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Activities of the ATEA Project

- Expert Review: six experts in vision and motor disabilities reviewed sample items, provided feedback on barriers to accessibility, and recommended supports and accommodations; spring 2013
- Teacher Panels: teachers in five states reviewed original and accessible items; fall 2013
- Cognitive Labs: one-on-one sample tests with students who have vision or motor disabilities; fall 2013
- Item Tryouts:
 - embedded in spring 2014 field tests in Kansas in order to test alternative TE formats with a large general population of students
 - in partner states during fall 2014 in order to obtain larger samples of students with vision and motor disabilities

Technology-Enhanced Test Items: Examinee Experience

- Presentation
 - Virtual tools, color, animation, alternative fonts, color overlays, reverse contrast, screen magnification, interactive graphics, auditory calming, and text-to-speech
 - Linked or embedded audio and video, data files, dictionaries, or other resources
 - Verbal descriptions of graphics, language translations, braille-ready text or tactile graphics files, human or avatar sign language interpretation
- Engagement
 - Opportunity to manipulate content interactively
 - Authentic, real-world experience and application
 - Motivation for the examinee

Technology-Enhanced Items: Responses, Scoring, and Measurement

- Responses
 - More demanding response requirements, such as constructed response or multiple response options
 - Alternate platforms such as touch screen tablets and assistive technologies in addition to keyboards and mice
 - Response latency, time spent on item, history of changed responses
- Scoring
 - Partial credit, graded response, multiple correct answers, and other complex scoring algorithms
- Construct Measurement
 - Increased cognitive complexity (e.g., application rather than recall or recognition)
 - Efficiency of combining the content of several traditional items into one stimulus

Challenges in Creating Accessible Items

- Removing inaccessible actions like dragging and dropping elements onscreen
- Replacing those actions with accessible alternatives like radio buttons or click-to-select interactions
- Including accommodations such as screen magnification, text-to-speech audio, reverse contrast, and switch systems
- Creating static alternatives for print and braille test forms
- Maintaining content and wording of original TE items
- Maintaining construct consistency with original TE items

Drag-and-Drop Task Interface

- Intuitive, motivating, and efficient for students without vision or motor disabilities
- Inaccessible to students who cannot see the screen or navigate with a mouse or touchscreen
- Difficult to transcribe into braille or print
- Difficult for text-to-speech screen readers
- Inaccessible to switches

Drag and Drop: Labeling (one to one)

Select the x value that makes each equation true.

$x = -3$



$x = -2$

$x = -4$

$x = -1$

drop correct response here

$x^2 - x - 6 = 0$

drop correct response here

$3x^2 - 12x - 15 = 0$

drop correct response here

$6x^2 - 6x - 72 = 0$

drop correct response here

$6x^2 + 18x - 24 = 0$

Accessible Alternative: Matching

Select the x value that makes each equation true.

$$x = -3$$

$$x = -2$$

$$x = -4$$

$$x = -1$$

$$x^2 - x - 6 = 0$$

$$3x^2 - 12x - 15 = 0$$

$$6x^2 - 6x - 72 = 0$$

$$6x^2 + 18x - 24 = 0$$

Drag and Drop: Labeling (unlimited)

Compare the fractions below using the correct symbol for each pair of fractions. A symbol may be used more than once.

=

>

<

$\frac{7}{8}$

drop correct response here

$\frac{6}{8}$

$\frac{5}{6}$

drop correct response here

$\frac{5}{4}$

$\frac{4}{4}$

drop correct response here

$\frac{6}{6}$

$\frac{6}{4}$

drop correct response here

$\frac{3}{2}$

Accessible Alternative: Matrix

Compare the fractions below using the correct symbol for each pair of fractions. A symbol may be used more than once.

	=	>	<
$\frac{7}{8} ? \frac{6}{8}$	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
$\frac{5}{6} ? \frac{5}{4}$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
$\frac{4}{4} ? \frac{6}{6}$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
$\frac{6}{4} ? \frac{3}{2}$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Accessible Alternative: Drop Down

Compare the fractions below using the correct symbol for each pair of fractions. A symbol may be used more than once.

$$\frac{7}{8} \quad \begin{array}{c} \text{Choose} \downarrow \\ \text{Choose} \\ = \\ > \\ < \end{array} \quad \frac{6}{8}$$

$$\frac{5}{6} \quad \begin{array}{c} > \\ < \end{array} \quad \frac{5}{4}$$

$$\frac{4}{4} \quad \text{Choose} \downarrow \quad \frac{6}{6}$$

$$\frac{6}{4} \quad \text{Choose} \downarrow \quad \frac{3}{2}$$

Drag and Drop: Ordering

Read the sentences below. They are not in the correct order. Put the sentences in the correct order.

"Next time let's come earlier and catch even more fish!" Andy added.

"That sounds like a great idea," said Grandpa Bill.

"Anytime, buddy," his grandpa answered.

"Thank you, Grandpa Bill, for helping me learn to fish!" Andy exclaimed.



Accessible Alternative: Matching

Read the sentences below. They are not in the correct order. Put the sentences in the correct order.

1.

"Next time let's come earlier and catch even more fish!" Andy added.

2.

"That sounds like a great idea," said Grandpa Bill.

3.

"Anytime, buddy," his grandpa answered.

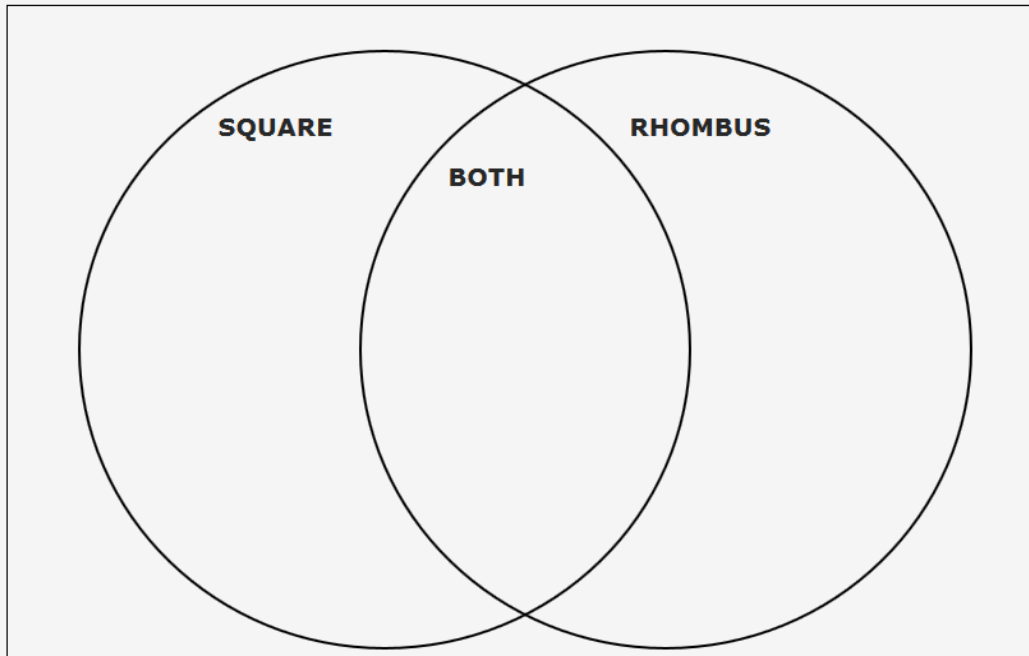
4.

"Thank you, Grandpa Bill, for helping me learn to fish!" Andy exclaimed.

Drag and Drop: Venn Diagram

Choose the correct category for each property.

all sides equal
all angles equal
four sides
four angles



Accessible Alternative: Matrix

Choose the correct category for each property.

	Square	Rhombus	Both
all sides equal	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
all angles equal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
four sides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
four angles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Drag and Drop: Categorization into two “buckets”

Read the sentence below.

Sally ran to look for her pair of skates.

Sort the words from the sentence into the correct noun or verb box.

Words

Sally



ran

look

pair

skates

Noun

Verb

Accessible Alternative: Matrix

Read the sentence below.

Sally ran to look for her pair of skates.

Sort the words from the sentence into the correct noun or verb box.

	Noun	Verb
Sally	<input checked="" type="radio"/>	<input type="radio"/>
ran	<input type="radio"/>	<input type="radio"/>
look	<input type="radio"/>	<input type="radio"/>
pair	<input type="radio"/>	<input type="radio"/>
skates	<input type="radio"/>	<input type="radio"/>

Drag and Drop: Categorization into three “buckets”

Read the sentence below.

The storms form over warm waters and sometimes strike land.

Select the correct part of speech for each of the words below.

Word

storms

form

warm

waters

strike

land

Noun

Verb

Adjective

Accessible Alternatives: Matrix for Braille

Read the sentence below.

The storms form over warm waters and sometimes strike land.

Sort the words as they are used in the sentence into the category that shows the correct part of speech.

	Noun	Verb	Adjective
1. storms	A	B	C
2. form	A	B	C
3. warm	A	B	C
4. waters	A	B	C
5. strike	A	B	C
6. land	A	B	C

Drag and Drop: Graphic Labeling

Read the sentences below about a tree.

A tree grows roots in the ground. The trunk is the strongest part of the tree. It reaches from the ground all the way up through the branches of the tree. Leaves grow on the branches.

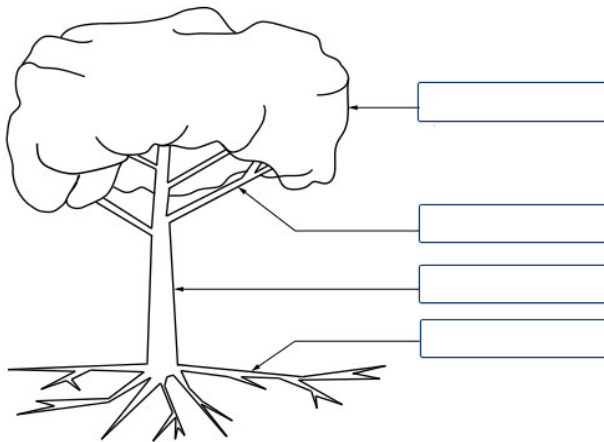
Select the correct label for each part.

branches

roots

leaves

trunk

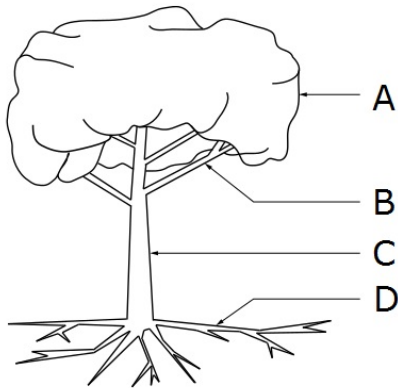


Accessible Alternative: Drop Down

Read the sentences below about a tree.

A tree grows roots in the ground. The trunk is the strongest part of the tree. It reaches from the ground all the way up through the branches of the tree. Leaves grow on the branches.

Select the correct label for each part.



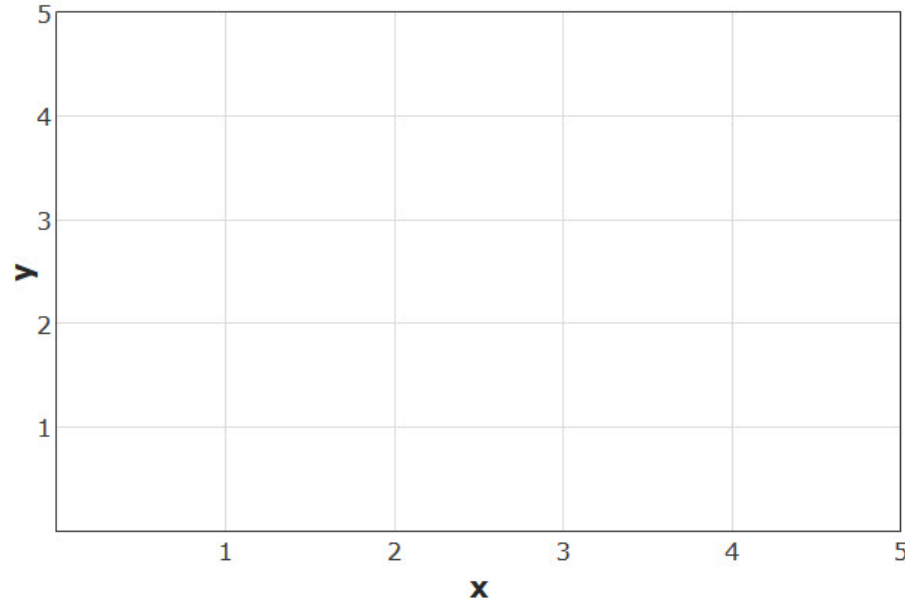
- A
- B
- C
- D
-
-

Click-to-Select Task Interface

- Includes traditional multiple choice radio button test items
- Can be printed and transcribed into braille
- May be accessible using text-to-speech screen readers
- May be accessible to one- and two-switch systems
- May not be easily accessible onscreen depending on the nature of the task
- More accessible alternatives may be available

Click to Select: Graphing

Select two points to form a line that represents a proportional relationship.



Undo

Erase All

Click to Select: Select Text (before)

Natalia is writing an article for her school newspaper about traveling. Read the paragraph from her article and choose the **two** words that should be changed to fit the purpose and audience.

The **coolest** place I have ever visited is Machu Picchu, Peru. Hiking in the nearby mountains, I could see the ancient **ruins** from a distance. It was **super beautiful**. As I took in the **view**, I was **sure** that all the hours I traveled to **get** there had been worth it!

Click to Select: Select Text (after)

Natalia is writing an article for her school newspaper about traveling. Read the paragraph from her article and choose the **two** words that should be changed to fit the purpose and audience.

The **coolest** place I have ever visited is Machu Picchu, Peru. Hiking in the nearby mountains, I could see the ancient **ruins** from a distance. It was **super beautiful**. As I took in the **view**, I was **sure** that all the hours I traveled to **get** there had been worth it!

Accessible Alternative: Multiple Select

Natalia is writing an article for her school newspaper about traveling. Read the paragraph from her article and choose the **two** words that should be changed to fit the purpose and audience.

The **coolest** place I have ever visited is Machu Picchu, Peru. Hiking in the nearby mountains, I could see the ancient **ruins** from a distance. It was **super beautiful**. As I took in the **view**, I was **sure** that all the hours I traveled to **get** there had been worth it!

- ☐ coolest
- ☐ ruins
- ☐ super
- ☐ beautiful
- ☐ view
- ☐ sure
- ☐ get

Click to Select: Matching

Order the fractions from smallest to largest.

First

Second

Third

Fourth

$$\frac{5}{2}$$

$$\frac{5}{6}$$

$$\frac{5}{3}$$

$$\frac{5}{4}$$

Click to Select: Drop Down (single)

Choose the correct answer to the equation below.

$6 \times (5 - 3) =$ Choose ▾

- Choose
- 48
- 24
- 12
- 8

Accessible Alternative: Multiple Choice

Choose the correct answer to the equation below.

$$6 \times (5 - 3) = ?$$

- ☐ 48
- ☐ 24
- ☐ 12
- ☐ 8

Click to Select: Drop Down (multiple)

The simplification of $(6 + 7) + 4$ is shown. Choose the property used for step 1 and step 2.

$$(6 + 7) + 4$$

$$(7 + 6) + 4$$

$$7 + (6 + 4)$$

$$7 + 10$$

$$17$$

- Select
- associative property
- commutative property
- distributive property

Accessible Alternative: Print and Braille

The simplification of $(6 + 7) + 4$ is shown. Choose the property used for step 1 and step 2.

$$(6 + 7) + 4$$

$$(7 + 6) + 4$$

- A) associative property
- B) commutative property
- C) distributive property

$$7 + (6 + 4)$$

- A) associative property
- B) commutative property
- C) distributive property

Field Tests with the General Population

- Students taking general assessments will see all types of items (e.g., drag and drop, click to select, radio button)
- Some of these will be pairs of items with identical content on two test forms
- Students taking general assessments should find all of these types equally accessible
- We will be able to evaluate item difficulty, use of onscreen tools, and time to respond for all item types
- If items in alternate formats are comparable, then we know it is fair and equitable to use the accessible format for students who require it

Field Tests with Students with Disabilities

- Students who require accommodations can receive
 - Audio presentation through synthetic text to speech
 - Screen magnification
 - Reverse contrast or color overlay
 - Switches
 - Print, large print, or braille booklets
- Students who require accommodations will respond to the same items as other students but in the most accessible formats
- Statistical comparisons will be made for item difficulty and time to respond on identical items delivered with and without accommodations