

# ATEEA



Accessibility for  
Technology-Enhanced  
Assessments

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# History of the ATEA Project

- The Accessibility for Technology-Enhanced Assessments Enhanced Assessment Grant was funded October 1, 2012 through September 30, 2014
- Designed to address the need for accessibility of new, computerized, technology-enhanced assessments under development by major assessment consortia (SBAC, PARCC)
- Eight partner states: Kansas, Ohio, Michigan, Wisconsin, West Virginia, Utah, Maryland, Kentucky
- National Advisory Board: five national assessment experts who guide the activities and outcomes of the project
- ATEA website: <http://ateassessments.org/>

# 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
- Teacher Panels: teachers in five states review original and accessible items
- Task Tryouts: one-on-one sample tests with students who have vision or motor disabilities
- Field Tests: large-scale tests during spring testing window
- Major Outcomes:
  - Guidelines and recommendations for creating accessible technology-enhanced test items
  - Quantitative analysis of item functioning and accessibility

# TE 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

# TE Items: Scoring and Measurement

- Response
  - More demanding response requirements, such as constructed responses or multiple responses
  - Alternate platforms such as touch screen tablets and assistive technologies in addition to keyboards and mice
  - Capture of response latency, time spent on each item, history of changed responses
- Construct Measurement
  - Sophisticated scoring procedures such as partial credit and other complex scoring algorithms
  - 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 items 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

# Sample Drag and Drop Tasks

## Labeling

Label the quadratic equations with the  $x$ -values that make the equations true.

$x = -3$

drop correct response  $x^2 - x - 6 = 0$

$x = -2$

drop correct response  $3x^2 - 12x - 15 = 0$

$x = -4$

drop correct response  $6x^2 - 6x - 72 = 0$

$x = -1$

drop correct response  $6x^2 - 18x - 24 = 0$



# Sample Drag and Drop Tasks

## 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.

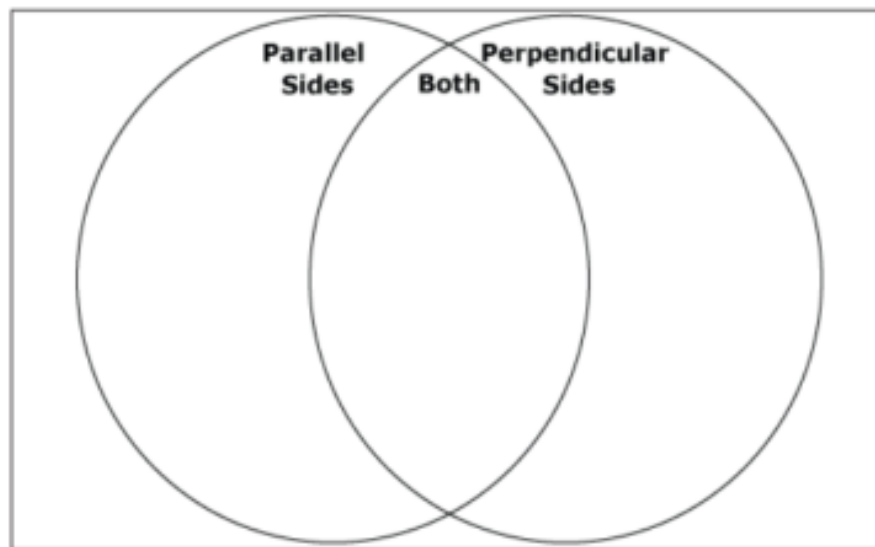
"Thank you, Grandpa Bill, for helping me learn to fish!" Andy exclaimed.

# Sample Drag and Drop Tasks

## Venn Diagram

Place the polygons below where they belong in the Venn diagram.


- parallelogram
- rectangle
- rhombus
- square
- trapezoid



# Sample Drag and Drop Tasks

Categorization into two “buckets”

A rectangle and a parallelogram are shown below.



What are attributes of both shapes? Choose all that belong.

Attribute	Yes
Four sides	<input type="checkbox"/>
Four angles	<input type="checkbox"/>
All equal sides	<input type="checkbox"/>
All equal angles	<input type="checkbox"/>
Two pairs of parallel sides	<input type="checkbox"/>
Two pairs of equal sides	<input type="checkbox"/>

# Sample Drag and Drop Tasks

## Categorization into three “buckets”

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 box that shows the correct part of speech.

Words	Noun
storms	
form	Verb
warm	
waters	Adjective
strike	
land	

< Back   Clear   Next >   Review & End

# Accessible Alternatives: Radio Buttons

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
storm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
form	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
waters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
strike	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
land	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

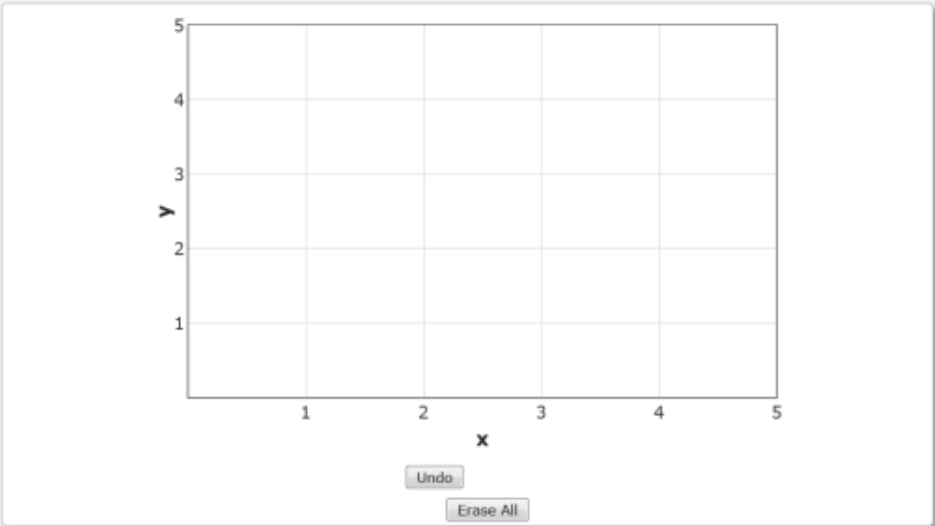
# Click to Select Task Interface

- Includes traditional multiple choice radio button test items
- Can be printed and transcribed into braille
- May be accessible using text-to-speech screen readers
- Accessible to two-switch systems with tab and select keys
- Accessible to single switch systems using step scanning

# Click to Select Tasks

## Graphing

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



Undo

Erase All

◀ Back Clear Next ▶ Review & End

# Click to Select Tasks

## Hot Text

Read the sentences below about Andy catching a fish. Choose all of the verbs from the highlighted words.

Suddenly, an enormous fish broke the lake's surface. It flashed in the light. A spray of water leapt into the sky as the fish thrashed in the water.



# Click to Select Tasks

## Matching

Read the paragraph below.

Spiders are invertebrate creatures in the Araneae order of the class Arachnida in the phylum Arthropoda. A spider has up to eight eyes, eight legs, and seven silk-producing glands in its abdomen. These glands secrete proteins that are extruded through spinnerets to produce different kinds of silk. Many spiders, particularly orb, funnel, sheet, and cob-weaving spiders, use this silk to build webs with which they use to catch prey.

Match the word on the left with the correct word or phrase on the right.

Arachnida

invertebrate

Araneae

funnel

Arthropoda

spider type

phylum

type of creature

order

class

◀ Back

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Next ▶

Review & End

# Accessibility Features in KITE

- Current accessibility features
  - Self-voicing item presentation
  - Whole-screen magnification
  - Reverse contrast
  - Color overlays
  - Tab and select key operation to support dual switch systems
  - Step scanning for single switch systems
- Features planned for the future
  - Delivery of braille-ready files (BRFs) to a refreshable braille display or embosser
  - Delivery of portable document format files (PDFs) to a printer
  - Magnifying glass for spot magnification onscreen

# Evaluation of Accessibility Part I

- 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

# Evaluation of Accessibility Part II

- Students who require accommodations can receive
  - Audio presentation through synthetic text to speech
  - Reverse contrast or color overlay for vision enhancement
  - Use of switch systems
  - 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