



Stackable Instructionally- embedded Portable Science (SIPS) Assessments Project

Grade 5 Science

Unit 4: Designing Equitable Assessments for Diverse Learners

Earth and Its Gravitational Force and Motion

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SIPS Grade 5 Unit 4: 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., a 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 promotes students' ability to respond fully and accurately to each prompt or item. The annotations on the example science assessment task, "Space Systems," 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 5 Science Assessment Task: Space Systems

Student Worksheet

CCR-Science Standard

SC.5.11.3 Gather and analyze data to communicate understanding of space systems: Earth's stars and solar system.

Provide the scenario separately so it can be enlarged, printed in high contrast, or digitized. Consider graphics to aid in comprehension.

Task

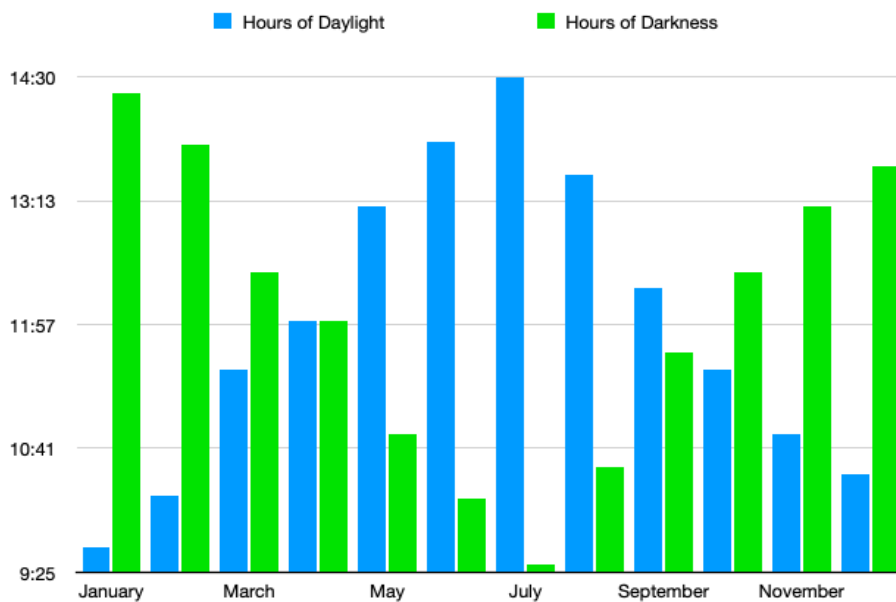
This task is about patterns in daylight and darkness. Answer the two prompts below. Prompt 2 has two parts.

Kathy likes to ride her bike in the neighborhood when it is light outside. She notices that she can ride her bike early in the morning and late in the evening during the month of July. However, during November, it is dark in the early morning and dark again in the evening. She wonders why this happens.

Provide the graph separately to allow students to easily refer to it when responding to the prompts.

Below is a graph titled, **Average Amount of Daylight and Darkness in Different Months**. The blue represents the number of hours of daylight. The green represents the number of hours of darkness. The horizontal (x) axis shows the months of the year. The vertical (y) axis shows the amount of daylight or darkness in a 24-hour period.

Average Amount of Daylight and Darkness in Different Months



Clarify that the amount is shown in hours and minutes. Students, especially those who have recently moved from other countries may see these as times during the day as opposed to hours and minutes.

Differentiate the key and bars on the graph in more than just color (e.g., solid fill and diagonal lines or two different values).

Data provided by Earth System Research Laboratories, Global Monitoring Laboratory, 325 Broadway R/GMD, Boulder, CO 80305 (<https://www.esrl.noaa.gov/gmd/grad/solcalc/table.php?lat=41.85&lon=-87.65&year=2020>)

Bold or highlight "changes" and "same" in each answer option to emphasize the key difference between a and b, c and d.

Prompt 1

Study the graph. What patterns in the data can be observed? You may select more than one.

- a. The total number of hours in a day changes throughout a year
- b. The total number of hours in a day stays the same throughout a year
- c. The number of hours of daylight and darkness changes throughout a year
- d. The number of hours of daylight and darkness stays the same throughout a year

Prompt 2

Kathy lives in Chicago, IL. Below is a chart titled, **Average Sunrise and Sunset Time for Chicago, IL 2020**. This chart shows the average time the sun rises and sets each month of the year for where Kathy lives. Kathy likes to ride her bike outside but wants to make sure it is light out

Average Sunrise and Sunset Time for Chicago, IL 2020

Month	Sunrise a.m.	Sunset p.m.
January	7:42	5:17
February	7:17	5:57
March	7:02	7:02
April	6:44	8:05
May	7:07	8:36
June	5:54	8:56
July	6:09	8:51
August	6:35	8:19
September	7:05	7:31
October	7:38	7:42
November	7:13	5:07
December	7:40	5:00

Provide prompt and chart on a separate paper to allow students easily refer to it while responding to the prompt.

Data provided by Earth System Research Laboratories, Global Monitoring Laboratory, 325 Broadway R/GMD, Boulder, CO 80305 (<https://www.esrl.noaa.gov/gmd/grad/solcalc/table.php?lat=41.85&lon=-87.65&year=2020>)

Use the data in the chart, **Average Sunrise and Sunset Time for Chicago, IL 2020**, to answer both parts of the following question:

Prompt 2 Part A. At what time could Kathy ride her bike any day of the year where it would be daylight?

- A. 5:30 p.m.
- B. 9:30 a.m.
- C. 7:30 p.m.

Digitize the prompt to allow students to type their answer, use text to speech, use an adaptive keyboard and/or mouse, etc.

Prompt 2 Part B. Use the patterns in the **Average Amount of Daylight and Darkness in Different Months** graph and the data in the **Average Sunrise and Sunset Time for Chicago, IL 2020** table to explain your answer.



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, 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, socioeconomic status, or 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.