

Dynamic Interactive Formative Assessment Tasks and End-of-Unit Tests for Measuring Challenging Concepts and Skills of Diverse Middle School Students

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Background

Funded through U.S. Department of Education grants, ONPAR has developed accessible computerized classroom assessments to test students' knowledge of complex science. Assessments use engaging multi-media to reduce accessibility barriers for students who struggle with language-heavy traditional tests. ONPAR is designed to integrate into existing classroom curriculum using the latest college and career readiness standards, the Next Generation Science Standards.

4 Translate audio to: Spanish

2 ENGLISH Spanish

Tori puts an insect in a jar. Predict the amount of oxygen and carbon dioxide after 3 hours.

3 O₂ CO₂

1

5

Task 3 | Screen 3/8

Screen Text

Accessible by Design

Most content assessments treat accessibility as an afterthought, layering features onto an existing test form. ONPAR is designed with accessibility from the blueprint stage.

Accessibility features include:

- 1 Graphics and animations as a central focus.
- 2 Simplified text prompts.
- 3 Hyperlinked word and phrase support in the form of graphics, symbols, animations, and halos.
- 4 A speaker button that provides an oral English reading or native language translation of the prompt.
- 5 Novel response mechanisms that allow students to demonstrate understandings that do not primarily rely upon language.

See Kopriva (2009) for further description of ONPAR features.

Content & Language Integration

Body Systems

Task 1: Paper-based task

Task 2: Mountain Hike

Task 3: Workout

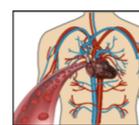
Task 4: End of Unit

Each science unit contains integrated academic language resource materials to support language and content development in four key topics:

- Talking science (building oral discourse skills to express science understandings).
- Writing science (building written discourse skills to express science understandings).
- Explanations (building language skills to articulate understandings of phenomena and models).
- Argumentation (building language skills to make logical arguments based on evidence and data).

Each academic language topic is the focus of one unit per year; students repeat topics every year of middle school. Activities are built into each unit for ease of teacher use. Activities include:

- Vocabulary development (word list, definitions, examples, word wall cards).
- Debrief questions to review key questions and build oral discourse.
- Writing prompt integrating all three dimensions of NGSS.



The **function** of the heart is to pump blood.

A person records heart rate and breathing rate while resting, walking, and running over six days. Answer one of the questions below about structures and functions of body systems as the person does these activities. Use the vocabulary list, if needed.

day	activity	heart rate (beats per minute)	breathing rate (breaths per minute)
1	resting / low	65	12
2	resting / low	65	12
3	walking / medium	85	17
4	walking / medium	85	17
5	running / high	115	25
6	running / high	115	25

○ What structures are present in the circulatory system? What function does each structure have when the person is exercising? How do you think each structure behaves?

○ What structures are present in the respiratory system? What function does each structure have when the person is exercising? How do you think each structure behaves?

(maximum length: 1,000 characters)

Task 4 | Screen 13/13

Screen Text

Pilot & Results



Pilots conducted nationwide during SY 2017-18 and 2018-19 to test eleven middle school science units:

- Teachers trained online to (1) backwards plan for task implementation and (2) differentiate instruction based on immediate scoring feedback.
- Students watched training video and interacted with practice item.
- Students took three 30 minute tasks during instructional unit.

Results:

- Teachers were enthusiastic and felt the tasks were engaging and well aligned to instructional needs.
- Teachers liked the level of challenge, content, and digital nature.
- Students liked the digital format and different response types (interactivity), as well as the translator and rollovers.
- Students generally found the tasks challenging.
- Professional development was useful for teachers and administrators.
- Many teachers suggested modifications in the way information is displayed on classroom score reports for improved usability.

Summary & Next Steps

- Overall tasks successfully assessed a range of students with differing accessibility needs: ELs, students with disabilities in reading, those with attentional challenges as well as mainstream students.
- Tasks were appropriately challenging for students (and teachers, too).
- Tasks were successful in assessing three-dimensional science knowledge.
- Psychometric analysis is ongoing.
- Working toward commercializing ONPAR so that assessments are available to districts and schools in 2019-20.