

# Universal Design for Assessment

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# Principles of Universal Design

- Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

— *Ron Mace*

# Testing Accessibility with Technology


41 Question 2 8th Grade Math: All Tools Demonstration

1  
2  
3  
4  
5  
6  
7  
8

Jim has  $\frac{3}{4}$  of a yard of string which he wishes to divide into pieces, each  $\frac{1}{8}$  of a yard long. How many pieces will he have?

(A) 3  
(B) 4  
(C) 6  
(D) 8

**OPTIONS**



pause play close

player size  
small medium large

Calculator  
References  
Finish or Review

Previous Question Mark this question for later review Next Question

# Advocates

**Educators**



**Parents**



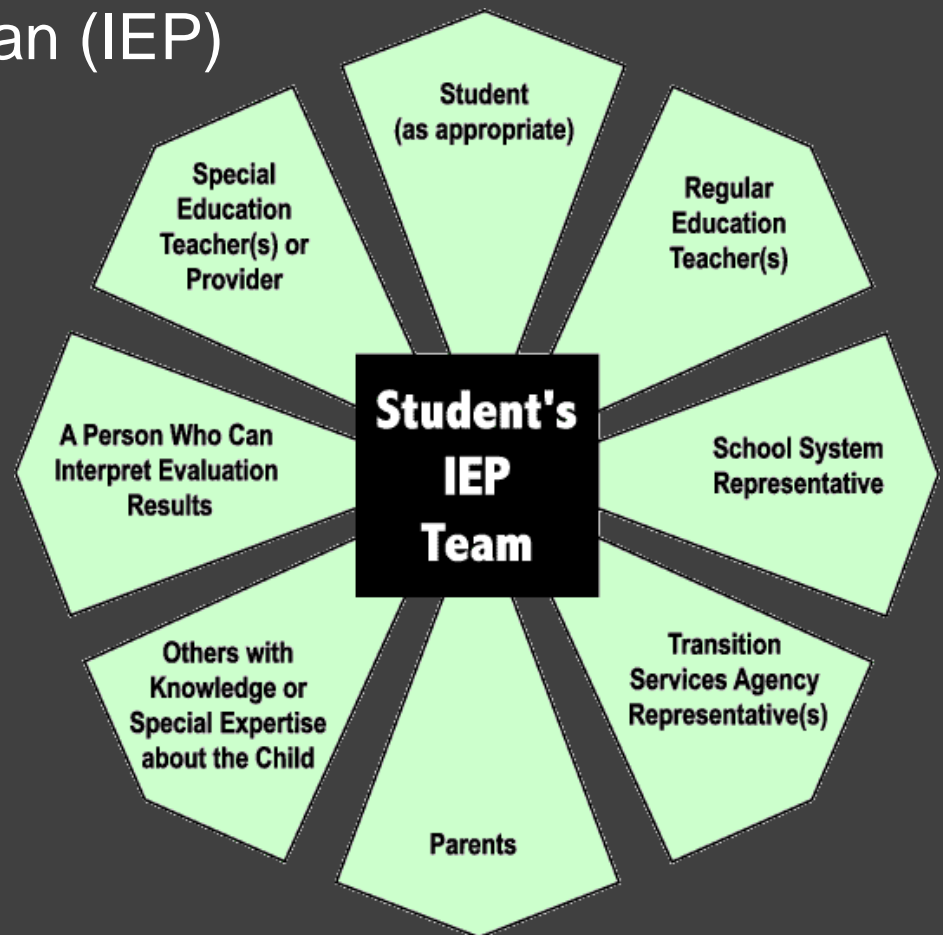
**Lawyers**



# Eligibility for Test Accommodations

- Eligibility defined by:
  - Individual Education Plan (IEP)
  - School request
  - No unfair advantage

- Question:
  - If no unfair advantage, why do schools make it so difficult?



# Three-part Answer

1.



Tests developed for

**GENERAL STUDENT POPULATION**

2.



Tests developed to be administered under

**STANDARD CONDITIONS**

3.



Tests delivered by

**STANDARD MEDIUM** (*paper*)

# New Model: Computer-based Testing

- New approach to testing accessibility uses principles of universal design
- Build accommodations into test at outset of test development, eliminating the need for costly retrofits



# Five Accommodation Categories

## Change in:

- Presentation
- Equipment / Materials
- Response Method
- Schedule/Timing
- Setting

# Five Accommodation Categories

<u>Change in:</u>	<u>Example:</u>
<ul style="list-style-type: none"><li>• Presentation</li></ul>	<ul style="list-style-type: none"><li>• Large Print, Braille, Sign</li></ul>
<ul style="list-style-type: none"><li>• Equipment / Materials</li></ul>	<ul style="list-style-type: none"><li>• Magnifier, Templates, Noise buffer</li></ul>
<ul style="list-style-type: none"><li>• Response Method</li></ul>	<ul style="list-style-type: none"><li>• Scribe, Keyboard, Pointing</li></ul>
<ul style="list-style-type: none"><li>• Schedule/Timing</li></ul>	<ul style="list-style-type: none"><li>• Extended time, Breaks, Multi-Days</li></ul>
<ul style="list-style-type: none"><li>• Setting</li></ul>	<ul style="list-style-type: none"><li>• Individual, Separate room, Carrel</li></ul>

# Five Accommodation Categories into Three New Categories

## Current Categories:

- Presentation
- Equipment / Materials
- Response Method
- Schedule/Timing
- Setting

## Alternate Categories:

- Alternate Representation
- Altered Presentation
- Administrative Change

# Administrative Changes

- Changes intended to removes barriers such as:
  - Difficulty concentrating
  - Easily distracted by movement or sound



**Imagine...**

Ability to concentrate on the problem is  
one of the constituent parts of the  
successful mental work

# Imagine...

We all see things the same way. We see words in groups or phrases. The print is more dominant than the background. The print shows no movement. The printed letters are evenly black. Black print on white paper gives the best contrast for everyone. White background looks white.

# Altered Presentation Examples

- Magnification
- High Contrast
- Color Filters
- Read Aloud

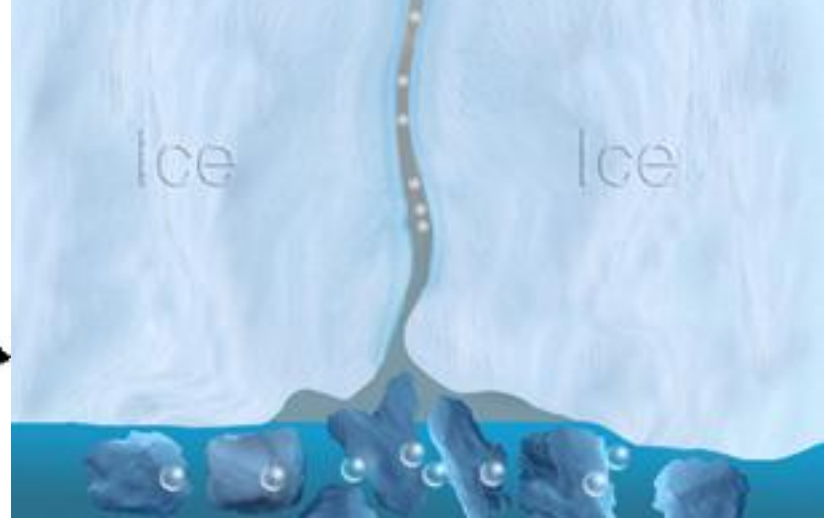
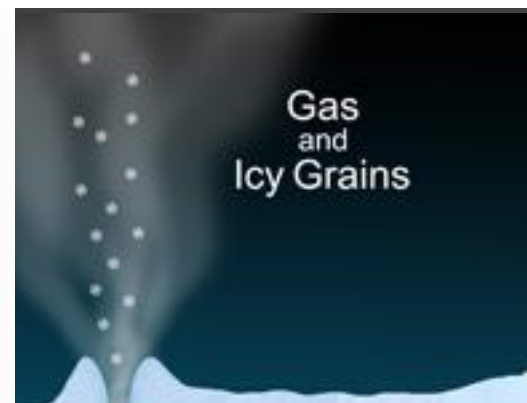
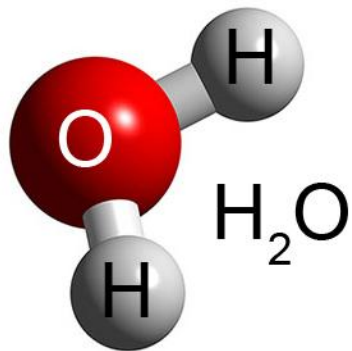
# Alternate Representation: WATER

W-A-T-E-R



**maji**

water



Swahili Language (Kiswahili)

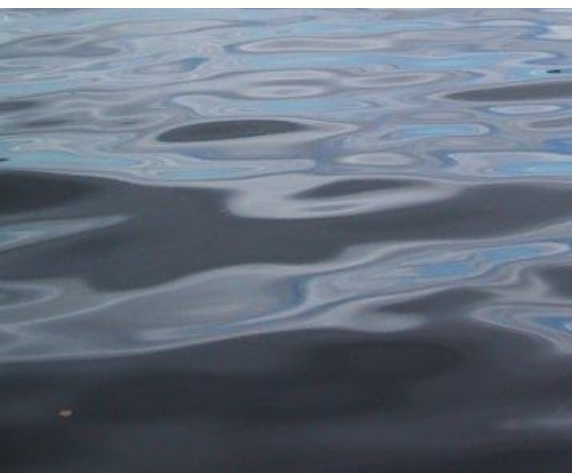
maji

English Language (English)

water

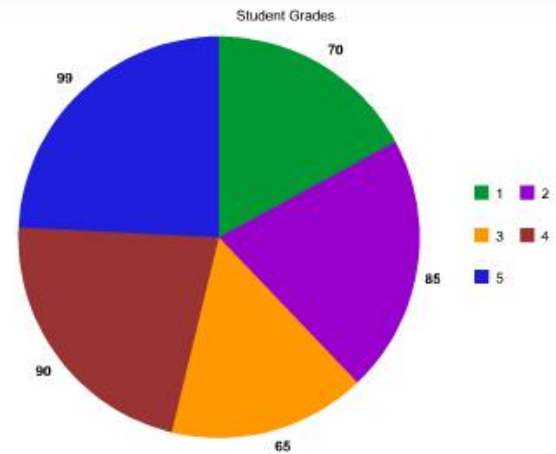
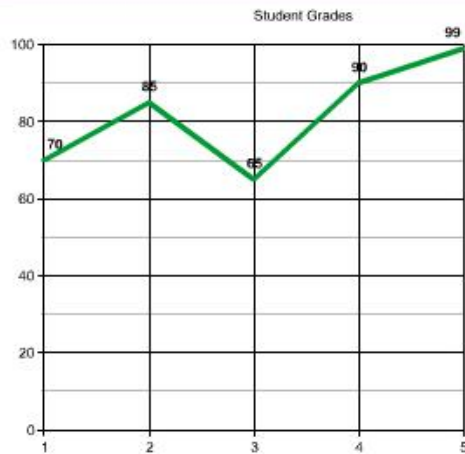
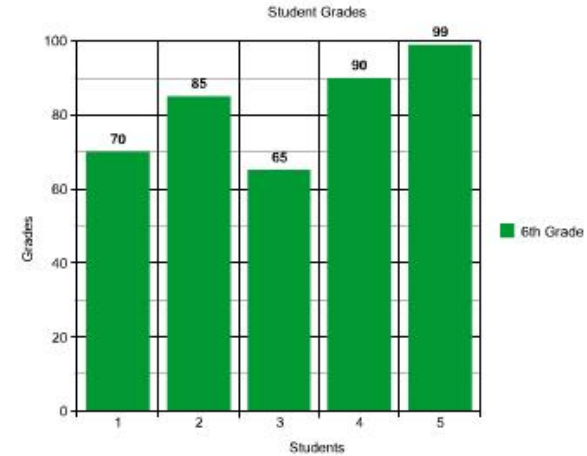


水



# Alternate Representation: RELATIONSHIPS

Student 1	Student 2	Student 3	Student 4	Student 5
70	85	65	90	99

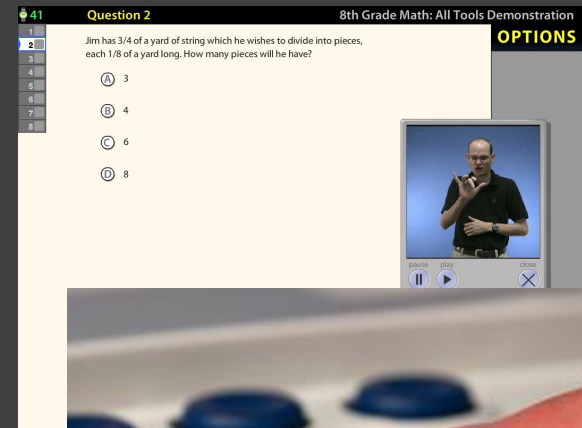


# Most Common Forms of Alternate Representation

- Braille
- American Sign Language
- Foreign languages
- Scientific notation
- Narrative descriptions of images
- Images for narratives
- Oral descriptions of table & graphs

# Technological Advantages

- Easy to dynamically change forms on computer-based testing
  - Deaf can click to get signed presentation
  - Blind can get an electronic Braille display or Read-aloud
  - Student with difficulty in scientific notation can click to see formulas



41 Question 2 8th Grade Math: All Tools Demonstration

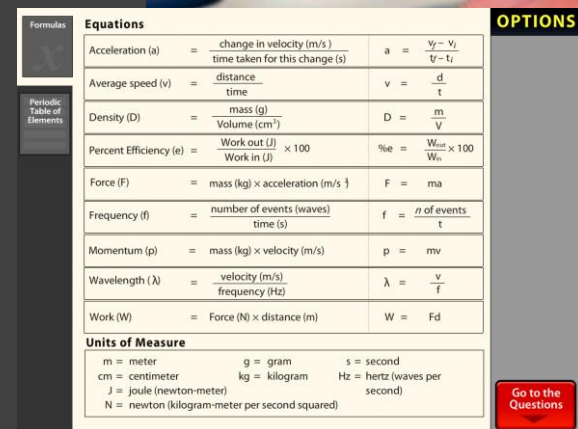
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Ⓐ 3  
Ⓑ 4  
Ⓒ 6  
Ⓓ 8

OPTIONS

pause play close

A small video inset shows a man in a black shirt signing.



Formulas

Periodic Table of Elements

Equations

Acceleration (a)	$= \frac{\text{change in velocity (m/s)}}{\text{time taken for this change (s)}}$	$a = \frac{v_f - v_i}{t_f - t_i}$
Average speed (v)	$= \frac{\text{distance}}{\text{time}}$	$v = \frac{d}{t}$
Density (D)	$= \frac{\text{mass (g)}}{\text{Volume (cm}^3\text{)}}$	$D = \frac{m}{V}$
Percent Efficiency (e)	$= \frac{\text{Work out (J)}}{\text{Work in (J)}} \times 100$	$\%e = \frac{W_{out}}{W_{in}} \times 100$
Force (F)	$= \text{mass (kg)} \times \text{acceleration (m/s}^2\text{)}$	$F = ma$
Frequency (f)	$= \frac{\text{number of events (waves)}}{\text{time (s)}}$	$f = \frac{n \text{ of events}}{t}$
Momentum (p)	$= \text{mass (kg)} \times \text{velocity (m/s)}$	$p = mv$
Wavelength ( $\lambda$ )	$= \frac{\text{velocity (m/s)}}{\text{frequency (Hz)}}$	$\lambda = \frac{v}{f}$
Work (W)	$= \text{Force (N)} \times \text{distance (m)}$	$W = Fd$

Units of Measure

m = meter	g = gram	s = second
cm = centimeter	kg = kilogram	Hz = hertz (waves per second)
J = joule (newton-meter)		
N = newton (kilogram-meter per second squared)		

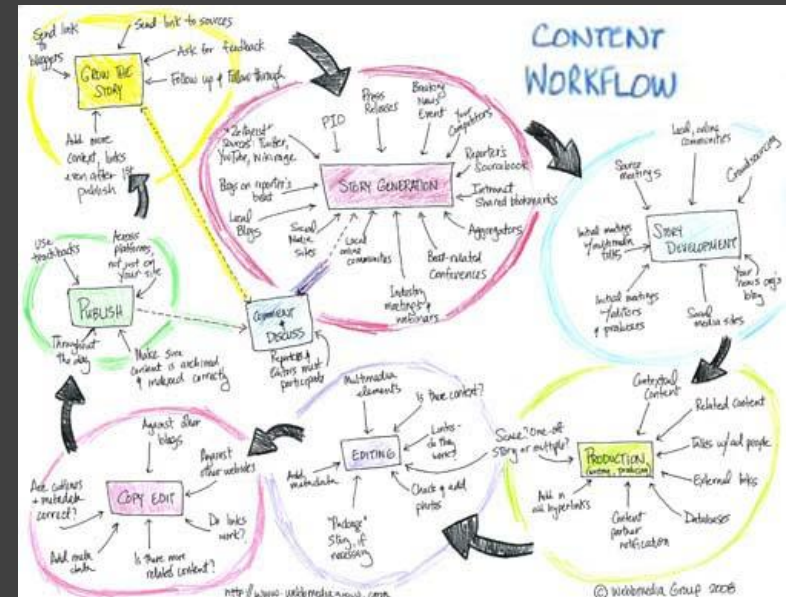
OPTIONS

Go to the Questions

# Issues for Consideration

- Content developers must address two main issues:

1. Consideration of default representational form
2. Development of alternates that will meet the needs of ALL people interacting with that content



- Digital content industry must:

- Deepen understanding of alternate representational forms
- Develop content that can take multiple forms