



Stackable Instructionally- embedded Portable Science (SIPS) Assessments Project

Grade 8 Science

Unit 3: Designing Equitable Assessments for Diverse Learners

Understanding Earth History and the Origin of Species

June 2023

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SIPS Grade 8 Unit 3: Designing Equitable Assessments for Diverse Learners

How do we optimize accessibility for diverse learners and why is this important? This document provides steps to planning and developing equitable assessments that incorporate the principles of [Universal Design for Learning](#) (UDL) and the elements of [Universally Designed Assessments](#) (UDA). Both UDL and UDA are designed to promote access to instruction and/or assessment to the widest range of students. This includes, but is not limited to, students with varying abilities, cultures, primary languages, background knowledge, and interests. For more information about equitable assessment design and use, and why it is important, view *Chapter 4: Fairness and Accessibility* of the Strengthening Claims-based Interpretations and Uses of Local and Large-scale Science Assessment Scores (SCILLSS) [Digital Workbook on Educational Assessment Design and Evaluation: Creating and Evaluating Effective Educational Assessments](#).

A multi-step process to promote the selection and design of equitable assessments for diverse learners is detailed which includes planning, selection and development, and evaluation and reflection. General information, links to tools and resources, and guiding questions provide additional considerations to support the implementation of this multi-step process.

Planning

Consider all students when designing the assessment task, including students' gender, race, ethnicity, socio-economic status, primary and secondary language, disability, cultural experiences, background knowledge, etc. Knowing what understandings and abilities different students bring to the assessment is vital to removing or reducing barriers to students' ability to demonstrate attainment of the assessed acquisition goals.

It is important to ensure that the requirements of the assessment task clearly target the selected acquisition goals. Consider how to include additional knowledge and skills that are related, but not specifically assessed, and how to elicit students' background knowledge to support students' accurate and complete demonstration of their learning through the evidence they produce.

Use the *Bias, Sensitivity, and Accessibility Review Worksheet* (see page 7) as part of the planning process.

Selection and Development

When selecting or developing an assessment task, consider how it will engage students, how the directions and information are presented to students, and how students will interact with the task requirements and materials. Developing the assessment task while considering these three components helps identify possible barriers and provides access to the widest range of students taking the assessment. Each component includes guiding questions to prompt a deeper look at the assessment task.

Student Engagement

1. Select or develop an assessment task that will engage students and encourage students to put forth the effort and time to fully demonstrate their understanding of the acquisition goals.
 - a. Are the goals clear and understandable for students?
 - b. Is the assessment task authentic and relevant?

- c. Are options available for individual choices and decisions?
- d. Is the time allotted to complete the task reasonable?
- e. Does the task allow students to actively participate?
- f. Are there opportunities to collaborate with peers?

Presentation of Content

2. Provide multiple and accessible ways to present the assessment task, including the directions, the information, and the materials.
 - a. Can the assessment task directions be accessed as needed?
 - b. Are the directions and information presented using simple, clear, and intuitive language (e.g., limit unnecessary wording, avoid multiple-meaning words, avoid unnecessary scientific terminology)?
 - c. Can the assessment task directions and information be accessed in more than one way (e.g., auditorily, visually, use of technology, in the primary language, etc.)?
 - d. Is the readability and comprehensibility of the information appropriate for the widest range of students (e.g., length, direct sentence structure, scientific and academic terminology explained or glossed)?
 - e. Is the physical appearance of the included material easily read (e.g., plenty of white space, adequate font size; the standard font, etc.)?
 - f. Is necessary background knowledge activated or supplied?

Student Interaction

3. Ensure all students can interact with the assessment task requirements and materials.
 - a. Are there options for how the student can complete the task (choice of materials, tools, methods, etc.)?
 - b. Are there multiple ways to participate in the task (e.g., technology, physical manipulation, variety of strategies)?
 - c. Are the materials and task requirements easily accommodated for a student with a visual impairment, physical disability, cognitive disability, for a student using assistive technology (AT), or an alternative, assistive communication (AAC) system, etc.?
 - d. Are differentiated levels of support available (e.g., modeling the process, peer mentoring, supplying background knowledge)?
 - e. Are there varied opportunities to ask questions or express observations (e.g., designated time, individually, within small groups)?
 - f. Are there multiple ways and levels of feedback throughout the task (e.g., using a checklist to self-monitor, encouraging students through the steps, and teacher checking for accuracy at each step)?

Evaluation and Reflection

Two evaluation and reflection checkpoints should occur. First, prior to administering the task, use the guiding questions above (see **Selection and Development** section) along with the *Bias, Sensitivity, and Accessibility Review Worksheet* (see page 7) to review how the assessment task will engage students, the presentation of the assessment task materials, and how the student interacts with the assessment task requirements and materials. Make any needed revisions to maximize equity to a wide range of students. Remember to ensure the assessment task can be further accommodated as necessary (e.g., tactile model for a student who is blind).

The second checkpoint should occur following the administration of the assessment task. Determine any barriers observed while students were completing the assessment task and note additional revisions that could be applied to remove or reduce the barriers. Use these notes when planning for instruction and when selecting or developing another assessment task.

Annotated Example

An annotated assessment task supports understanding and interpretation of the features of a well-designed, high-quality assessment task that promote students' ability to respond fully and accurately to each prompt or item. The annotations on the example science assessment task, "What Can the Grand Canyon Tell Us About the Past," provided for use by the Nebraska Department of Education highlight features of an assessment task and suggest additional features that could be applied to optimize accessibility and equity for the widest range of students.



Grade 8 Science Assessment Task:

What Can the Grand Canyon Tell Us About the Past?

Student Task

The description of the task and the video provides background knowledge. The video includes closed captions for students with a hearing impairment as well as provides additional support for English learners.

Task: Scenario or Context

This task is about how rock strata are used in determining the relative age of the Earth.

Background Information

This video explains why there are layers of rock and how the Grand Canyon was formed over time.

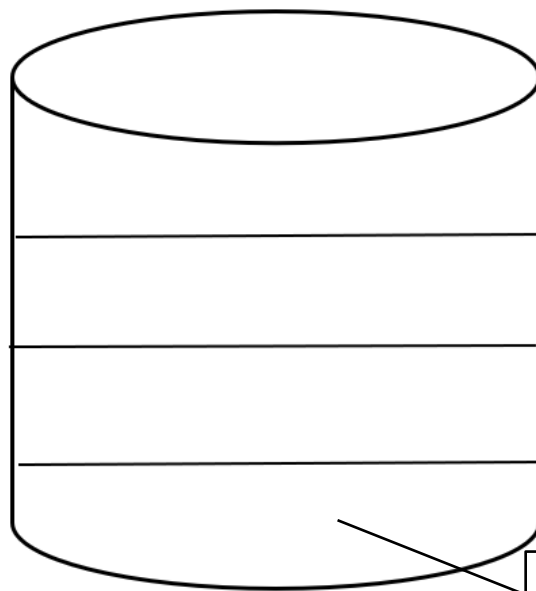
How was the Grand Canyon Formed?




https://www.youtube.com/watch?v=-v_RLRT9930&t=48s

Prompt 1.

Anya’s science class is studying rock layers on Earth. Her teacher sets up an activity to allow students to model rock layers with everyday materials. The students use this model to help them understand the

Alternative text can be provided for the model.



-  Macaroni
-  Cereal
-  Oatmeal Flake

Layer 3

The materials could be changed to nonfood items to be sensitive to students who experience food insecurity.

Layer 2

Layer 1

Providing a completed model will provide additional support.

Law of Superposition.

https://www.youtube.com/watch?v=-v_RLRT9930&t=48s

Law of Superposition along with pictures showing examples of rock layers can be posted in the classroom.

The task is authentic and can allow for active participation if students replicate Anya's actions.

Anya is given a plastic cylinder and cups of macaroni, cereal, and oatmeal flakes. Anya pours the cereal into the cylinder first. She then pours in the oatmeal flakes and finishes by putting the macaroni into the cylinder.

Use the Law of Superposition to order the layers of materials (in the model) from oldest to youngest.
[oldest] _____, _____
_____ [youngest]

Use evidence to explain why each layer is placed in that sequence.

The labels "oldest" and "youngest" provide additional support to the task directions.

Directions are clear and succinct. Using the same term in all prompts can support English learners (e.g., order or sequence).

Prompt 2.

Geologists collect three different rock samples from the Grand Canyon. Two index fossils are found in those samples. **Why is the ammonite fossil in sample C older than the pecten fossil in sample D?** Be sure to include evidence from **ALL** the samples to support your answer.

Index of Different Geologic Periods



Ammonite
(Cretaceous Period)



Pecten
(Oligocene Epoch to Recent)

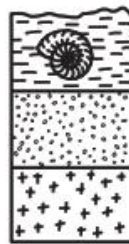
The task can be provided as shown, enlarged, or a digital format that allows for the use of assistive technology.

Bolded text alerts the student to the question and the key word of "All."

Rock Strata Containing Index Fossils



B



C



D

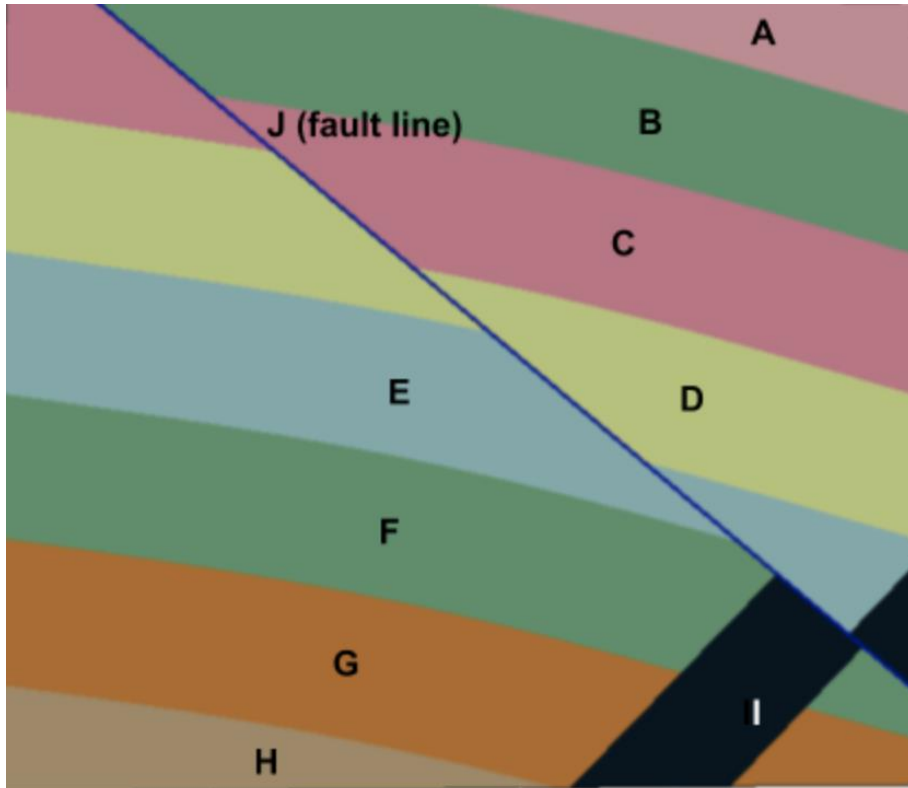
Tactilely enhance (e.g., embossing machine, puffy paint) the graphics for access for students with a visual impairment.

Recreated image by Better Lesson; licensed under Creative Commons (CC BY-NC 4.0)

Note: For a visually impaired student, an embossing machine could be used to create the drawings so the student would be able to feel the fossil as well as the raised features within each rock layer.

Prompt 3.

Order the letters of each rock layer/event from youngest to oldest.



Youngest _____

Oldest _____

Visual Geology. [Visualization Tool]. Retrieved at <https://app.visiblegeology.com/>
Note for a visually impaired student an embossing machine could be used to create the letters and lines. Also, someone could describe how the layers are ordered to these students.

Describe your thinking when ordering the events in the above diagram.



SIPS Three-dimensional Classroom Science Task Accessibility Checklist

Accessibility and Fairness Review Worksheet

Review Criteria Category	Description	Agree	Disagree	For any statements of Disagree, please provide specific feedback to explain aspects of the tasks that need improvement.
The scenario, design problem, prompts, presented information, and expectations for the collection of student evidence...				
Bias/Sensitivity: The task does not provide an unfair disadvantage for a sub-group of students through the use of unfamiliar language, contexts, examples, or content that provokes negative feelings or challenges beliefs or values.	use appropriate vocabulary, phrases, and/or sentence structure for the assessed grade level.	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
	do not use content and language that may be considered offensive based on race, gender, sexual orientation, age, religion, ethnicity, socioeconomic status, and regional location.	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
	do not use vocabulary that may be considerably more familiar to some groups than others.	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
	do not include content that portrays any group of people in a negative or stereotypical manner.	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
Accessibility: The task is accessible to all students and adheres to the principles of Universal Design for Learning.	are accessible to students from Nebraska and will not interfere with students' ability to demonstrate their knowledge or understanding.	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
	provide equal opportunities for students to demonstrate their knowledge, skills, and abilities without giving students an unfair advantage over other students.	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
	include all information needed for students to demonstrate their knowledge, skills, and abilities in response to each question.	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.
	provide a variety of response modes as represented by the types of work products (constructed response, drawing, completing a graph, selected response, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	Click or tap here to enter text.