <p><br />When writing your story, find ways to use information and details from the sources to <span data-catalog-idref="glossary-term-3" data-sbac-term="improve">improve</span> your story. Make sure you develop your <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">character(s)</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-3">character(s)</span>, the <span data-catalog-idref="glossary-term-4" data-sbac-term="setting">setting</span>, and the plot, using details, <span data-catalog-idref="glossary-term-5" data-sbac-term="dialogue">dialogue</span>, and description where appropriate.</p>
 <p><strong></strong></p>
 <p><strong><span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">REMEMBER:</span><span aria-hidden="true" data-catalog-idref="item-54697-
```

catalog-10">REMEMBER: A well-writtenwell-written story:
<ul>
<li>
has a clear plot and clear sequence of eventsevents
</li>
<li>
is well-organizedwell-organized and has a point of viewview
</li>
<li>
uses details from the sources to support your storystory
</li>
<li>
uses clear languagelanguage
</li>
<li>
follows rules of writing (spelling, punctuation, and grammar)
</li>
</ul>
Now begin work on your story. Manage your time carefully so that you can:can:

<dl>
<dd>
1. plan your storystory
</dd>
<dd>
2. write your storystory
</dd>
<dd>
3. revise and edit the final draft of your storystory

```
 </dd>
 </dl>
 <p><strong> </strong></p>
 <p><span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">Word-processing</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-5">Word-processing</span> tools and spell check are available to you.</p>
 <p><strong> </strong></p>
 <p>For Part 2, you are being asked to write a story that is several paragraphs long. Type your response in the box below. The box will get bigger as you type.</p>
 <p><strong> </strong></p>
 <p>Remember to check your notes and your <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">prewriting</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-6">prewriting</span><span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">/</span><span aria-hidden="true" data-catalog-idref="item-54697-catalog-7">/</span>planning as you write and then revise and edit your story.</p>
 </div>
 <qti-extended-text-interaction response-identifier="RESPONSE" format="xhtml" class="sbac-height-lines-95" />
 </div>
 </div>
 </qti-item-body>
```

3.10 Grid Interaction (GI)

3.10.1 GI Layout Overview

Example Link: QTI specific link will be provided at a later date.

Within Grid Items, Smarter Balanced utilizes the Drag and Drop, Graphing, and Hot Spot technology enhanced interactions. There will be no Portable Custom interaction GI items delivered.

Drag and Drop

The Grid Item – Drag and Drop variant has a workspace with a background image. Other images can be dragged and dropped into the workspace. The drop locations may or may not be constrained. When they are constrained, dropped images snap to nearby locaitons.

Hot Spot

The Grid Item – Hot Spot Variant response area consists of a space in which images are displayed. Clicking on certain hot spot areas causes images appear or disappear. Transparent sections of the images allow the background to show through. Another example of a Grid Item – Hotspot variant, is the case where there is a different image representing each level and they are selectively displayed according to the hotspot where the student clicks. The same technique is also used to create bar charts that may be manipulated by the student.

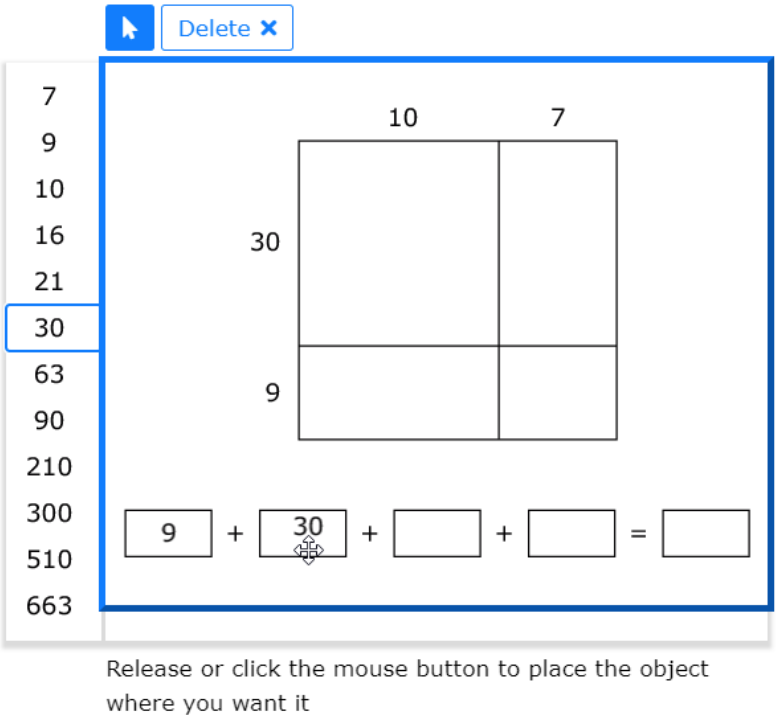
Graphing

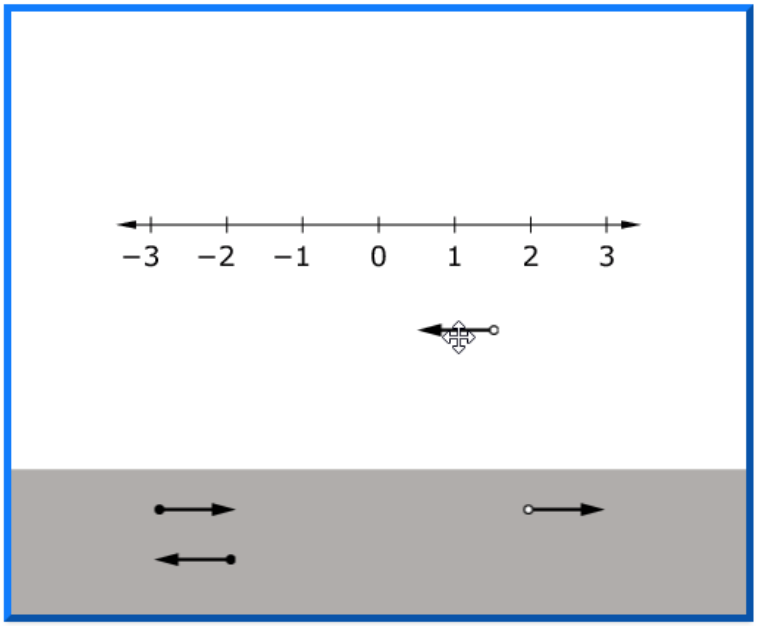
The Grid Item - Graphing variant response area consists of a grid in which students plot points and/or lines. The available tools include a select, delete, add point, and connect line.

Depending on the item, the point or line tool may not appear. A text box below the grid offers hints on what the student can do with each tool.

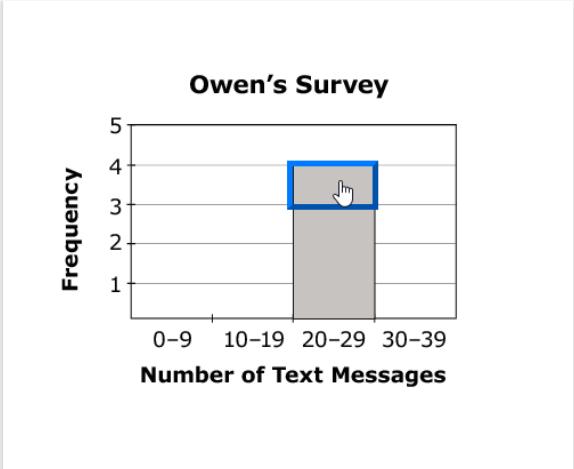
3.10.2 GI User Interaction

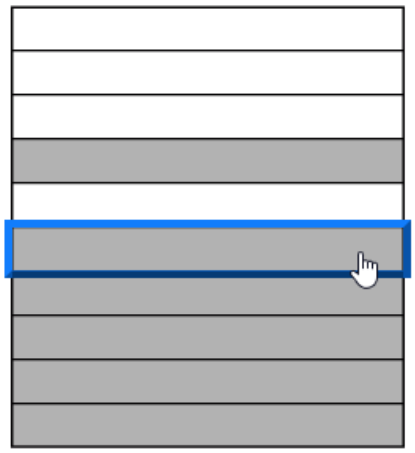
Mouse Interaction - Drag and Drop

Interaction Description	Visual Example (if available or applicable)
Images are selected from a pallet and dropped onto another image via the mouse. A student clicks and holds an image to "drag" said image to the main image surface, and releases the mouse to "drop" the image. A delete button is provided to remove the dropped image from the main image surface.	

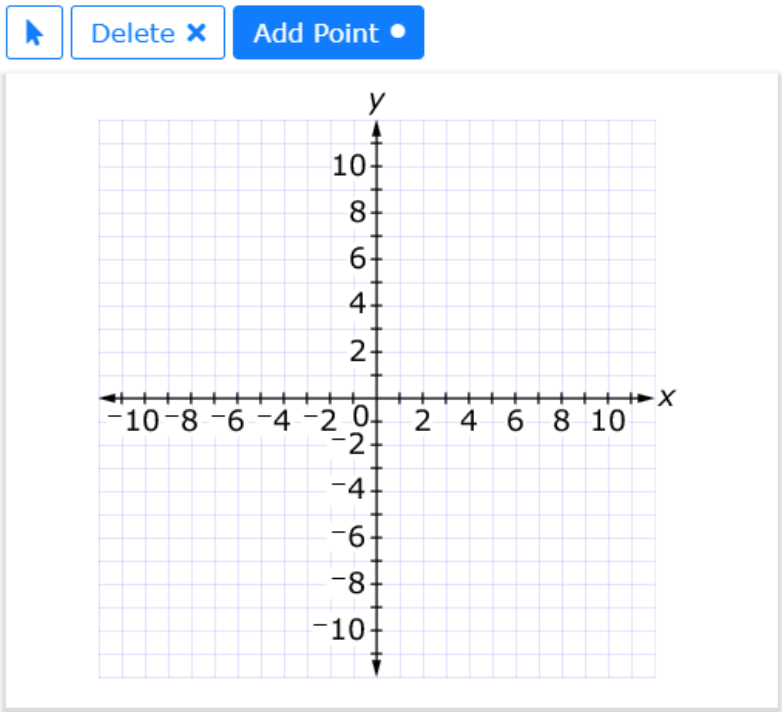
	 Release or click the mouse button to place the object where you want it

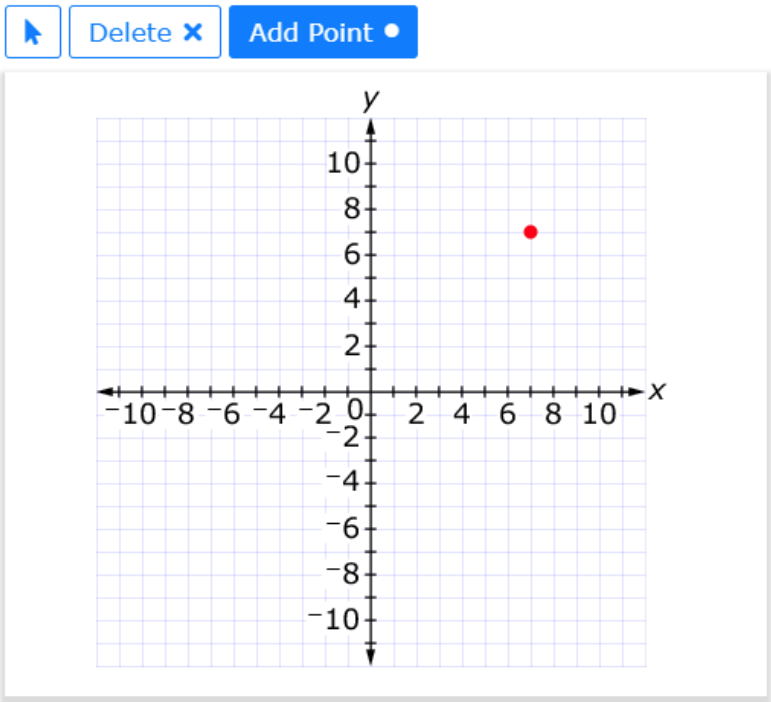
Mouse Interaction - Hot Spot

Interaction Description	Visual Example (if available or applicable)
A student uses a mouse to click in a particular area ("hot spot") of a main image in order to change the appearance. This can be seen in a bar graph.	Click within the graph area to create a histogram for the number of text messages Owen's classmates each send per day. 

A student uses a mouse to click on a main image ("hot spot") to change the image, indicating a change.	 **Figure R**

Mouse Interaction - Graphing

Interaction Description	Visual Example (if available or applicable)
A grid interface is provided, and a student interacts with the grid by plotting points with a mouse and connecting the points with a line. The points and line can also be deleted using the mouse	 Select locations of points

	 Select locations of points

Keyboard Interaction

Keyboard interaction is not fully supported.

3.10.3 GI Attributes

Interaction Attribute

GI items use the Custom Interaction QTI element; these are mapped to **"qti-custom-interaction"**. The Custom Interaction element provides an opportunity for Smarter Balanced to deliver Grid Item interaction support not currently built into the QTI specification. The "qti-custom-interaction" element contains a "custom-option" element, which in turn contains the grid item markup surrounded by a CDATA element.

Name	Usage	Value	Default
response-identifier	String identifier pointing to the qti response declaration scoring element	RESPONSE	
class	Style class	tei-sbgrid	

Interaction Code Sample

We have **bolded** the relevant XML for reference purposes.

```
<qti-assessment-item
xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd
http://www.w3.org/1998/Math/MathML
https://purl.imsglobal.org/spec/mathml/v3p0/schema/xsd/mathml3.xsd
http://www.w3.org/2001/10/synthesis
https://purl.imsglobal.org/spec/ssml/v1p1/schema/xsd/ssmlv1p1-core.xsd
http://www.w3.org/2001/XInclude
https://purl.imsglobal.org/spec/w3/2001/schema/xsd/XInclude.xsd "
 xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
 xmlns:m3="http://www.w3.org/1998/Math/MathML"
 xmlns:ssml11="http://www.w3.org/2001/10/synthesis"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" identifier="sbac-200-
183232" title="183232" xml:lang="en" tool-name="TIMS QTI 3.0 Export" tool-
version="5.10.4" time-dependent="false">
 <qti-response-declaration identifier="RESPONSE" cardinality="single" base-type="string"
/>
 <qti-outcome-declaration identifier="SCORE" cardinality="single" base-type="float"
normal-maximum="2.0" normal-minimum="0.0">
 <qti-default-value>
 <qti-value>0</qti-value>
 </qti-default-value>
 </qti-outcome-declaration>
 <qti-outcome-declaration identifier="Responses" cardinality="ordered" base-
type="string" />
 <qti-outcome-declaration base-type="string" cardinality="ordered" identifier="pA"/>
 <qti-outcome-declaration base-type="integer" cardinality="single"
identifier="pACount"/>
 <qti-outcome-declaration base-type="string" cardinality="ordered" identifier="pB"/>
 <qti-outcome-declaration base-type="integer" cardinality="single"
identifier="pBCount"/>
 <qti-outcome-declaration base-type="integer" cardinality="single"
identifier="pointAB"/>
 <qti-outcome-declaration base-type="string" cardinality="ordered" identifier="xAxis"/>
 <qti-outcome-declaration base-type="integer" cardinality="single"
identifier="xAxisCount"/>
 <qti-outcome-declaration base-type="string" cardinality="ordered" identifier="pC"/>
 <qti-outcome-declaration base-type="integer" cardinality="single"
identifier="pCCount"/>
 <qti-outcome-declaration base-type="string" cardinality="ordered" identifier="max"/>
 <qti-outcome-declaration base-type="integer" cardinality="single"
identifier="maxCount"/>
 <qti-outcome-declaration base-type="float" cardinality="single"
identifier="MaxMinusXAxis"/>
 <qti-companion-materials-info>
 <qti-calculator>
 <qti-calculator-type>graphing</qti-calculator-type>
```

<qti-description>all scientific functions, regression, graphing capabilities</qti-description>
</qti-calculator>
</qti-companion-materials-info>
<qti-stylesheet href="sbac-qti-assessment.css" type="text/css" />
<qti-item-body class="sbac">

Given the function <img class="qti-visually-hidden sbac-mathml-svg"
src="...LDwvdGV4dD48L3N2Zz4=" alt="SVG MathML"
/><m3:math><m3:mi>y</m3:mi><m3:mo>=</m3:mo><m3:mn>3</m3:mn><m3:msup><m3:mi>x</m3:mi><m3:mn>2</m3:mn></m3:msup><m3:mo>−</m3:mo><m3:mn>12</m3:mn><m3:mi>x</m3:mi><m3:mo>+</m3:mo><m3:mn>9</m3:mn><m3:mo>,</m3:mo></m3:math>

<ul>
<li>
Place a point on the coordinate grid to show each x-intercept of the function.
</li>
</ul>

<ul>
<li>
Place a point on the coordinate grid to show the minimum value of the function.function.
</li>
</ul>

<qti-custom-interaction response-identifier="RESPONSE" class="tei-sbgrid">
<custom-option><![CDATA[<Question id="3232" ITSVer="0" ScoreEngineVer="1" version="2.0"><Description /><QuestionPart id="1"><Options><ShowButtons>delete,point</ShowButtons><GridColor>LightBlue</GridColor><GridSpacing>15,Y</GridSpacing><UpdateLayout>false</UpdateLayout><CanvasWidth>500</CanvasWidth><CanvasHeight>410</CanvasHeight><PaletteWidth>75</PaletteWidth><CenterImage>false</CenterImage><ProperLineGeometry>false</ProperLineGeometry><ScaleImage>false</ScaleImage></Options><Text /><ObjectMenuIcons /><ImageSpec><FileSpec>item_3232_v0_Background_png16malpha.png</FileSpec><Position>0,0</Position></ImageSpec></QuestionPart><PreSetAnswerPart><AnswerSet>

```
<Question id="3232"><QuestionPart id="1"><ObjectSet /><SnapPoint
/></QuestionPart></Question></AnswerSet></PreSetAnswerPart></Question>]]></cu
stom-option>
 </qti-custom-interaction>
 </div>
 </div>
 </qti-item-body>
 </qti-assessment-item>
```

4 Shared Stimulus (Stim)

4.1 Overview

Example Link: QTI specific link will be provided at a later date.

A stimulus is a rich text prompt that is referenced by multiple response items that follow the stimulus. Stimulus may include embedded image and/or audio files (note: audio track may also contain Closed-Caption Transcripts as an embedded Accommodations*). The stimulus appears to the left of the items unless the student has the layout set to streamline mode. When the stimulus appears to the left of the items, the stimulus can be scrolled independently from items; the stimulus can also be expanded to take up 100% of the viewable area. If the user minimizes the stimulus, the items appear to the right of the text again.

* Sample:

```
<audio controls="true" class="sbaudio sound-repeat">
        <source src="passage_171000_v3_7382_audio1.m4a" type="audio/mp4" />
        <source src="passage_171000_v3_7382_audio1.ogg" type="audio/ogg" />
        <track label="Transcript" kind="captions"
src="passage_171000_v3_7382_audio1.vtt" srclang="en" default="true" />
      </audio>
```

4.2 Shared Stimulus

Smarter Balanced makes extensive use of the **"qti-assessment-stimulus-ref"** element, a.k.a. "shared stimulus", in items and in packaging. A description of Shared Stimulus can be found here: https://www.imsglobal.org/node/196951#h.pb0clew9cko9

Smarter Balanced items *always use the explicit placement method*; i.e., data-stimulus-idref and class="qti-shared-stimulus" to specify the stimulus injection location in the item body.

For item sets or performance tasks, downstream systems will need to have logic built in that - for all the items in the item set that share the same stimulus - items should only display the shared stimulus once.

Example: Item (taken from 33715) with Shared Stimulus and Explicit Injection

```
<qti-assessment-item>

  <qti-assessment-stimulus-ref identifier="sbac-200-170720" href="../sbac-200-
170720/sbac-200-170720.xml" />
```

```
  <qti-item-body class="sbac">
    <div class="qti-layout-row sbac-pane-scrolling">
      <div class="qti-layout-col5 sbac-left-pane">
        <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-
read-aloud">Passage</h2>
        <!-- This specifies the stimulus injection point for the stimulus with
             identifier "sbac-200-170720" -->
        <div data-stimulus-idref="sbac-200-170720" class="qti-shared-stimulus" />
      </div>
      <div class="qti-layout-col7 sbac-right-pane">
        <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-
read-aloud">Question</h2>
        <div class="prompt">
          <p>
            Based on the presentation, which statement <strong><span data-catalog-
idref="item-33715-catalog-0">best</span></strong> describes
the early bicycles?
          </p>
        </div>
        ... additional content left out for brevity ...
      </div>
    </div>
  </qti-item-body>

  <qti-catalog-info>
    <qti-catalog id="item-33715-catalog-0">
      <qti-card support="spoken">
        <qti-card-entry data-reading-type="computer-read-aloud">
          <qti-html-content>best,</qti-html-content>
        </qti-card-entry>
      </qti-card>
    </qti-catalog>
    <qti-catalog id="item-33715-global">
      <qti-card support="ext:sbac-braille-files">
        ...  item braille file qti-card-entry's left out for brevity ...
      </qti-card>
      <qti-card support="sign-language">
        <qti-card-entry default="true" xml:lang="ase">
          <qti-html-content>
            <video controls="true">
              <source src="item_33715_ASL_STEM.mp4" type="video/mp4"/>
              <source src="item_33715_ASL_STEM.webm" type="video/webm"/>
            </video>
          </qti-html-content>
        </qti-card-entry>
      </qti-card>
    </qti-catalog>
  </qti-catalog-info>
</qti-assessment-item>
```

Smarter Balanced shared stimuli will frequently contain catalog entries. To ease implementation, Smarter Balanced scopes a Shared Stimulus' element id's and catalog entries to avoid collisions with element id's and catalogs in the item itself.

The qti-stylesheet element is supplied with each Shared Stimulus. However, similar to stylesheets in items, no styles are currently provided in items contained in the Smarter Balanced QTI 3.0 Certification Content Package.

Example: Shared Stimulus (taken from 17100) used with 33715 above

```
<qti-assessment-stimulus identifier="sbac-200-171000" title="171000">
  <qti-stylesheet href="sbac-qti-assessment.css" type="text/css" />
  <qti-stimulus-body>
    <div data-catalog-idref="item-171000-global" class="sbac-global-item-catalog-ref" />
    <div>
      <br /><br />
      <p>
        <strong>The First <span class="qti-visually-hidden" data-qti-suppress-
tts="computer-read-aloud">Bicycles;</span><span aria-hidden="true" data-catalog-
idref="item-171000-catalog-0">Bicycles</span></strong>
      </p>
      <br />
      <div>
        <p><span>Listen to the presentation. Then answer the questions.</span></p>
        <br />
        <audio controls="true" class="sbaudio sound-repeat">
          <source src="passage_171000_v3_7382_audio1.m4a" type="audio/mp4" />
          <source src="passage_171000_v3_7382_audio1.ogg" type="audio/ogg" />
          <track label="Transcript" kind="captions"
src="passage_171000_v3_7382_audio1.vtt" srclang="en" default="true" />
        </audio>
      </div>
    </div>
  </qti-stimulus-body>
  <qti-catalog-info>
    <qti-catalog id="item-171000-catalog-0">
      <qti-card support="spoken">
        <qti-card-entry data-reading-type="computer-read-aloud">
          <qti-html-content>Bicycles;</qti-html-content>
        </qti-card-entry>
      </qti-card>
    </qti-catalog>
    <qti-catalog id="item-171000-global">
      <qti-card support="ext:sbac-braille-files">
        ...  stimulus braille file qti-card-entry's left out for brevity ...
      </qti-card>
      <qti-card support="sign-language">
        <qti-card-entry default="true" xml:lang="ase">
          <qti-html-content>
            <video controls="true">
              <source src="stim_171000_ASL_STEM.webm" type="video/webm" />
              <source src="stim_171000_ASL_STEM.mp4" type="video/mp4" />
            </video>
```

```
        </qti-html-content>
      </qti-card-entry>
    </qti-card>
  </qti-catalog>
 </qti-catalog-info>
</qti-assessment-stimulus>
```

In addition to many items in the Smarter Balanced QTI 3.0 Certification Content Package, please see the QTI3 / Level 2 / I4 Shared Stimulus conformance test package, items, and stimulus found here: https://github.com/IMSGlobal/qti-conformance/tree/develop/qti3.0/Level%202/I4%20Shared%20Stimulus (Login Required)

4.3 Slideshow

Smarter Balanced provides stimuli with image and audio files, that when combined, can be used as a slideshow feature.

As delivered, the assets that make up the stimuli slideshow feature will need to be fully implemented by implementation teams.

File assets supplied by Smarter Balanced

File	Purpose
Stimulus XML file	Contains HTML markup within the qti-stimulus-body element.
Image files	Individual image files that make up the slideshow. The image files are contained in parent elements, that have an attribute called **data-begin**. This attribute value is the time index, in seconds, that correspond to the audio presentation for which the image is to be displayed. Additional CSS helper classes are included (sbac-slides-config, sbac-slides-container, sbac-slide, sbac-slides-audio) in the markup for implementation teams to use as they see fit.
Audio files	Audio files (in mp4 and ogg formats) that align with the image files.
Closed caption file	Closed caption file (in vtt format) that contains text which align with the audio presentation.

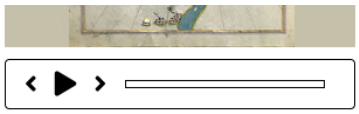
Implementation Team Details

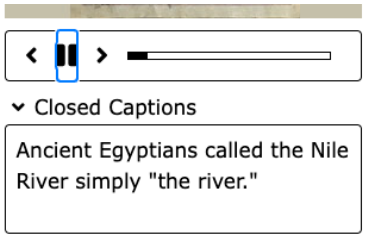
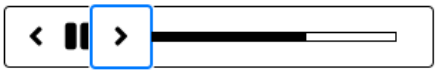
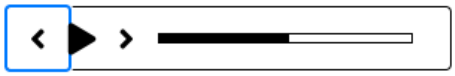
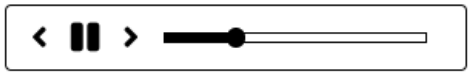
Files	Purpose
An HTML template (not required)	The HTML markup in the stimulus XML file can either be used as delivered, or processed and placed within an HTML template, depending on the item rendering implementation.
A control mechanism (typescript or plain javascript)	The rendering engine must include specific controlling logic for the slideshow feature. The logic can reside on the front end within the browser, and can be written in plain javascript, or TypeScript, or any other browser-based logic. This logic controls the audio player, and synchronizes the

	visibility (through the toggling of the **qti-hidden** style class) of the individual images based on the **data-begin** attribute on the elements surrounding the individual images. The controlling logic also must control the visibility and refresh of the closed caption content.
Cascading Style Sheet (not required, but strongly urged)	A CSS (cascading style sheet) file can be used to adjust the audio player elements, and other decorations, such as slide show images, audio player, and closed caption content.

Example: Slideshow stimulus HTML markup

```
<div class="sbac-slides-config">
   <div class="sbac-slides-container">
      <div data-begin="0" class="sbac-slide">
         <img src="passage_171192_v10_image_11th c map.jpg" alt="" data-
filetype="jpg"/>
      </div>
      <div data-begin="000027" class="qti-hidden sbac-slide">
         <img src="passage_171192_v10_image_nile delta.jpg" alt="" data-
filetype="jpg"/>
      </div>
      <div data-begin="000048" class="qti-hidden sbac-slide">
         <img src="passage_171192_v10_image_harvest.jpg" alt="" data-
filetype="jpg"/>
      </div>
      <div data-begin="000122" class="qti-hidden sbac-slide">
         <img src="passage_171192_v10_image_river boat.jpg" alt="" data-
filetype="jpg"/>
      </div>
      </div>
      <audio visible="true" class="sound_repeat sbaudio sbac-slides-audio">
         <source class="inline-playable" src="passage_171192_v10_6791_audio1.m4a"
type="audio/mp4" data-filetype="m4a"/>
         <source class="inline-playable" src="passage_171192_v10_6791_audio1.ogg"
type="audio/ogg" data-filetype="ogg"/>
         <track label="English" kind="captions"
src="passage_171192_v10_6791_audio1.vtt" srclang="en" data-filetype="vtt"/>
      </audio>
   </div>
</div>
```

Interaction Description	**Visual Example**
Audio element with custom styling to remove time display, mute button, and other default controls.	

Closed caption content area below the audio player	
Next image button that advances to the next image and the audio time index based on the **data-begin** attribute value on the element surrounding the image.	
Previous image button that returns to the previous image and the audio time index based on the **data-begin** attribute value on the element surrounding the image.	
Audio scrubbing on mouse hover.	

5 Catalog

Smarter Balanced provides the following Personal Needs and Preferences (PNP) through the use of Catalog resources. Implementation teams may define the use of Catalog resources.

Tag	**Catalog Resource**	**SB Labels/References**
sign-language	American Sign Language	"ase" <qti-catalog id="item-51235-global"> <qti-card support="sign-language"> <qti-card-entry default="true" xml:lang="ase"><qti-html-content> <video controls="true"><source src="item_51235_ASL_STEM.webm" type="video/webm" /> <source src="item_51235_ASL_STEM.mp4" type="video/mp4" />Your browser does not support the video element. </video> </qti-html-content>

		</qti-card-entry> </qti-card> </qti-catalog>
braille	Eboss-On-Demand Transcripts of Closed-Captions	“ext:sbac-braille” <qti-catalog id="item-51235-global"> <qti-card support="ext:sbac-braille-files"> <qti-card-entry data-math-representation="UEB" data-contracted="true" data-type="BRF" data-format="UEB" xml:lang="en"> <qti-file-href mime-type="application/braille">item_51235_enu_uct.brf</qti-file-href> </qti-card-entry> <qti-card-entry data-math-representation="nemeth" data-contracted="false" data-type="BRF" data-format="UEB" xml:lang="en"> <qti-file-href mime-type="application/braille">item_51235_enu_uxn.brf</qti-file-href> </qti-card-entry> <qti-card-entry data-math-representation="UEB" data-contracted="false" data-type="BRF" data-format="UEB" xml:lang="en"> <qti-file-href mime-type="application/braille">item_51235_enu_uxt.brf</qti-file-href> </qti-card-entry> <qti-card-entry data-math-representation="nemeth" data-contracted="true" data-type="BRF" data-format="UEB" xml:lang="en"> <qti-file-href mime-type="application/braille">item_51235_enu_ucn.brf</qti-file-href> </qti-card-entry> </qti-card> </qti-catalog>
glossary-on-screen	English Glossaries	“TDS_WL_Glossary” <qti-catalog id="glossary-term-3"> <qti-card support=”glossary-on-screen"> <qti-card-entry data-list-code="TDS_WL_Glossary" data-list-type="glossary" xml:lang="en"> <qti-html-content> <div> <span>A greeting</span> </div>

		</qti-html-content> </qti-card-entry> </qti-card> </qti-catalog>
keyword-translation	Translated Glossaries	"TDS_WL_[*INSERT language tag*]" Ex: "TDS_WL_ArabicGloss" See page 4 of the ISAAP Accessibility Features Document for specific information <qti-catalog id="glossary-term-3"> <qti-card support="keyword-translation"> <qti-card-entry data-list-code="TDS_WL_ArabicGloss" data-list-type="glossary" xml:lang="ar"> <qti-html-content> <div> <span>مسح</span> <audio controls="true"> <source src="glossary/item_51235_survey_3_arabic.m4a" type="audio/mp4" /> <source src="glossary/item_51235_survey_3_arabic.ogg" type="audio/ogg" /> </audio> </div> </qti-html-content> </qti-card-entry> </qti-card> </qti-catalog>
	Illustrated Glossaries	"ext:sbac-glossary-illustration" <qti-catalog id="glossary-term-2"> <qti-card support="ext:sbac-glossary-illustration"> <qti-card-entry data-list-code="TDS_ILG1" data-list-type="illustration"> <qti-html-content> <img src="item_51235_skateboarders.svg" alt="skateboarders" /> </qti-html-content> </qti-card-entry> </qti-card> </qti-catalog>
spoken	Computer Read-Aloud	Designed to be compatible with assistive technologies

		<qti-catalog id="item-51235-catalog-0"> <qti-card support="spoken">> <qti-card-entry data-reading-type="computer-read-aloud">> <qti-html-content>more,</qti-html-content> </qti-card-entry> </qti-card> </qti-catalog>

*High-contrast support is not included in the Catalog, Smarter Balanced applies this universal support via css styles.

5.1 Text to Speech: Screen Reader and Computer Read Aloud

Using shared css and HTML DOM elements, Smarter Balanced is able to support Text to Speech assistive technologies such as Screen Reader and Computer Read Aloud.

Smarter Balanced items are delivered in a state that supports Screen Reader technology. For specific portions of text, you will find elements identified with the **data-qti-suppress-tts** attribute set to **computer-read-aloud** (see examples below, with *peach highlight and italicized formatting*). These elements are also set to be visually hidden through the use of the QTI shared vocabulary CSS style of **qti-visually-hidden**. Immediately adjacent to these elements, you will find an additional elements with an aria-hidden attribute set to true (indicated in the examples with yellow highlight). The contents of this adjacent element is visible to a user, but is "hidden" to assistive technology.

Please see section 5.2 for information on how Text to Speech is handled for MathML.

Screen Reader (default and as delivered by Smarter Balanced)

```
<span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">SKATE PARK</span>
<span aria-hidden="true">SKATE PARK</span>
```

It is important to note that, as delivered, the screen reader catalog entries have already been saturated into the markup. You will find the **computer-read-aloud** catalog entries still in the item xml, which should be toggled into the markup programmatically by the specific downstream item renderer, by setting the aria-label attribute value on the appropriate . The screen reader is then set to be aria hidden.

Computer Read aloud

```
<span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud" aria-hidden="true">SKATE PARK</span>
<span aria-hidden="false" aria-label="Skate Park,">SKATE PARK</span>
```

Screen Reader and Computer Read aloud for Images (default and as delivered by Smarter Balanced)

For images, we have taken a further step and saturated all **computer-read-aloud** and **screen-reader** content withinthe HTML markup, without any pointers to the catalog entries. For images, the <img> tag includes an attribute aria-describedby that has a value for an identifier to a tag immediately adjacent to the <img> tag. The tag includes the qti-visually-hidden class style to hide the content from sighted users, and a data-qti-suppress-tts="computer-read-aloud" to hide the content from the browser speech engine, but is available to assistive technology (see Shared Image Resources scenario below).

Additional Information

Classes, Tags	**Scenario**	**Examples**
qti-visually-hidden data-qti-suppress-tts aria-hidden="true"	Plain Term with a Screen Reader Override	reedread
qti-visually-hidden data-qti-suppress-tts aria-hidden="true"	Shared Glossary Terms	 SKATE PARK SKATE PARK
qti-visually-hidden data-qti-suppress-tts aria-describedby="filename" id="filename"	Shared Image Resources	 <img aria-describedby="img-descript-0" src="passage_171646.png" alt="" /> Two line plots are shown. The title of the line plots is Preferences of 8 Local Skateboarders. The line plot on the left is titled, Number of Single Ramps Requested. The number line has a range from 0-4, increasing in increments of 1. Data points are as follows: 1: X X X, 2 X X X X, 3: X. The line plot on the right is titled, Number of Double Ramps Requested. The line plot has a range from 0 to 4, increasing in increments of 1. Data points are as follows: 1: X X X X X, 2: X X, 4: X

Additional suggested reference material: [IMS QTI 3.0 BPIG - Annotated Item Examples]

5.2 MathML and TTS Markup

The exception to the delivery of TTS markup and catalog entries is for MathML content. Smarter Balanced items with MathML content are delivered with both the MathML markup and an accompanying base64 encoded image. The image content includes the CSS classes **qti-visually-hidden** and **sbac-mathml-svg**. Rather than saturate the TTS content within the markup, both **computer-read-aloud** and **screen-reader** content are delivered in the qti catalog entries. Downstream rendering systems will need to toggle the markup programmatically for the differing TTS content based on the data-catalog-idref identifiers.

Additional Information

Classes, Tags	Scenario	Examples
qti-visually-hidden sbac-mathml-svg	MathML Resources	<img class="qti-visually-hidden sbac-mathml-svg" src=".." alt="SVG MathML" /><m3:math><m3:mo>−</m3:mo><m3:mfrac bevelled="false"><m3:mn>10</m3:mn><m3:mn>7</m3:mn> </m3:mfrac></m3:math>

6 QTI Stylesheet Element

Smarter Balanced items **do not utilize the qti-stylesheet**. Smarter Balanced is choosing to include the stylesheet in items as a 'just in case' approach should this practice change at a later date.

7 CSS

7.1 QTI Shared CSS

Smarter Balanced makes use of virtually all QTI 3 Shared CSS defined as of 11/1/2021 in the QTI 3 Conformance tests which can be found here:

https://github.com/IMSGlobal/qti-conformance/tree/develop/qti3.0/Level%202/I19b%20Shared%20CSS%20Vocabulary%20Full

Consequently, delivery partners should implement all qti- css classes in their delivery systems in order to provide the expected item rendering UX.

The Shared CSS classes include:

- qti-italic
- qti-fullwidth
- qti-bordered
- qti-align-left
- qti-align-center
- qti-align-right
- qti-valign-top

- qti-valign-middle
- qti-valign-baseline
- qti-valign-bottom
- qti-well
- qti-display-inline-block
- qti-layout-row
- qti-layout-col1 (all column values 1,2,3,4,5,6,7,8,9,10,11,12)
- qti-layout-offset1 (all offset values 1,2,3)
- qti-hidden

Example: Shared CSS Vocabulary 1

```
<qti-assessment-item>
  <qti-item-body>
    <div>
      <![CDATA[
      <style>
      /* These styles not part of shared css */
      .muted {color:#999999;font-size:smaller;}
      /* For image spacing */
      .img-margin-04 {margin:0 4px;}
      </style>
      ]]>

      <h4>Underline an Element</h4>

      <p>Look at the <span class="qti-underline">underlined text</span> in this
sentence.</p>

      <h4>Italicize an Element</h4>

      <p>Look at the <span class="qti-italic">italicized text</span> in this sentence.</p>

      <h4>Horizontal Alignment - Left, Center, Right <span class="muted">- table border
added for effect</span></h4>

      <table class="qti-fullwidth qti-bordered">
        <tbody>
          <tr>
            <td class="qti-align-left">I am left-aligned text in a table cell.</td>
          </tr>
          <tr>
            <td class="qti-align-center">I am center-aligned text in a table cell.</td>
          </tr>
          <tr>
            <td class="qti-align-right">I am right-aligned text in a table cell.</td>
          </tr>
        </tbody>
      </table>
```

```
    <h4>Vertical Alignment - Top, Middle, Baseline, Bottom <span class="muted">- 4x28
images and paragraph borders added for effect</span></h4>

    <p class="qti-bordered">
      <img class="qti-valign-top img-margin-04" alt="placeholder"
src="
AAFUlEQVR42mNkYPhfz4AEGEcFhosAAM7zKeUTvPB1AAAAAElFTkSuQmCC" width="4"
height="28"/>
      I am top-valigned.
    </p>
    <p class="qti-bordered">
      <img class="qti-valign-middle img-margin-04" alt="placeholder"
src="
AAFUlEQVR42mNkYPhfz4AEGEcFhosAAM7zKeUTvPB1AAAAAElFTkSuQmCC" width="4"
height="28"/>
      I am middle-valigned.
    </p>
    <p class="qti-bordered">
      <img class="qti-valign-baseline img-margin-04" alt="placeholder"
src="
AAFUlEQVR42mNkYPhfz4AEGEcFhosAAM7zKeUTvPB1AAAAAElFTkSuQmCC" width="4"
height="28"/>
      I am baseline-valigned.
    </p>
    <p class="qti-bordered">
      <img class="qti-valign-bottom img-margin-04" alt="placeholder"
src="
AAFUlEQVR42mNkYPhfz4AEGEcFhosAAM7zKeUTvPB1AAAAAElFTkSuQmCC" width="4"
height="28"/>
      I am bottom-valigned.
    </p>

    <h4>Make an Element Fullwidth (width=100%) <span class="muted">- table border
added for effect</span></h4>

    <table class="qti-fullwidth qti-bordered">
      <tbody>
        <tr>
          <td class="qti-align-left">I am left-aligned</td>
        </tr>
        <tr>
          <td class="qti-align-center">I am center-aligned</td>
        </tr>
        <tr>
          <td class="qti-align-right">I am right-aligned</td>
        </tr>
      </tbody>
    </table>

    <h4>Add an Element Border <span class="muted">- second paragraph is
bordered</span></h4>
```

```
    <p>
      Ho hum.  I am a non-bordered paragraph.
    </p>
    <p class="qti-bordered">
      Look at me! I am a bordered paragraph.
    </p>
    <p>
      I am yet another non-bordered paragraph.
    </p>

    <h4>Place an element in a Well <span class="muted">- second paragraph is in a
well</span></h4>

    <p>
      Ho hum.  I am a non-bordered paragraph.
    </p>
    <p class="qti-well">
      Look at me! I am in a well!
    </p>
    <p>
      I am yet another non-bordered paragraph.
    </p>

    <h4>Display: inline-block</h4>

    <div>
      This is some text with a nested table element <em>with</em> qti-display-inline-
block: <table class="qti-display-inline-block qti-bordered qti-valign-
middle"><tbody><tr><td>Row 1 Cell 1</td></tr><tr><td>Row 2 Cell
1</td></tr></tbody></table> that is displayed inline with the surrounding text.
    </div>

   </div>
  </qti-item-body>
</qti-assessment-item>
```

Images of expected rendering of Shared CSS above can be found in the conformance suite here:

https://github.com/IMSGlobal/qti-conformance/blob/develop/qti3.0/Level%202/I19b%20Shared%20CSS%20Vocabulary%20Full/layout-css-1-visual-8-3.jpg (Login Required)

Example: Shared CSS Vocabulary 2 ("layout css")

```
<?xml version="1.0" encoding="UTF-8"?>
<qti-assessment-item
  xmlns="http://www.imsglobal.org/xsd/imsqtiasi_v3p0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.imsglobal.org/xsd/imsqtiasi_v3p0
https://purl.imsglobal.org/spec/qti/v3p0/schema/xsd/imsqti_asiv3p0_v1p0.xsd"
```

```
identifier="i19b-shared-css-vocab-2" title="i19b Shared CSS Vocabulary 2"
time-dependent="false" adaptive="false">

<qti-item-body>
  <div>
    <![CDATA[
    <style>
    /* Utility CSS to demonstrate column virtual borders - no effect on layout. */
    [class*="qti-layout-col"] {background-color:#eee;}
    </style>
    ]]>

    <h4>qti-layout-row, qti-layout-col</h4>

    <hr />
    <br />

    <div class="qti-layout-row">
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
```

```
      <div class="qti-layout-col1">
        The quick brown fox jumps over the lazy dog.
      </div>
    </div>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col2">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.
      </div>
      <div class="qti-layout-col2">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.
      </div>
      <div class="qti-layout-col2">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.
      </div>
      <div class="qti-layout-col2">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.
      </div>
      <div class="qti-layout-col2">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.
      </div>
      <div class="qti-layout-col2">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.
      </div>
    </div>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col3">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col3">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col3">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col3">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
```

```
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
    </div>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col4">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col4">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col4">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
    </div>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col5">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col7">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
    </div>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col6">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col6">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
    </div>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col12">
```

```
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
    </div>

    <hr />

    <h4>qti-layout-row, qti-layout-col, qti-layout-offset</h4>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col6 qti-layout-offset3">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
    </div>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col4 qti-layout-offset2">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col4">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
    </div>

    <hr />

    <div class="qti-layout-row">
      <div class="qti-layout-col2 qti-layout-offset1">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col4 qti-layout-offset1">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
      <div class="qti-layout-col2 qti-layout-offset1">
        The quick brown fox jumps over the lazy dog.  The quick brown fox jumps over the
lazy dog.  The quick brown fox jumps over the lazy dog.
      </div>
    </div>
```

```
    <hr />
   </div>
  </qti-item-body>
</qti-assessment-item>
```

Images of expected rendering of Layout CSS can be found in the conformance suite:

- https://github.com/IMSGlobal/qti-conformance/blob/develop/qti3.0/Level%202/I19b%20Shared%20CSS%20Vocabulary%20Full/layout-css-2-visual-bordered.png (Login Required)
- https://github.com/IMSGlobal/qti-conformance/blob/develop/qti3.0/Level%202/I19b%20Shared%20CSS%20Vocabulary%20Full/layout-css-2-visual.png (Login Required)

NOTE: It is *anticipated* that new Shared CSS Classes will be defined for *margin* and *padding*. We advise delivery partners to stay abreast of these new CSS developments as they will almost certainly be used in future item releases.

7.2 SBAC CSS Styles

Smarter Balanced uses the following CSS Styles as markers, or handles, for downstream systems that render items. For example, the "sbac-left-pane" class is intended to show a QTI viewer which HTML element is designated as the left side of the content. It is up to the downstream system to either allow vertical scrolling, or some other indicator that content is presented on the left-hand side. The functionality that these classes represent were present within the items upon field testing. The recommendation is that these classes be incorporated into downstream systems accordingly.

SBAC CSS Class	Usage Context	Examples
sbac	An implementation partner can use this as an indicator that they will be working with Smarter Balanced content.	Any HTML element that supports the class attribute can have “sbac” as a value.
sbac-global-item-catalog-ref	An implementation partner can use this as an indicator that they will be working with Smarter	Found in the <qti-item-body> elements. <qti-item-body class=”sbac-global-item-catalog-ref”> Stimulus content contains this class in an immediate sibling element to <qti-stimulus-body>, since the <qti-stimulus-body> cannot have class attributes.

	Balanced resources in the catalog.	<qti-stimulus-body> … </qti-stimulus-body>
sbac-pane-scrolling	An indicator that a particular HTML flow content area that indicates independent horizontal or vertical scrolling area(s)	<qti-item-body class="sbac"> <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Passage</h2>
sbac-left-pane	Connected to sbac-pane-scrolling to identify scroll in the left pane	<qti-item-body class="sbac"> <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Passage</h2>
sbac-right-pane	Connected to sbac-pane-scrolling to identify scroll in the right pane	<qti-item-body class="sbac">\ <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Passage</h2> <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Question</h2>
semantic-marker	Used to indicate visually hidden HTML elements intended for assistive technology	<qti-item-body class="sbac">\ \ \ <h2 class="qti-visually-hidden **semantic-marker**"

		data-qti-suppress-tts="computer-read-aloud">Passage</h2> <h2 class="qti-visually-hidden **semantic-marker**" data-qti-suppress-tts="computer-read-aloud">Question</h2>
prompt	Handle for communicating that a user is in the 'prompt'. Only found in the <qti-item-body> content.	<qti-item-body class="sbac"> These two maps show the same area at two different scales.
item-part	Handle for identifying and separating items within EBSR	<qti-item-body class="sbac"> <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Passage</h2> <h2 class="qti-visually-hidden semantic-marker" data-qti-suppress-tts="computer-read-aloud">Question</h2> The following question has two parts. First, answer part A.A. Then, answer part B.<span aria-hidden="true" data-catalog-idref="item-182828-catalog-

		1">B.</p> </div> <div class="**item-part**"> <h3 class="choicePart">Part A</h3> <div class="prompt"> <p>Which conclusion is supported by the presentation?</p> </div> <qti-choice-interaction class="sbac" response-identifier="RESPONSE-PART-A" max-choices="1" min-choices="1"> <qti-simple-choice identifier="A"> <p>The New York parade is the largest of its kind.</p> </qti-simple-choice> <qti-simple-choice identifier="B"> <p>The huge balloons in a parade are difficult to control.</p> </qti-simple-choice> <qti-simple-choice identifier="C"> <p>Balloon wranglers have a harder job than others in the parade.</p> </qti-simple-choice> <qti-simple-choice identifier="D"> <p>The main reason people like the balloons is because of who they look like.</p> </qti-simple-choice> </qti-choice-interaction> </div> <div class="**item-part**"> <h3 class="choicePart">Part B</h3> <div class="prompt"> <p>Which sentence from the presentation <strong><span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">best</span><span aria-hidden="true" data-catalog-idref="item-182828-catalog-3">best</span> </strong>supports your answer in part <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">A?</span><span aria-hidden="true" data-catalog-idref="item-182828-catalog-2">A?</span></p> </div>
choicePart	Handle for identifying the choice elements within an EBSR	<div class="item-part"> <h3 class="**choicePart**">Part A</h3> <div class="prompt"> <p>Which conclusion is supported by the presentation?</p>

		 <qti-choice-interaction class="sbac" response-identifier="RESPONSE-PART-A" max-choices="1" min-choices="1"> <qti-simple-choice identifier="A"><p>The New York parade is the largest of its kind.</p> </qti-simple-choice> <qti-simple-choice identifier="B"><p>The huge balloons in a parade are difficult to control.</p> </qti-simple-choice> <qti-simple-choice identifier="C"><p>Balloon wranglers have a harder job than others in the parade.</p> </qti-simple-choice> <qti-simple-choice identifier="D"><p>The main reason people like the balloons is because of who they look like.</p> </qti-simple-choice> </qti-choice-interaction> <h3 class="**choicePart**">Part B</h3> <p>Which sentence from the presentation <strong><span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">best</span><span aria-hidden="true" data-catalog-idref="item-182828-catalog-3">best</span> </strong>supports your answer in part <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">A?</span><span aria-hidden="true" data-catalog-idref="item-182828-catalog-2">A?</span></p>
tei-sbee	Handle for identifying	<qti-custom-interaction response-identifier="RESPONSE" class="**tei-sbee**">

	Smarter Balanced equation item types	<custom-option><![CDATA[<editorconfig> <tabConfig> <tab xmlns="http://www.w3.org/1999/xhtml" title="Basic"><grid cols="3" title="Numbers"> <item title="one" aria-label="one">1</item> <item title="two" aria-label="two">2</item> <item title="three" aria-label="three">3</item> <item title="four" aria-label="four">4</item> <item title="five" aria-label="five">5</item> <item title="six" aria-label="six">6</item> <item title="seven" aria-label="seven">7</item> <item title="eight" aria-label="eight">8</item> <item title="nine" aria-label="nine">9</item> <item title="zero" aria-label="zero">0</item> <item title="period" aria-label="period">.</item> <item title="fraction" aria-label="fraction" cmd="/" class="mje_button_fraction"/> </grid> </tab> </tabConfig> <editorRow> <math xmlns="http://www.w3.org/1998/Math/MathML" title=""><mstyle> <mo>##</mo> </mstyle> </math> </editorRow> </editorconfig>]]></custom-option> </qti-custom-interaction>
sbac-mathml-svg	Handle for identifying MathML images (versus the MathML mark-up)	<p><span data-catalog-idref="glossary-term-1" data-sbac-term="Click">Click</span> the spaces of the figure to shade <span data-catalog-idref="item-183419-catalog-0"><img class="qti-visually-hidden **sbac-mathml-svg**" src="…" alt="SVG MathML" /><m3:math><m3:semantics><m3:mfrac><m3:mn>3</m3:mn><m3:mn>5</m3:mn></m3:mfrac><m3:annotation encoding="StarMath 5.0">3 over 5</m3:annotation></m3:semantics></m3:math> </span> of <span class="qti-visually-hidden" data-qti-suppress-tts="computer-read-aloud">Figure, R. ; This is an interactive image. The main answer space contains a figure, The figure is labeled, Figure, R.</span><span aria-hidden="true" data-catalog-idref="item-183419-catalog-1">Figure R.</span></p>

tei-sbgrid	Handle for identifying Smarter Balanced Grid item types	 <qti-custom-interaction response-identifier="RESPONSE" class="**tei-sbgrid**"> <custom-option><![CDATA[<Question id="3419" ITSVer="0" ScoreEngineVer="1" version="2.0"><Description /><QuestionPart id="1"><Options><ShowButtons /><GridColor>None</GridColor><GridSpacing>10,N</GridSpacing><UpdateLayout>false</UpdateLayout><CanvasWidth>500</CanvasWidth><CanvasHeight>410</CanvasHeight><PaletteWidth>75</PaletteWidth><CenterImage>false</CenterImage><ProperLineGeometry>false</ProperLineGeometry><ScaleImage>false</ScaleImage></Options><Text /><ObjectMenuIcons /><ImageSpec><FileSpec>item_3419_v0_Background_png16malpha.png</FileSpec><Position>0,0</Position></ImageSpec><HotSpots><Regions><Region name="a1" shape="rect" coords="126, 50, 374, 77"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke-dasharray="" /></Event></Region><Region name="a2" shape="rect" coords="126, 77, 374, 105"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke-dasharray="" /></Event></Region><Region name="a3" shape="rect" coords="126, 106, 374, 133"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke-dasharray="" /></Event></Region><Region name="a4" shape="rect" coords="126, 134, 374, 161"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke-dasharray="" /></Event></Region><Region name="a5" shape="rect" coords="126, 162, 374, 189"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke-dasharray="" /></Event></Region><Region name="a6" shape="rect" coords="126, 190, 374, 217"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke-dasharray="" /></Event></Region><Region name="a7" shape="rect" coords="126, 218, 374, 245"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke-dasharray="" /></Event></Region><Region name="a8" shape="rect" coords="126, 246, 374, 273"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke-

		dasharray="" /></Event></Region><Region name="a9" shape="rect" coords="126, 273, 374, 301"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke- dasharray="" /></Event></Region><Region name="a10" shape="rect" coords="126, 302, 374, 329"><Event name="select"><Styles fill="black" fill-opacity="0.3" stroke="white" stroke-width="0" stroke-opacity="" stroke- dasharray="" /></Event></Region></Regions><RegionGroups><Regi onGroup name="grp1" min="0" max="0"><Include region="a1" /><Include region="a2" /><Include region="a3" /><Include region="a4" /><Include region="a5" /><Include region="a6" /><Include region="a7" /><Include region="a8" /><Include region="a9" /><Include region="a10" /></RegionGroup></RegionGroups></HotSpots></Quest ionPart><PreSetAnswerPart><AnswerSet><Question id="3419"><QuestionPart id="1"><ObjectSet /><SnapPoint /></QuestionPart></Question></AnswerSet></PreSetAn swerPart></Question>]]></custom-option> </qti-custom-interaction> </div>
tei-sbti	Handle for identifying Smarter Balanced Table Interaction item types	<qti-custom-interaction response- identifier="RESPONSE" data-table-sub-type="TableInput" class="**tei-sbti**"> <custom- option><![CDATA[<div class="ti- title"></div> <table class="tableItem"> <thead> <tr> <th data-ti-column-identifier="col0" data-its- identifier="col0"> <p class="qti-align-center"><strong><span data-catalog-idref="glossary-term- 2">Ingredient</span></strong></p> </th> <th data-ti-column-identifier="col1" data-its- identifier="col1">

		Amount Needed for 4 Cakes </th> <th data-ti-column-identifier="col2" data-its-identifier="col2"> Amount of Ingredient Remaining </th> </tr> </thead> <tbody> <tr> <td class="ti-label"> Cups of Flour </td> <td class="ti-label">
sbaudio	Handle for identifying the Smarter Balanced audio player	 <audio controls="true" class="**sbaudio** sound-repeat"> <source src="passage_193773_v1_8051_audio1.m4a" type="audio/mp4" /> <source src="passage_193773_v1_8051_audio1.ogg" type="audio/ogg" /> <track label="Transcript" kind="captions" src="passage_193773_v1_8051_audio1.vtt" srclang="en" default="true" />Your browser does not support the audio element.

		</audio>
sound-repeat	Class that communicates the display of an audio repeat user interaction	 <audio controls="true" class="sbaudio **sound-repeat**"> <source src="passage_193773_v1_8051_audio1.m4a" type="audio/mp4" /> <source src="passage_193773_v1_8051_audio1.ogg" type="audio/ogg" /> <track label="Transcript" kind="captions" src="passage_193773_v1_8051_audio1.vtt" srclang="en" default="true" />Your browser does not support the audio element. </audio>

7.3 SBAC CSS Table Cell Width Styles

Smarter Balanced uses the following CSS Styles for width values. These styles are intended to be used with any item rendering software. These width styles replace the hard-coded width styles found in many Smarter Balanced HTML table markup.

CSS Style	**Width Value**
sbac-qti-width-1	10px
sbac-qti-width-2	20px
sbac-qti-width-3	30px
sbac-qti-width-4	40px
sbac-qti-width-5	50px
sbac-qti-width-6	60px
sbac-qti-width-7	70px
sbac-qti-width-8	80px
sbac-qti-width-9	90px
sbac-qti-width-10	100px

sbac-qti-width-11	110px
sbac-qti-width-12	120px
sbac-qti-width-13	130px
sbac-qti-width-14	140px
sbac-qti-width-15	150px
sbac-qti-width-16	160px
sbac-qti-width-17	170px
sbac-qti-width-18	180px
sbac-qti-width-19	190px
sbac-qti-width-20	200px
sbac-qti-width-21	210px
sbac-qti-width-22	220px
sbac-qti-width-23	230px
sbac-qti-width-24	240px
sbac-qti-width-25	250px
sbac-qti-width-26	260px
sbac-qti-width-27	270px
sbac-qti-width-28	280px
sbac-qti-width-29	290px
sbac-qti-width-30	300px
sbac-qti-width-31	310px
sbac-qti-width-32	320px
sbac-qti-width-33	330px
sbac-qti-width-34	340px
sbac-qti-width-35	350px
sbac-qti-width-36	360px
sbac-qti-width-37	370px
sbac-qti-width-38	380px

sbac-qti-width-39	390px
sbac-qti-width-40	400px
sbac-qti-width-41	420px
sbac-qti-width-42	440px
sbac-qti-width-43	460px
sbac-qti-width-44	480px
sbac-qti-width-45	500px
sbac-qti-width-46	520px
sbac-qti-width-47	540px
sbac-qti-width-48	560px
sbac-qti-width-49	580px
sbac-qti-width-50	600px
sbac-qti-width-51	620px
sbac-qti-width-52	640px
sbac-qti-width-53	660px
sbac-qti-width-54	680px
sbac-qti-width-55	700px
sbac-qti-width-56	720px
sbac-qti-width-57	740px
sbac-qti-width-58	760px
sbac-qti-width-59	780px
sbac-qti-width-60	800px
sbac-qti-width-61	820px

Sample ccs

```
.sbac-qti-width-1 {width: 10px;}
```

8 Rubric Block

Each item contains a rubric block. Smarter Balanced displays rubric block information via CDATA. Please note that some rubric blocks may not be surrounded by CDATA as the information within is conformant HTML. An example is provided below:

Item ID: 183443

```
<qti-rubric-block class="qti-rubric-discretionary-placement" use="scoring"
view="scorer">

        <qti-content-body><![CDATA[<h3>Rubric</h3><p>Exemplar:</p><br
        /><p><img src="item_183443_v0_exemplar_png16malpha.png"
        alt="Unlabelled" /></p><p>Scoring note: the numbers used to make the
        addition equation can be in any order and the area model does not have
        to be used in order to receive 1 point.</p><br /><p>For this item, a full-
        credit response includes</p><br /><ul><li><p><span>Student enters
        correct response as shown and described in exemplar.</span><span>
        </span><span>(1 point).</span></p></li></ul>]]></qti-content-
        body>

    </qti-rubric-block>
```

Because **view="scorer"**, Rubric block content should not be available to students.

9 Response Processing and Outcome Declarations

Smarter uses all of the built in operators in the IMS specification. In addition, Smarter Balanced uses these additional custom operators and those can be found on the Item Scoring Custom Operator document.

An example of XML with an embedded Custom Operator for an equation item type:

```
<qti-assessment-item>
 <!-- EQ interactions produce an XML string -->
 <qti-response-declaration base-type="string" cardinality="single" identifier="RESPONSE"
/>
 <!-- Good Practice to specify normal max/min if not declaring MAXSCORE -->
 <qti-outcome-declaration base-type="float" cardinality="single" identifier="SCORE"
normalmaximum="1" normal-minimum="0">
 <qti-default-value>
 <qti-value>0</qti-value>
 </qti-default-value>
 </qti-outcome-declaration >
 <qti-outcome-declaration identifier="PP_RESPONSE" base-type="string"
cardinality="ordered"/>
 <qti-outcome-declaration identifier="Line1" base-type="string" cardinality="single"/>
 <qti-item-body>
 <!-- item body must contain an interaction for the response declaration -->
 <qti-custom-interaction class="tei-sbee" response-identifier="RESPONSE">
 <qti-custom-option>
 <![CDATA[ EAX ]]>
 </qti-custom-option>
```

```
 </qti-custom-interaction>
 </qti-item-body>
 <qti-response-processing>
 <qti-set-outcome-value identifier="PP_RESPONSE">
 <qti-custom-operator class="qti.sbac.customOperators.EQ.PREPROCESSRESPONSE"
definition="response=RESPONSE"/>
 </qti-set-outcome-value>
 <qti-set-outcome-value identifier="Line1">
 <qti-index n="1">
 <qti-variable identifier="PP_RESPONSE"/>
 </qti-index>
 </qti-set-outcome-value>
 <qti-response-condition>
 <qti-response-if>
 <qti-or>
 <qti-custom-operator class="qti.sbac.customOperators.EQ.ISEQUIVALENT"
definition="exemplar=Eq(c,((10)/3)*g)|||object=Line1|||simplify=True"/>
 <qti-custom-operator class="qti.sbac.customOperators.EQ.ISEQUIVALENT"
definition="exemplar=Eq(((10)/3)*g,c)|||object=Line1|||simplify=True"/>
 <qti-custom-operator class="qti.sbac.customOperators.EQ.ISMATCH"
definition="constraints=a>=3.3,a<3.4|||object=Line1|||parameters=a|||pattern=Eq(c,a*
g)|||
simplify=True|||variables=c,g"/>
 <qti-custom-operator class="qti.sbac.customOperators.EQ.ISMATCH"
definition="constraints=a>=3.3,a<3.4|||object=Line1|||parameters=a|||pattern=Eq(a*g
,c)|||
simplify=True|||variables=g,c"/>
 </qti-or>
 <qti-set-outcome-value identifier="SCORE">
 <qti-base-value base-type="float">1</baseValue>
 </qti-set-outcome-value>
 </qti-response-if>
 </qti-response-condition>
 </qti-response-processing>
</qti-assessment-item>
```

For historical reference only, response processing function and operators have remained the same as SAAIF custom operators.

10 Packaging

This section will contain packaging information when it is specific for Smarter Balanced QTI 3.0 items and their implementation.

10.1 Language Variant Content

The IMS Best Practices and Implementation Guide makes reference to item or content variants that may exist within a Content Package. This section will address Smarter Balanced language variants.

Language variants are prefixed with a **variant identifier** tag. A **variant identifier** is then associated with the corresponding resource(s) within the manifest via the **identifierref** tag. The resource(s) are then tagged with the **resource identifier** tag.

The following table shows the **variant identifier** values present in Smarter QTI 3.0 items:

Label	**Value**	**Description**
variant identifier	Prefix of “es”	Stacked-Spanish related resources
variant identifier	Prefix of “os”	Spanish-Only related resources

Example

```
<cpx:variant identifier="itemVariantRelationship-es-sbac-200-183216"
identifierref="es-sbac-200-183216">
        <cpx:metadata>
          <drd:accessForAllResource>
            <drd:languageOfAdaptation>es</drd:languageOfAdaptation>
          </drd:accessForAllResource>
        </cpx:metadata>
      </cpx:variant>
      <cpx:variant identifier="itemVariantRelationship-os-sbac-200-183216"
identifierref="os-sbac-200-183216">
        <cpx:metadata>
          <drd:accessForAllResource>
            <drd:languageOfAdaptation>es</drd:languageOfAdaptation>
          </drd:accessForAllResource>
        </cpx:metadata>
      </cpx:variant>
<resource identifier="es-sbac-200-183216" type="imsqti_item_xmlv3p0" href="sbac-
200-183216/es-sbac-200-183216.xml">
      <file href="sbac-200-183216/es-sbac-200-183216.xml"/>
      <file href="sbac-200-183216/item_183216_v0_graphics1_png256.png"/>
      <file href="sbac-200-183216/item_183216_v0_graphics2_png256.png"/>
      <file href="sbac-200-183216/item_183216_walked_v1_illustration_glossary.svg"/>
      <file href="sbac-200-183216/item_183216_enter_v1_illustration_glossary.svg"/>
<resource identifier="os-sbac-200-183216" type="imsqti_item_xmlv3p0" href="sbac-
200-183216/os-sbac-200-183216.xml">
      <file href="sbac-200-183216/os-sbac-200-183216.xml"/>
      <file href="sbac-200-183216/item_183216_v0_graphics1_png256.png"/>
```

*Please note that not all resource files are prefixed with variant values (e.g. illustration glossary files).