

# MIXING IT UP TO MAKE THE MOST OUT OF TECH-BASED TECHNIQUES FOR AT-RISK STUDENTS (AND OTHERS TOO)

---

Rebecca Kopriva  
Institute for Innovative Assessment  
University of Wisconsin  
[rkopriva@wisc.edu](mailto:rkopriva@wisc.edu)

Presentation at the Instructional Sensitivity Conference, KU, Lawrence, Kansas

11-14-13



Well-designed and traditionally crafted instructionally sensitive items/tasks **work** for learners who:

1. Can easily and fluently navigate

- denser language and language structures
- ‘shorthand’ text in close-ended items
- typing in responses to constructed response items that *fully and accurately* reflect what they want to say.

2. Are comfortably fluent in (non-target relevant) grade-level academic nomenclature and structures of academic discourse.

It seems that many at-risk students don't respond as well to typical methods of teaching and testing.

- There are many reasons, for instance:
  - Literacy problems
  - Lack of exposure to enough ongoing academic-related environments
  - Substantial economic problems
  - Chaotic living environments
  - Boredom and lack of meaningful successes
  - Disability or English language challenges

Ed Roebber argues that about 30-40% of US students fall in the 'at risk' category



“Works for everyone, disadvantages no one”, VP, Renaissance Learning.

- ONPAR is an assessment methodology that utilizes a wide range of multi-modal, multi-layered techniques to convey meaning to students AND from students.
- Properly designed, ONPAR tasks provide instructionally sensitive and instructionally supportive information.
- Numerous experimental and qualitative studies document its effectiveness.

Demonstration:

ONPAR Elementary Mathematics Testlet,  
Pre-Algebra

# How Does the Methodology Work?

## Some Underpinnings from Cognition Research

1. **Narrative Elements** – Opening vignettes quickly draw students into the ‘story’ of an assessment task and stimulate schema, prior knowledge structures
  - Layered, multi-semiotic representations facilitate multiple cognitive connections and retrieval paths (e.g., “dual coding”).
  - Integration of textual and multi-modal elements minimizes split attention and reduces processing demands

# How Does It Work?

## Some Underpinnings from Cognition Research

2. **Efficient** – Multimodal, interactive contextual stimuli designed to **maximize richness in an efficient way**
  - Tasks briefly convey a great deal of critical information to **minimize processing demands and guide student focus to salient information** (good ads do this...)
  - **Standardized locations of screen elements** (e.g., Help icons and prompts) ‘prime’ attention and maximize efficiency

# How Does it Work:

## Some Underpinnings from Cognition Research

3. **Pacing** – Slow enough to engage; change enough to keep attention high
4. **Chunking** – As relevant to the target, tasks are broken into parts and sub-problems across multiple screens keeps tasks fresh and students focused and engaged.
  - This maximizes working memory capacity and processing efficiency.



# How Does it Work:

## Some Underpinnings from Cognition Research

5. **Continuous interaction**— Maximize interaction with screen elements to **keep students involved**, e.g.:
  - Manipulating onscreen supports,
  - Moving screen elements to build responses
  - Using sub-tasks for the purpose of focusing attention
6. **Encourage autonomy and choices**—**Students impact their experience**

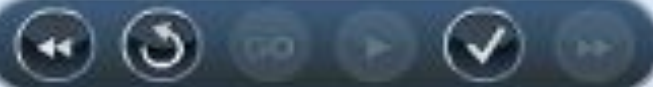
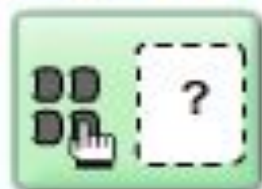
# How Does it Work:

## Some Underpinnings from Cognition Research

7. **Multiple redundancies**—Across modes and screens reduce working memory demands
8. **Careful attention** to foreground and background screen elements so as not overwhelm (again, ads do this very effectively)
9. **Response Formats** – Let's take a look...

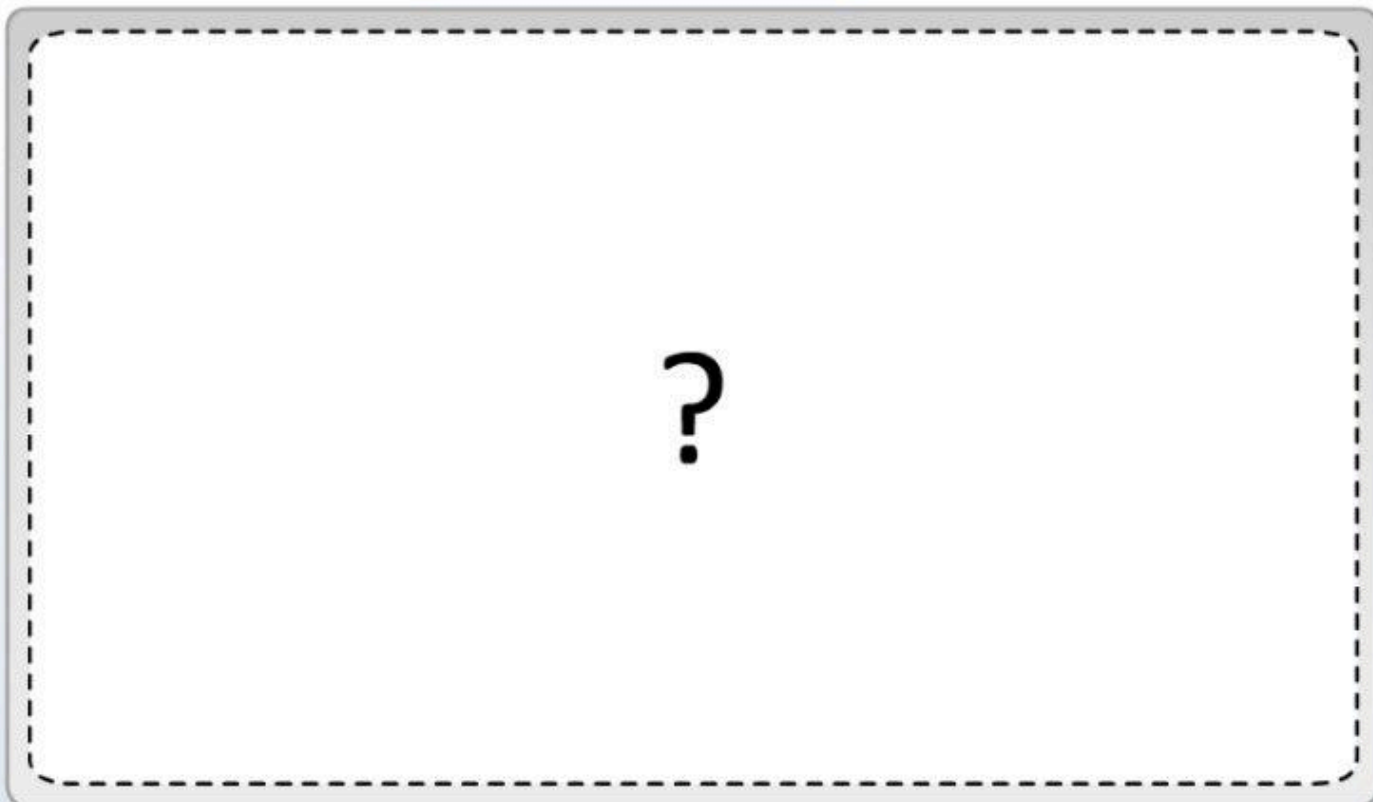
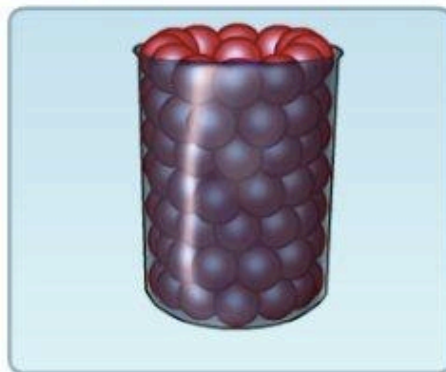
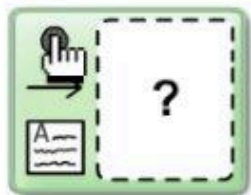


Make a shape that can fold into the prism.





Show how to estimate the number of marbles in the jar.



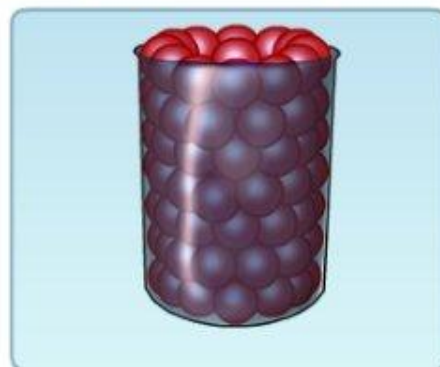
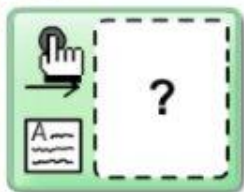
GO



Question: 1 of 1

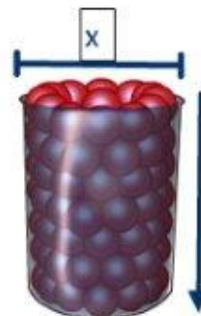


Show how to estimate the number of marbles in the jar.



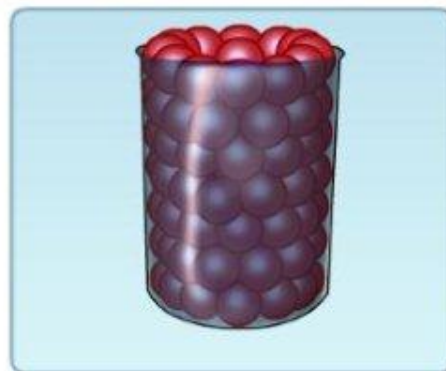
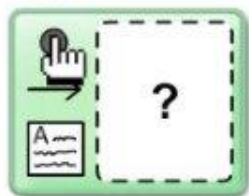
Count the number of marbles on the top of the jar, then multiply by the amount of

rows of marbles in the jar

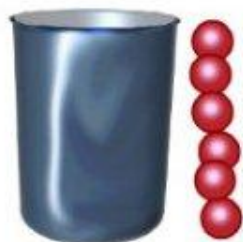




Show how to estimate the number of marbles in the jar.



12 marbles per layer



6 layers

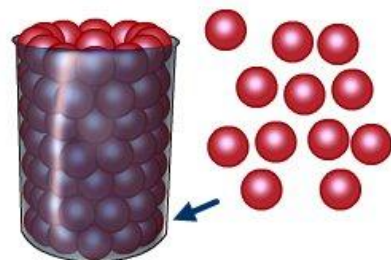
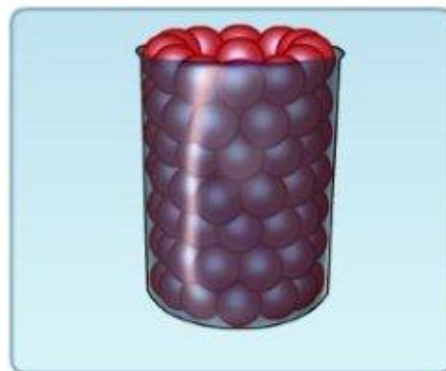
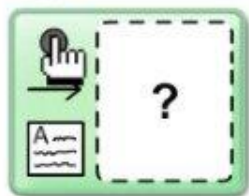
$$12 \times 6 = 72$$







Show how to estimate the number of marbles in the jar.



12 marbles on the bottom row

there are about 7 rows in the jar











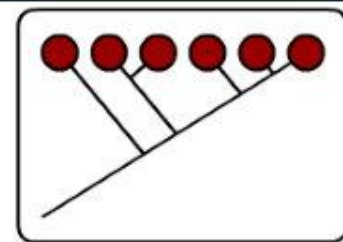
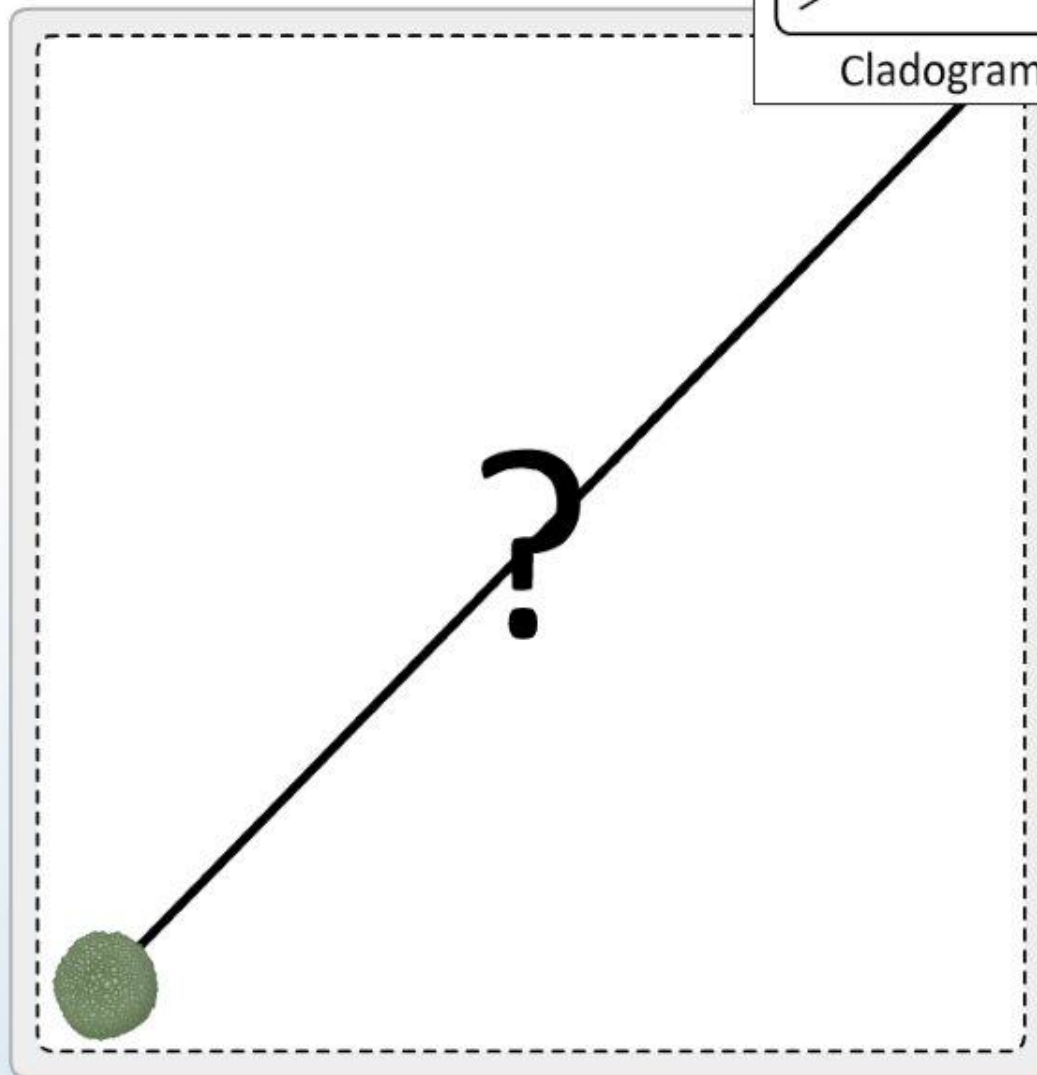
$12 \times 7 = 84$  marbles





Use the **amino acid differences** to **make a cladogram** for the **bacteria**.

		Position
		11    52    79
Given	Bacteria	
		W    E    K
New		V    P    R
		V    E    R
		W    E    R
		V    E    R
		  



Cladogram





Use the [amino acid differences](#) to [make](#) a [cladogram](#) for the [bacteria](#).

17



Known

Bacteria

Position

11 52 79

W E K

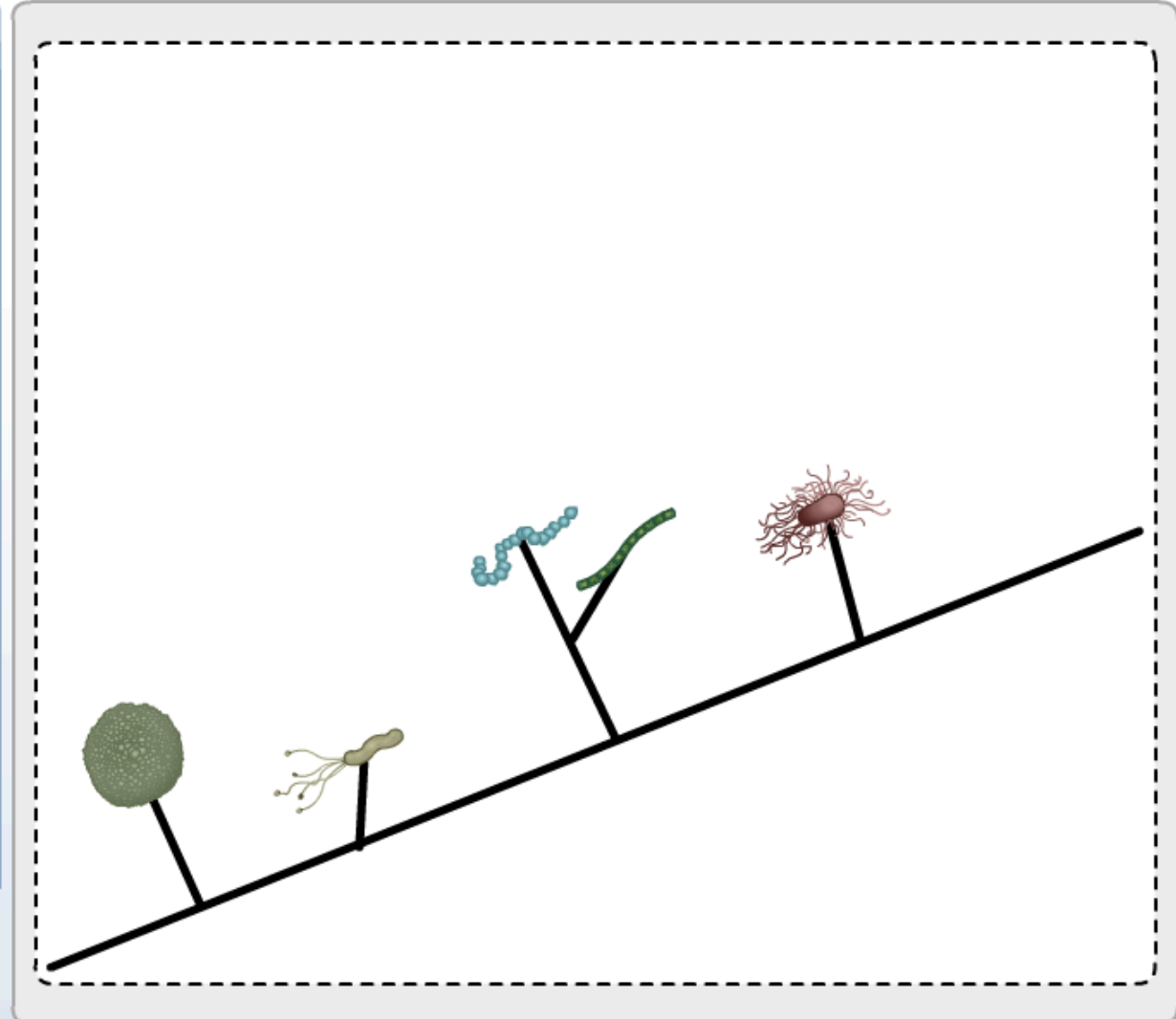
V P R

V E R

W E R

V E R

New





Draw the Lewis structures for H<sub>2</sub>O, CO<sub>2</sub> and CH<sub>4</sub>.



?

H C O

- |

= ||

≡ ≡≡

.

: ..

::

H<sub>2</sub>O

?

CO<sub>2</sub>

?

CH<sub>4</sub>

?





Draw the Lewis structures for H<sub>2</sub>O, CO<sub>2</sub> and CH<sub>4</sub>.



?

H C O

- |

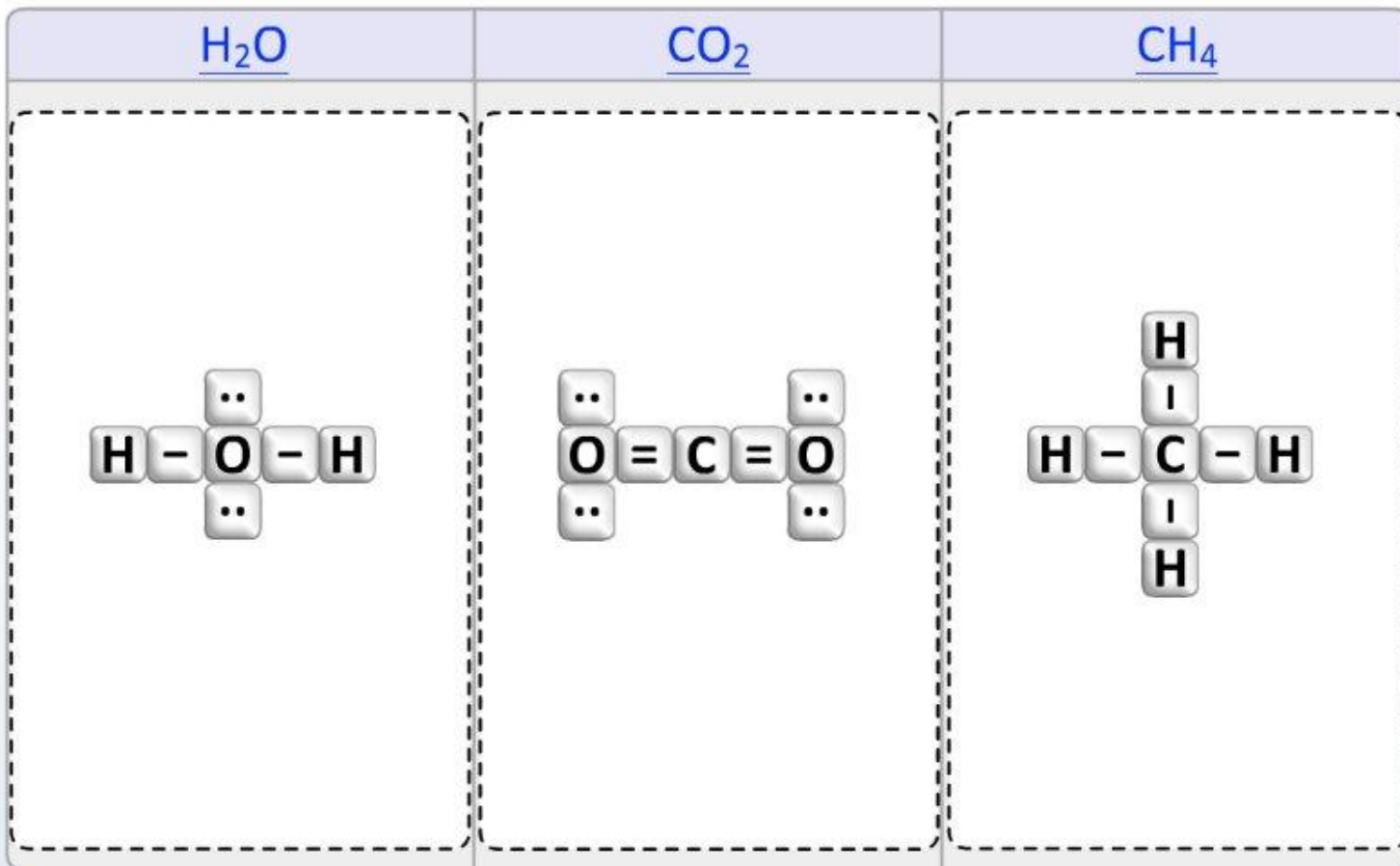
= ||

≡ ≡≡

·

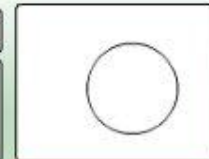
:

⋮





Make a Bohr model of a **helium** atom.



Particles



Orbits



?





Explain your answer.



1234567890

salt

sand

water

filter

absorbs

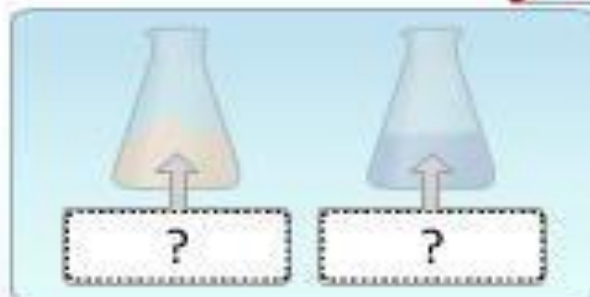
does not absorb

dissolves in

does not dissolve in

floats in

sinks in



Because

\_\_\_\_\_ ? \_\_\_\_\_ ? \_\_\_\_\_ ?

and

\_\_\_\_\_ ? \_\_\_\_\_ ? \_\_\_\_\_ ?

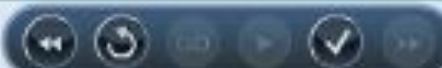
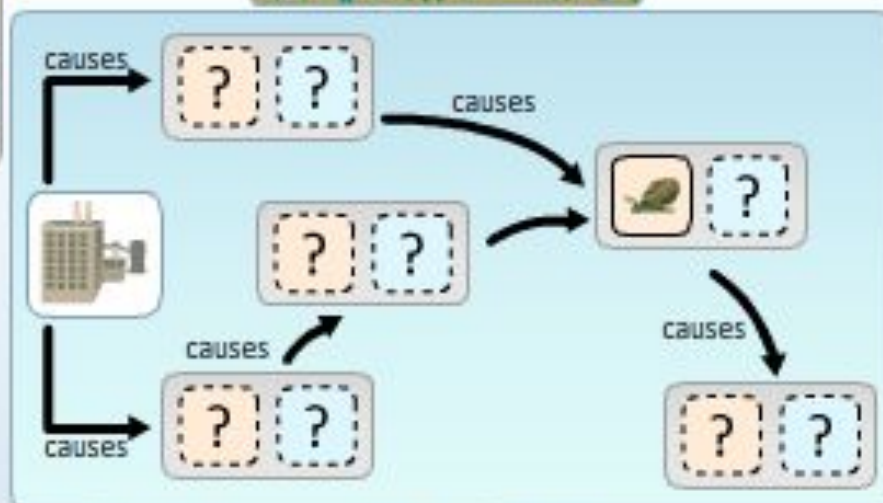


Question: 1 of 1

How does the power plant affect the lake ecosystem?



algae	O <sub>2</sub> air	
acid water	O <sub>2</sub> water	
	CO <sub>2</sub> air	
	CO <sub>2</sub> water	
	air	
	water	




Question: 1 of 1



# For More Information...

<http://iiassessment.wceruw.org/>



**Rich, efficient assessments facilitate deep learning and thinking.**

**INSTITUTE for innovative ASSESSMENT**

ABOUT PROJECTS RESEARCH PEOPLE

Search

**PROJECTS**

**STELLA for Classroom Learning**  
Explore resources designed to empower teachers to differentially instruct and assess ELs in the classroom. [More](#)

**ONPAR Middle School Science Testlet**

**NEWS**

ONPAR science tasks presented at 2013 NASBE Eastern Regional Symposium on Standards-Next Generation Science Standards. [More](#)

ONPAR Assessments Facebook Page

<http://www.onpar.us/>



**ONPAR**

CONNECT: [f](#) [JOIN email list](#)

HOME ABOUT US ASSESSMENT TASKS RESEARCH RESOURCES

**NEW!**

**Elementary Mathematics Testlet**

- Tests knowledge of pre-algebra operations and algebraic reasoning
- Includes 5 interactive elementary mathematics tasks and a score report

**Middle-School Science Testlet**

- Tests knowledge of forces & motion
- Includes 5 interactive middle-school science tasks and a score report

**News**

- ONPAR researchers awarded WIDA Fabulous Award in April

**Technology-Enhanced Mathematics and Science Assessments for ALL**

*ONPAR assessments provide multiple avenues for diverse learners to:*

- access meaning through multi-modal representations, innovative supports, and novel response spaces
- interact with engaging tasks via dynamic onscreen stimuli, animations, and simulations
- demonstrate knowledge, skills, and abilities using performance-based response formats

**Sample Tasks**

**Elementary Mathematics Testlet**

**Middle-School Science Testlet**

[View sample tasks](#)

[Take the mathematics test](#)

[Take the science test](#)