



# **Stackable Instructionally- embedded Portable Science (SIPS) Assessments Project**

## **Grade 5 Science**

### **Unit 3: Designing Equitable Assessments for Diverse Learners**

#### **Earth Systems and the Solution of Water Problems**

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## SIPS Grade 5 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, and 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 9) 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 9) 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, "Ogallala Aquifer," 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.



## Student Worksheet

### CCR-Science Standard

**SC.5.13.4** Gather and analyze data to communicate understanding of Earth’s systems.

Directions and information can be reread to the student, translated to a student’s primary language, digitized to allow a student to access using a screen reader as well as allowing students to access as needed and access in multiple ways.

Orients student to the task and the tools to be used as well as activating background knowledge.

This task is about saltwater and freshwater reservoirs of water on Earth. You will use pictures, graphs, and tables to answer three questions.

Water is everywhere on Earth. There are many types of water reservoirs on Earth. Some water is on Earth’s surface. Some water is underground. A large portion of all water on Earth’s surface is saltwater. A very small portion is freshwater. Below are some pictures of some different types of reservoirs.



Creative Commons CC0 license

This is a picture of ocean water, which is liquid saltwater.



Creative Commons CC0 license.

This is a picture of glacial water, which is frozen freshwater.



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This is a picture of lake water, which is liquid freshwater.

Task is authentic and photographs are accompanied with text to support understanding of the photographs.

The text supplies necessary background knowledge (i.e., liquid, frozen, freshwater, saltwater). There is adequate white space, font type, and font size to provide accessibility.

This is a picture of the Ogallala Aquifer Water, which is liquid freshwater found underground.



Non-assessed words (e.g., reservoir, aquifer) can be glossed using descriptive language (e.g., Reservoir is a place where large amounts of water get stored.)

The map is uncluttered and can easily be adapted for students with a visual impairment by outlining the state borders and aquifer with bolder lines and/or raised lines.

Source: USGS

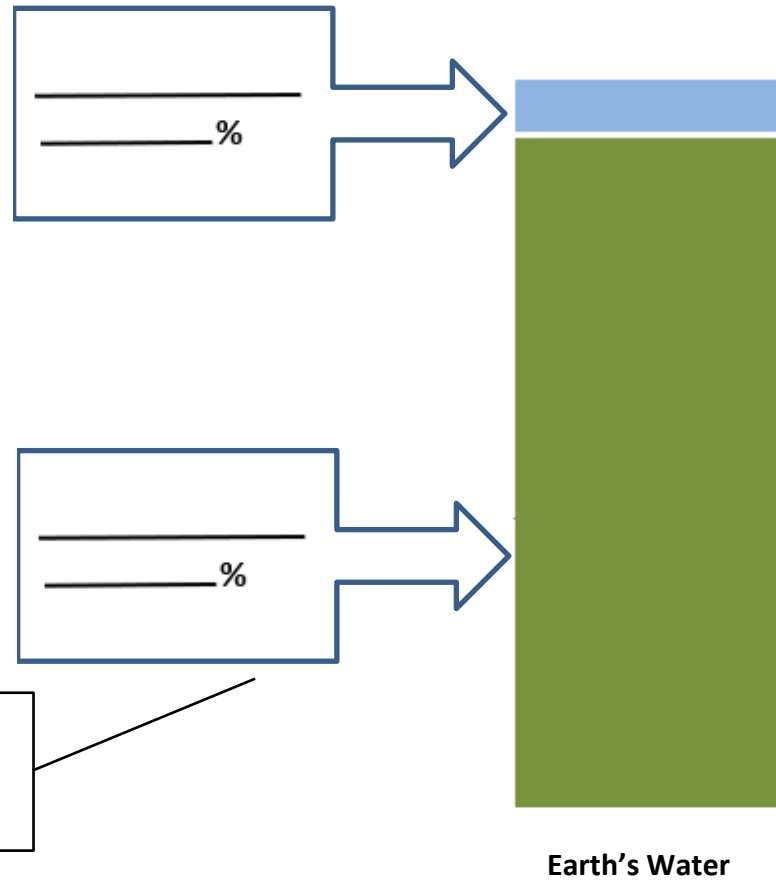
1. Use the information above to complete **Graph 1. Distribution of Earth's Water Reservoirs** to show the amounts of saltwater (**96%**) and freshwater (**4%**) found on Earth. Include labels on the blank lines in the chart by:

- identifying the type of water; and
- identifying the percent of each type of water.

The directions are clear (e.g., informing the student of what to use to complete the task) and simple (e.g., free of unnecessary wording).

A checklist with each step of the task can be provided for students to allow for self-monitoring.

**Graph 1. Distribution of Earth's Water Reservoirs**



The graph is simple and can easily be adapted by enlarging and/or outlining the representation for water.

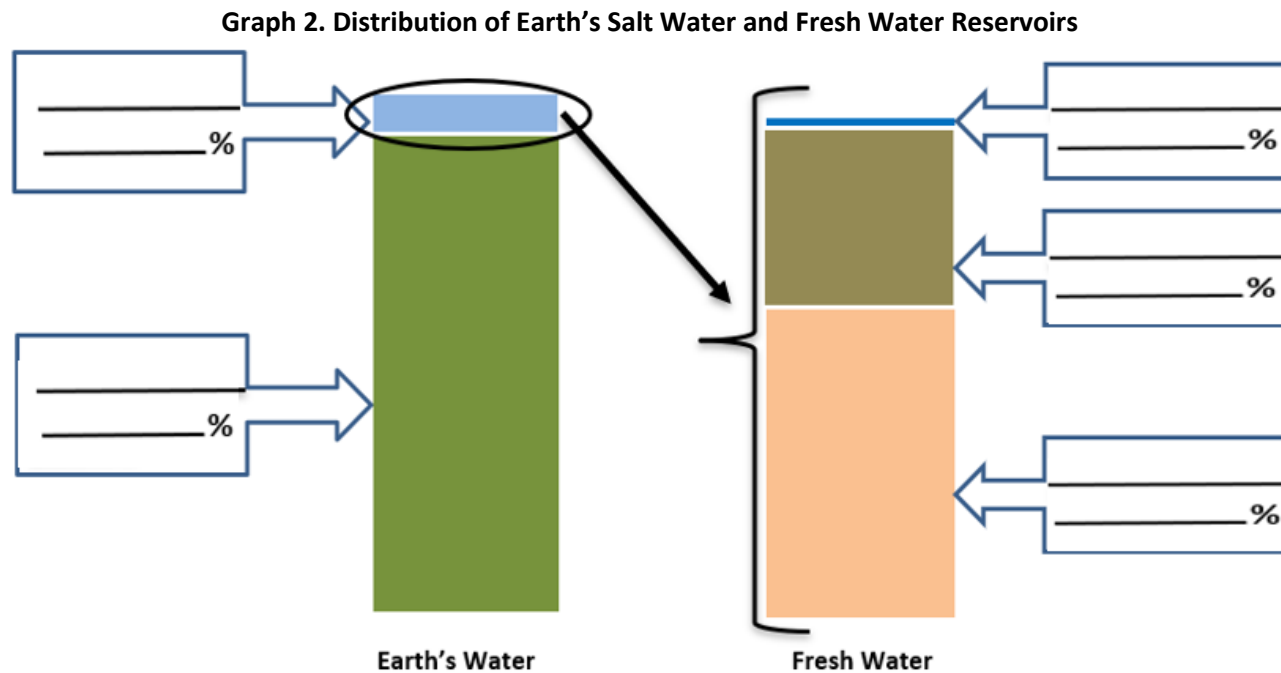
2. Some types of reservoirs only contain fresh water. **Table 1. Percent of Water Found in Fresh Water Reservoirs on Earth** shows the percent of freshwater on Earth.

**Table 1. Percent of Water Found in Fresh Water Reservoirs on Earth**

Type of Reservoir	Percent of Freshwater
Glaciers and Ice Caps (frozen)	68.6%
Groundwater (underground)	30.1%
Lakes and Rivers (on surface)	1.3 %

Use this information from **Graph 1. Distribution of Earth’s Water Reservoirs** above and **Table 1. Percent of Water Found in Fresh Water Reservoirs on Earth** to complete **Graph 2. Distribution of Earth’s Salt Water and Fresh Water Reservoirs** to show the distribution of saltwater and freshwater found on Earth. Include labels on the blank lines in the chart by:

- identifying the type of reservoir; and
- identifying the percent of each form of water.





3. Complete the chart below, **Table 2. Information about Types of Reservoirs**, by circling your answers. To complete the table, use information from the above **Graph 1. Distribution of Earth’s Water Reservoirs**, **Table 1. Percent of Water Found in Fresh Water Reservoirs on Earth**, and **Graph 2. Distribution of Earth’s Salt Water and Fresh Water Reservoirs**.

**Table 2. Information about Different Type of Reservoirs**

Type of Reservoir	Type of Water Circle your answer.	Safe for Drinking	Reservoir is Easy or Difficult to Get To	Is reservoir a water source that humans could rely upon? Circle YES or NO. Then, explain your answer by providing a reason.	
<b>Oceans</b>	Saltwater Freshwater	YES NO	Easy Difficult	YES NO	
<b>Glaciers/Ice caps</b>	Saltwater Freshwater	YES NO	Easy Difficult	YES NO	
<b>Groundwater/aquifers</b>	Saltwater Freshwater	YES NO	Easy Difficult	YES NO	
<b>Surface water (lakes/rivers)</b>	Saltwater Freshwater	YES NO	Easy Difficult	YES NO	



# 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.
<b>The scenario, design problem, prompts, presented information, and expectations for the collection of student evidence...</b>				
<b>Bias/Sensitivity:</b> The task does not provide an unfair disadvantage for a sub-group of students through the use of unfamiliar language, contexts or 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, socio-economic 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.
<b>Accessibility:</b> 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.