Lesson Plan Created by Rebecca Szczubiala

NVACSS Lesson Plan Template

Grade Level: Kindergarten	Topic: Energy K-PS3-2
General Lesson Description: (Include Estimated Time to Complete the Lesson) Day 1: SW discuss and observe shade. TW introduce/review basic concept of sun warming the earth. Day 2: SW learn about collaboration and review diagrams with their partner. SW collaborate with a partner to design a shade structure. Day 3 (Windless or Calm wind day): SW build shade structures outside Day 4: T will meet with individual S for summative assessment	
K-PS3-2. Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on Earth's surface. Performance Expectation: 1a. Students use given scientific information about sunlight's warming effect on the Earth's surface to collaboratively design and build a structure that reduces warming caused by the sun. 2a. Students describe* that the structure is expected to reduce warming for a designated area by providing shade. b Students use only the given materials and tools when building the structure	
Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.	Assessment Boundary:
Big Question: What structure can you build that will reduce the warming effect of the sun?	Specific Learning Targeted Outcomes: SW use knowledge about the sun's warming effect to design a structure that will reduce warming in a given area. SW collaborate to build a structure that reduces the warming effect of the sun on the Earth's surface. SW use the given materials and tools when building the structure. SW describe that the structure is expected to reduce warming by providing shade.

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NGSS Anchor Phenomena:

Background Information

Prior Student knowledge to teach this lesson:
FOSS Kindergarten Physical Science kit:
Materials and Motion, Investigation 3 part 6 builds background for this lesson.

Teacher background information around big ideas:
Engineering with Kindergarten:
https://www.teachingchannel.org/blog/2015/07/09/kindergartners-engineers
https://www.researchgate.net/publication/260869697_Integrating_the_engineering_design_process_in_the_kindergarten_science_classroom
Sun: https://sciencing.com/earth-receive-heat-sun-4566644.html

Possible Student Misconceptions:
Sun is smaller than the earth.

Evidence Statements: How do students show mastery?
S create a structure that provides shade.
S work collaboratively.

S verbally describe that the structure should reduce the warming effect of the sun.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions (science) and defining problems (engineering) 2. Developing and using models 6. Constructing explanations (science) and designing solutions (engineering) 8. Obtaining, evaluating, and communicating information	PS3.B Conservation of Energy and Energy Transfer • Sunlight warms Earth's surface	2. Cause and effect: Mechanism and explanation 4. Systems and system models 5. Energy and matter: Flows, cycles, and conservation 6. Structure and function

Lesson Plan: 5E Model

ENGAGE:

Teacher will display anchor phenomena picture. SW buddy talk to discuss what is happening in the picture. TW read or play from You Tube the story Fun in the Sun by David Catrow. Whole group will discuss prior knowledge of spending time in the sun. TW display pages 7-8. TW will ask S what do they see on this page that helps people stay cool? Whole group will discuss umbrellas and other structures that provide shade from prior knowledge. Whole group will go outside to observe and discuss other structures that provide shade (trees, playground covers, awnings, etc.) While outside, T will have S stand in shade and stand in sunlight. Whole group will discuss what is making us feel warm. (This relates to K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.)
TW encourage use of words describing relative measures such as warmer/cooler.
TW explain to S that they will be building a structure that reduces the warming effect of the sun.

Assessment

Formative: Observation - T will record S participation in discussion. Summative:

Engage Materials Needed and Website/Other Resources:
https://www.youtube.com/watch?v=IGRjRCmtg2M Story read aloud
Outdoor area with a variety of structures that provide shade.
Lesson is best presented on a sunny day so areas of shade can be observed.

EXPLORE:

TW review observations of shade in the school yard. TW create diagrams of outside structures that were observed on the board. TW model labeling drawings.
TW present challenge that the S will design and build a shade structure.
TW introduce idea of collaboration and how important collaboration is to scientists and engineers. Whole group will view collaboration video. TW lead discussion. TW intro sentence frames for collaboration. TW give examples of collaborative work using sentence frames.
TW introduce materials and criteria: S must use materials given. S must work in teams. Teams will use 2 chairs, 3'x3' piece of butcher paper, tape and tacky putty (optional - only if requested) to create structure. The goal is to create shade large enough for 2 S to sit in. S may not sit under chairs.
Teams will collaboratively work to create a diagram of the structure they will build.
TW remind S that diagrams should be labeled.

Assessment

Formative: Observation **Summative: Rubric 1**

Explore Materials Needed and Website/Other Resources:
Collaboration video: https://www.youtube.com/watch?v=3dZKYQKiNn0
paper and pencils for drawing diagrams

EXPLAIN:

TW review criteria: S must use materials given. S must work in teams. Teams will use 2 classroom chairs, 3'x4' piece of butcher (bulletin board) paper, tape and tacky putty (optional - only if requested) to create structure.
TW instruct S to review their diagram and make a plan with their partners. TW monitor conversations and make comments about positive collaboration.
TW demonstrate how to carry chairs safely. TW lead S outside and designate areas for each team.
TW remind S that they will be graded on their structures as well as how they work together. TW review collaboration expectations.
SW build structures using materials given.

Explain Materials Needed and Website/Other Resources:
CALM day - this part of the lesson is best attempted on a day with little to no wind.
Student chairs
cut butcher paper
tape (masking, packing or both)
tacky putty (useful of a team decides to attach paper to rough surface like a concrete wall)

ELABORATE: SW record (draw) the completed shade structures in science notebooks or on paper.

SW do a gallery walk of shade structures created by every team. TW take a digital picture of each teams structure to be used for summative assessment. **T will lead a discussion about what worked well and what could be improved.**
Assessment **Formative: Observation - T will record S participation in discussion** **Summative: Rubric 2**
Elaborate Materials Needed and Website/Other Resources: **Pencils and science notebooks or paper.** **Phone/iPad/tablet for teacher to take pictures of structures.**
<u>EVALUATE:</u> **TW meet individually with S. TW show picture to student of the structure they built and ask for an explanation of what they did and why. See Rubric 3**
Assessment **Formative: Summative: Rubric 3**
Evaluate Materials Needed and Website/Other Resources: **Pictures of structures from build session.**
Comments/Teacher Tips: **Practicing with tape before going outside is very beneficial! Give a quick instructional lesson in the classroom and let S practice handling tape and taping paper to chair before going outside. During practice, nstruct S (after tape placement) to rub the tape gently on the chair and paper to help with adhesion.** **Passing out tape during the building activity is challenging. Smaller pieces of tape are better due to tangling. Place several small strips of tape in chair surface so teams have a good amount to start with.**