

Lesson Planning for Sheltering Science Instruction for ELLs

Lesson: FOSS Weather and Water, Investigation 3 part 3

Learning Target: Explain how the angles of light rays and light intensity affect the seasons
Language Target: Orally compare the spot from a beam of light at different angles.

Strategy: Being clear about the learning targets helps students focus on important details

Opening question: (on PPT with images to make language comprehensible)
What is it about summer that makes it hotter?

Strategy: Using images makes content more comprehensible

Recapping and connecting to prior experiences:

Yesterday, remember that we talked about the days getting longer (show the graph that they made from previous activity showing days of sunlight) Remember that Alaska (Picture) has 24 hours of sunlight, but in Mexico in the summer there are only 12 hours of sunlight. Is it hotter in Anchorage? (Point to the picture on the globe.) So we know hours of sunlight are part of the picture, but it doesn't explain everything.

Strategy: Intentionally connecting to prior experiences and knowledge

Content Vocabulary Chart:

Today in lab we are going to explore another piece of the explanation for seasons. It has to do with the word *intensity*

Write the word intensity on the vocabulary chart. Practice saying the word. Ask how many have heard the word before, how many haven't, tally and add that number to the chart. Ask each group to put their heads together and come up with a predicted definition for intensity. Pull groups, write down the initial ideas on the chart.

Strategy: teaching a tier 2 vocabulary term that will be important in the lesson using a vocabulary chart.

Vocab Chart

Word	Prediction	Definition and drawing
Intensity <div style="display: flex; justify-content: space-around; font-size: small;"> Heard (tally) Not heard (tally) </div>	(List predictions, ask why they got their ideas)	(leave blank till end of lesson)

Demonstration of Lab Procedure:

We are going to do more modeling using a flashlight (hold flashlight). In our model the beam will stand in for the sun.

Strategy: Using images makes content more comprehensible

The flashlight makes what we call a beam of light (show the graphic beam). A beam is a bunch of light coming from a source. Turn and tell your neighbor what a beam of light is. "Turn and tell your left elbow partner another source for a beam of light?"

Strategy: Using gestures makes content more comprehensible

When I shine a beam of light from a flashlight onto a surface I will see a spot of light. (model spot on the board, circle the spot write SPOT)

Strategy: modeling the experiment

We are going to do an experiment where we see if the angle of the beam changes the spot of light.

Hold flashlight at angles, model the procedure, use the term BEAM

Set up-lab procedure in notebooks, use drawings to represent steps. Refer to images on PowerPoint.

Collect Data

(monitor groups to be sure they are collecting the appropriate data, check for understanding)

Share Results:

(Put the sentence frame on the board). Today as you are sharing your results you may use the following frame (point and read frame):

The spot from the 90 degree angle beam is _____ compared to the spot from the 45 degree angle beam which is _____.

(Have students practice using the sentence frame in table groups. Choose numbered kids from each group to share out. Be sure to choose ELL students to share out using the frame)

Sense making:

Question: *Is the amount of energy from the flashlight the same? (Groups talk about their thinking. Choose new numbered student to report out)*

Assumption: amount of energy is the same.

Light traveling from the flashlight to the paper travels in RAYS (point out rays to the beam graphic) light from sun also travels in rays (graphic in notebooks)

Strategy: providing sentence frames can scaffold conversations for emerging English speakers

Strategy: Calling on students and having them answer, with the help of their team, lets all students practice and build academic vocabulary.

Strategy: Discussing in small groups allows for academic language development

Strategy: Using images makes content more comprehensible

When lots of rays hit an area, the intensity is high, when not as many rays hit an area the intensity is low. (illustrate on the vocab chart and in lab notebooks and using gestures and modeling)

Think about your two spots, if you have the same amount of rays, the same amount of light energy (20 rays in your circles, model on vocab chart)

In small circle, light was brighter, it had a greater intensity (write "high intensity" under diagram)

If we spread (hand gesture) that same amount of rays out into a larger circle, the light is dimmer or lower intensity (write lower intensity)

Which angle of the flashlight (model 90 and 45) resulted in the greatest light intensity on your paper? (have students point or demonstrate)

If you looked at the same size area on your paper, the size of a penny, which receive the most energy one with the flashlight at 45 or one with the flashlight at 90, ?

(Talk at tables)

Ask students to show (thumbs up) which they think is more intense.

Sense making:

In your journals: more direct angle, more intense light, more intense light =more energy, more energy =more heat. (model)

Strategy: Discussing in small groups allows for academic language development

Strategy: Asking questions that can be answered with pointing or gestures allows students in the "silent stage" of English language develop

Strategy: allowing sense making and personal reflection with drawings or in primary language

Personal reflection:

What do you understand about what you learned today? Take a minute and write an answer in your notebook. You can use words or draw a picture.

Finalize Content Vocabulary Chart

Word	Prediction	Definition and drawing
Intensity Heard (tally) Not heard (tally)	(List predictions, ask why they got their ideas)	(fill in definition) image sentence

(Write the final definition of intensity, draw picture. Have each group talk to come-up with a sentence that explains the meaning of the word. Go around the room and have each group share.)

Home school connection: Intensity of Light

Strategy: Homework assignments which ask the students to relate their school experiences with something from home (and with a family member) help build relevance.