

OKLAHOMA STATE DEPARTMENT OF EDUCATION



PEARSON

Oklahoma Biology Item Workshop

Oklahoma Biology End of Instruction Assessment

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What are our goals today?

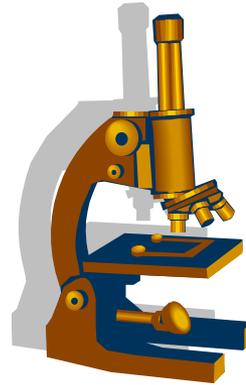
- To learn about the components of an assessment item
- To learn how items are created
- To become familiar with the requirements of the Oklahoma Biology End of Instruction (EOI) Assessment
 - Content/Process Standards
 - Depth of Knowledge
- To experience writing an item using data as a group
- To learn about areas which are under-performing

What are the components of an item?

Stimulus

A student is using the equipment shown to examine a leaf cell.

Art



Stem

What is the correct unit of measurement the student should use?

Answer choices

- A kilometers
- B meters
- C centimeters
- D millimeters

Multiple Choice Item Guidelines

- Multiple-choice items should include four answer options
 - the key (correct answer) and three plausible distractors.
- For multiple-choice items, arrange response options in a logical order.
 - Shortest to longest
 - Longest to shortest
 - Chronologically
 - Single-word answer choices may be arranged randomly

Dual Standards

Oklahoma EOI Biology uses a dual set of standards:
content standards and process standards.

Each item must meet the objective of

- one **content** standard
- AND
- one **process** standard

Item ID	Stimulus ID	Subject	Key	Item Type	Content Stnd,Obj, Skill	Process Stnd,Obj	DOK	Est. Dif.
60800003		Biology	B	MC	4.3	4.8	1	

Content Standards and Objectives

- Content standards cover biological knowledge:
 - Cells
 - Heredity
 - Biological diversity
 - Interdependence of organisms
 - Organization of matter/energy in living systems
and
 - Behavior of organisms

Process Standards and Objectives

- Process standards cover science inquiry aspects of knowledge:
 - Observation and measurement
 - Classification
 - Experimentation
 - Interpretation and communication
and
 - Modeling

Challenges of Aligning to Dual Standards

- Creation of innovative items that properly meet the dual standards is a particular challenge.
- Creating items that meet both the content and process standards is accomplished by beginning with either standard.

Either

- Focusing on authentic content (using verifiable sources) which aligns with a content standard and framing it in an action that meets a process standard

or

- Focusing on a action which meets the process standard and framing the action in the context of an authentic content scenario which meets a content standard.
- Focusing on the wording of the stated content/process objective is a useful approach in developing a sound item.

Depth of Knowledge

- Aligning items for depth of knowledge (DOK) is a useful way to establish item difficulty.
- The Oklahoma EOI Biology uses the Webb DOK classification

Depth of Knowledge

- Each item is classified by depth of knowledge.
 - Level 1: Recall and recognition
 - Level 2: Simple determination and calculation
 - Level 3: Complex determination and calculation
 - Level 4: Abstract thinking and processing
(Level 4 is not assessed on OK EOI Biology)
- The percentage distribution of items by depth of knowledge may be subject to adjustment.

Depth of Knowledge 1

- Items with DOK 1 are straight-forward recall, define, or state-the-answer items.
- Items that involve a one-step calculation would be DOK level 1.
- Key words include:
 - Identify
 - Recall
 - Recognize
 - Use
 - Measure
 - Calculate

Depth of Knowledge 1

In a certain plant species, red flowers (R) are dominant to white flowers (r). The Punnett square below shows a cross between two of these plants.

	R	R
r	Rr	Rr
r	Rr	Rr

The offspring with a genotype of Rr are referred to as

F Homogeneous.

G Heterozygous.

H Heterogeneous.

J Homozygous.

Depth of Knowledge 2

- Items with DOK 2 involve application of skills.
- These items often require more than one step to solve.
- Key words include:
 - Classify
 - Organize
 - Estimate
 - Make observations
 - Collect and display data (in tables, graphs, and charts)
 - Compare data

Depth of Knowledge 2

In a certain plant species, red flowers (R) are dominant to white flowers (r). The Punnett square below shows a cross between two of these plants.

	R	R
r	Rr	Rr
r	Rr	Rr

What percent of the offspring are expected to have white flowers?

F 0%

G 25%

H 75%

J 100%

Depth of Knowledge 3

- Items with a DOK level of 3 require strategic thinking.
- Items that require students to pull information from more than one table, graph or chart to then answer a question would be a DOK level 3.
- Key skills include:
 - Drawing conclusions from observations
 - Citing evidence and developing a logical argument for concepts
 - Explaining phenomena in terms of concepts
 - Using concepts to solve (non-routine) problems

Depth of Knowledge 3

In a certain plant species, red flowers (R) are dominant to white flowers (r). The Punnett square below shows a cross between two of these plants.

	R	R
r	Rr	Rr
r	Rr	Rr

If the offspring from this cross were then crossed with a pure-breeding plant having white flowers, about 25% of the next generation would be expected to have flowers which are

F red.

G pink.

H white.

J purple.

Useful Links

Priority Academic Student Skills

- PASS Standards and objectives:

<http://www.sde.state.ok.us/Curriculum/PASS/Subject/science.htm>

Item Specifications Document:

<http://www.sde.state.ok.us/AcctAssess/pdf/Core/itemspecs/EOIBiology.pdf>

Test Specifications Document:

<http://www.sde.state.ok.us/AcctAssess/pdf/Core/testspecs/EOIBio.pdf>

The path of Item Creation

Every item is touched by:

- Item Writer
- Content Specialists
- Artists (when item includes a graphic, table, chart or graph)
- Research Librarians
- Universal Design Reviewers
- Copy Editors

Sources

- All items using data are based on authentic science content.
 - Whenever data or a specific relationship is listed, it must be from a verifiable source.
- All sources are verified by the content specialist and by research librarians.
 - No item is accepted without a source listed.

Universal Design Considerations

- Items should be at grade-appropriate level of difficulty, readability (7th grade), and interest.
- Items should be free from bias or stereotyping.
 - Avoid language that is likely to disadvantage or be offensive to a specific group of students.
- Items should target the broadest group of students, and maintain the intent of the strands and objectives.
- Include art when necessary to answer the question.

Art

- All tables, graphs, and diagrams must have a title
- All graphs must have properly labeled axes (including units)
- Keep art as simple as possible.

Item Writing Style Tips

- Content of items must be relevant to Biology I only.
- All hypotheses must be in an “if, then” format.
- Minimize the use individual names. It is better to use “a student,” “a teacher,” or “a class.”
- Underline these emphasis words: main(ly), major, most(ly), greatest, least, less, more, most likely, least likely, not, except, both.

Item Writing Style Tips

- Do not ask students to “summarize” or “provide a title.”
- Test the application of the standard; do not make the standard into a question.
- Do not teach or require excess reading in an item.
- Do not underline content specific words.
- Do not use “it”. State explicitly that to which reference is being made.

What's Wrong with this item?

Which of these organelles is the site where proteins are made in all cells?

- A the nuclei
- B the cell membranes
- C the vacuoles
- D the cell walls

What's Wrong with this item?

How are a plant cell and an animal cell similar?

- A They both have one large permanent vacuole
- B They both have a cell wall
- C They both have a cell membrane
- D They both have small and temporary vacuoles

What's Wrong with this item?

Which of these units is not used to measure the height of a newly sprouted plant?

- A meters
- B millimeters
- C centimeters
- D kilometers

What's Wrong with this item?

All cells have cell membranes. Which of these describes the primary function on cell membranes?

- A They allow certain molecules to enter and exit the cell.
- B They allow all molecules to enter and exit the cell.
- C They do not allow molecules to enter or exit the cell.
- D They allow all molecules to enter the cell, but not exit.