

THE SUN THROUGHOUT THE YEAR



RATIONALE

Identifying where the sun rises and sets is a crucial skill that helps ocean navigators arrive at their destinations. Understanding how the track of the sun changes throughout the year helps students develop a stronger sense of belonging to their own communities and a better understanding of the Earth's place in the universe.

ESSENTIAL QUESTION

How does sunrise and sunset change throughout the year and how are solstices and equinoxes significant?

MATERIALS

- Computer, laptop, or tablet and Internet connection
- Other supplies listed in specific activities

LEARNING OBJECTIVES

After this lesson, learners will be able to:

- Explain how the sun changes throughout the year.
- Create a model of the sun's track during summer solstice, equinoxes, and winter solstice.
- Compare the sun's tracks when near the equator and further away from the equator.

OPENING DISCUSSION

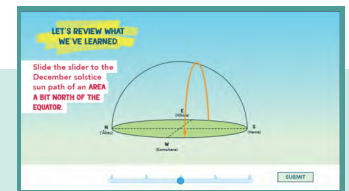
<https://ksdigitalfiles.ksbe.edu/assets/waa/content/sun/story.html>
(Select the "Overview" button)



The website above will help guide this opening discussion and supplement your verbal explanation of the sun throughout the year. Ask haumāna where the sun rises and sets. Explain that the sun rises in the east and sets in the west, generally, but that the rising and setting points vary slightly throughout the year. Then explain the difference between solstices and equinoxes, regarding where the sun rises and sets. Make sure to contrast sunrise/sunset at locations close to the equator and those further away. Describe what equinoxes and solstices are, when they occur, and what the sun does differently during those specific times. Ask students why they think these sun tracks are important. Explain the time difference between longest and shortest days of multiple locations and compare that to Hawai'i.

ACTIVITY IDEA #1: Where in the World?

<https://ksdigitalfiles.ksbe.edu/assets/waa/content/sun/story.html>
(Select the "Where in the World" button)



Have students put what they've learned into practice by identifying specific sun paths in this activity. They'll practice differentiating between solstice sun paths and equinox sun paths, as well as locations around the globe with smallest and largest time differences.

ACTIVITY IDEA #2: Make your own Sun Track Model

https://ksdigitalfiles.ksbe.edu/assets/waa/content/sun_activity/suntrackmodel.pdf



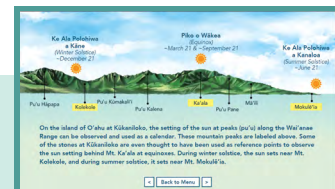
Tell students that each of them will be making their own model of the sun's tracks during solstices and equinoxes. List the materials they will need to get started, then begin by labeling your plate with the four cardinal points using 'ōlelo vocab. Show haumāna how to use a protractor to measure 30° above and below Komohana and Hikina, then punch the holes into.

Then demonstrate how to measure, cut, and twist together pipe cleaners to form three “tracks” for their sun to travel along in the model. Next, show them how to attach the sun tracks to the plate, as well as the sun bead, then glue an image of their town/city on top of the plate. Once everybody has completed their models, check for understanding by calling on students to show the sunrise, sunset, or sun at mid-day for specific days (equinox, solstice).



ACTIVITY IDEA #3: The Sun at Your Hale

<https://ksdigitalfiles.ksbe.edu/assets/waa/content/sun/story.html>
(Select the “Sun at Your Hale” button)



****Note:** This activity can instead be done in the classroom as a group, rather than having each student do it individually at home, if that works better for you.**

Explain to haumāna that this is a long-term activity that will require them to observe and document either sunrise or sunset a handful of times over the course of four or five months. Review step 1 with them, helping them to understand how to choose a good observation spot, and what spots might not be the best. Give examples of good markers to look for so they’ll be able to keep their spot the same throughout the year. Then explain step 2, telling students that they will need to take a photo of the sun each month at around the same time. Remind them to stand in the same spot and face the same direction each time. Demonstrate how to do step 3 by drawing a quick sketch and marking sunrise or sunset locations with x’s. After students have completed this long-term activity, have them bring in their journals to show the class, sharing what they learned.

SHOW US WHAT YOU DID!



Send us a photo or video of your sun track model for a chance to be featured on the Holomoana website!

Email it to ittraining@ksbe.edu.



SUPPLEMENTAL LINKS

<https://www.ksbe.edu/digital/holomoana/>

<https://www.youtube.com/watch?v=l64YwNl1wr0&t=5s>

<http://www.hokulea.com/kau-ka-pea-holo-ka-waa/>

<https://kaiwakiloumoku.ksbe.edu/moananuiakea>

(Learning standards are on the next page)



Kamehameha Schools®



POSSIBLE LEARNING STANDARDS CONNECTIONS

E Ola! <https://blogs.ksbe.edu/eola/>

'Ike kūpuna: ancestral experiences, insights, perspectives, knowledge, and practices.

Aloha 'aina: Hawaiian patriotism; love for the land and its people.

Problem Solving

Transfer Goal A: Students will independently use their learning to construct an explanation from observations of scientific phenomena. Overarching Understanding: Observations can lead to questions, predictions and conclusions.

- **Essential Questions:** How can observations create evidence? How do observations guide the development of an explanation?
- **Traits:** Observation: Receiving knowledge of the world by using the senses and recording quantitative and/or qualitative information. May employ the use of scientific tools or instruments.
- **Explanation:** Construct meaning from observations.

CCSS <http://www.corestandards.org/read-the-standards/>

English Language Arts

Text Types and Purposes

- **CCSS.ELA-LITERACY.WHST.6-8.2**
Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- **CCSS.ELA-LITERACY.WHST.6-8.7**
Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- **CCSS.ELA-LITERACY.WHST.6-8.8**
Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
- **CCSS.ELA-LITERACY.WHST.6-8.9**
Draw evidence from informational texts to support analysis, reflection, and research.

NGSS

<https://www.nextgenscience.org/>

Nā Hopena A'o:

<https://www.hawaiipublicschools.org/DOE/%20Forms/NaHopenaAoE3.pdf>

MS-ESS1-1 Develop and use a model of Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

- **ESS1.A: The Universe and its Stars**
Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed.
- **ESS1.B: Earth and the Solar System**
This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year.

1. Strengthened sense of belonging

- Know who I am and where I am from

6. Strengthened sense of Hawai'i

- Use Hawaiian words appropriate to their task
- Learn and apply Hawaiian traditional world view and knowledge in contemporary settings
- Share the histories, stories, cultures and languages of Hawai'i

— KS DIGITAL HOLOMOANA —

The Sun Throughout the Year

<https://www.ksbe.edu/digital/holomoana/>