Sun Warms the Earth
Aligned Lesson 1
Science Lesson 1 for Unit: Weather and Seasons

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Related Unit: Weather and Seasons	Lesson Length: 5-7 Days - 30/45 min. each day
Enduring Understandings	**Essential Questions**
-Patterns are used to make predictions about weather. -Sunlight warms Earth's surfaces. -Weather is a combination of sunlight and various precipitation e.g., snow, rain (location dependent). -Asking questions about observations helps us find answers to design investigations. -Data may be used for weather predictions. -Differences in sunlight are noticed in seasonal changes. -Weather affects our daily lives.	-How are changes in weather patterns observed over the course of the year? -Can patterns of the sun, moon, and stars be used to make predictions of future observations? -Why does the weather change over the course of a year? -What is the relationship between data and patterns in terms of weather forecasting? -How does weather affect our daily lives? -How can you stay healthy during different types of weather (sunscreen, coats, hats mittens, etc.)? -What tools can you use to collect data about the weather? -How does the Sun warm the Earth's surface? -What happens when the Sun doesn't warm Earth? -What is weather? -What happens when it snows, rains, or is windy? -How do people predict the weather? -How do we know what the weather will be today, tomorrow, or next week?
Transfer Goals	
▪ -Asking questions (for science) and defining problems (for engineering) ▪ -Developing and using models ▪ -Analyzing and interpreting data ▪ -Using mathematics and computational thinking ▪ -Constructing explanations (for science) and designing solutions (for engineering) ▪ -Obtaining, evaluating, and communicating information ▪ -Patterns of the natural world can be observed. ▪ -Use cause and effect to interpret relationships	
Learning Objectives	
Students will: -Record observations about sunlight and weather.	

-Ask questions about different types of weather.
-Use data to describe weather conditions.
-Use information to prepare for and respond to weather conditions and storms.
-Obtain information from text about sunlight, weather, and storms.
-Explain verbally or in writing the purpose of weather forecasting.
-Use a model to describe the types of weather.
-Use graphical displays (e.g., tables, pictographs, line plots) to organize data.
-Describe patterns showing certain types of weather happen more in certain places.

Library of Congress Primary Sources	Materials/Supplies/Resources
Anemometer U.S. WEATHER BUREAU INSTRUMENTS Early Barometer Treehouse Weather Kids Weather Channel Approaching Storm/Cloud Front Weather Balloon Sun Shelter Shelters Sunny Day Rainy Day Snowy Mountain Sunny Beach Spring Cherry Blossoms Winter Scene Summer at the Beach Weather Mysteries: Hot in Summer / Cold in Winter?	▪ Internet access ▪ Journal ▪ Weather books from the local library that may include the following titles: ▪ Check the Weather by Nancy Roser ▪ Weather Words by Gail Gibbons ▪ Weather by Seymour Simon ▪ *DK Eyewitness Weather* by Brian Cosgrove ▪ Navigate http://weather.weatherbug.com/ Website to collect data ▪ Weather Wiz Kids Farmers' Almanac For Kids ▪ https://www.loc.gov/teachers/classroommaterials/primarysourcesets/weather-forecasting/pdf/teacher_guide.pdf ▪ https://www.loc.gov/teachers/classroommaterials/primarysourcesets/weather-forecasting/pdf/teacher_guide.pdf ▪ Weather data sheets, Chart paper, Thermometer, Markers, US map, Weather images, Clear plastic cups, ice cubes ▪ Materials for building a shelter might include: clay, cloth, construction paper, cardstock, cardboard, small dowels, craft sticks, straws, pipe cleaners, tape, glue, etc.

Day #1 Engage: How can I get students interested in this? 15-30 minutes (Depending on how engaged the students are and how much background knowledge they have)

- Display and discuss the Analyze a Photo Tool : Display or make copies of the following primary source photographs: Rainy Day Sunny Day Approaching Storm/Cloud Front
- Give students 1-3 minutes to observe the photographs
- Discuss each question and section on the Analysis Tool and record class answers.
- Ask students how are the images connected? What is the something that all the photographs have in common? (Chart answers and discuss what season the student think it is now, where they live? Why? Describe evidence of the weather.) K-ESS3-2- CCC- Identify patterns in weather conditions during each season.
- List types of weather on a separate piece of chart paper. (Divide paper into four columns. Label each column with a season.) K-ESS2-1
- Pass out Weather Journals (attached) and work together to identify the weather outside today and record the weather in their journals. K-ESS2-1
  Students work in pairs and compare their observations of the weather they recorded in their journals. Students give each other feedback related to how their observations are the same or different. Students will be asked to count and compare the number of days each type of weather thy observed and recorded in their journals. K.MD.2. K.CC.6.CCC:

- Cause and Effect: Explain how the weather causes a change in how we go about our day. Give pairs of students one of the following questions and have them discuss and draw a picture representing their answer. Invite pairs to share their answers to their question. Invite students to give feedback to each group. How do you dress when the weather is cold/hot? What happens when it rains a lot? What happens when it snows a lot? What do you different on a rainy vs. a sunny day? Why?
- Discuss and explain that weather affects our daily lives. Ask students what they wore to school today and why?(ex. Shorts because it's hot, raincoat because it is raining, or coat, hat, and gloves because it is cold) Explain to students the definition of weather: The temperature and other outside conditions (such as rain, cloudiness, etc.) at a particular time and place. K-ESS3-2
  source: http://www.learnersdictionary.com/definition/weather

Day #2 Explore: How can I help students make sense of their observations? (25-30 min.)

- What is weather? Review the LOC pictures presented previously. Discuss what they observe? Explain that weather is what the air is outside.SS.IS.2.K-2, SS.IS.3.K-2:
- Read and discuss a weather book from the suggested list. Explain how the weather affects daily lives.SS.IS.1.K.-2:
- Navigate http://weather.weatherbug.com/ Discuss information on weather site. Look at weather in different areas and discuss differences.SS.IS.3.K-2: K-ESS2-1
- CCC: Explain and discuss how technology has changed how we predict the weather and the effects of the sun on the earth. (Computers calculate the warming effects of the sun on the earth and the resulting weather)

Day #3 Explain: How can I help students make sense of their observations? (20-30 min.)

- Have the students reflect upon their experiences and the Primary Source(s). (SS.IS.2.K-2, SS.IS.3.K-2)
- Have the students write down questions they wondered about and want more information on. SS.IS.1.K.-2
- What are some types of weather that were discussed in the text? (from previous day)
- What warms the earth and helps create types of weather?
- Review the following pictures: Provide individual copies for students that struggle to attend to whole group instruction, provide graphic organizer for students needing additional support beyond the class chart.
- Sun Shelter
- Shelters
- Sunny Day
- Rainy Day
- Snowy Mountain and ask students to describe how it would feel if they were in the picture?
- What do you think would happen if the sun was gone? (CCC: Cause and effect/ students will describe working in groups)
- Why do you think the sun is important to the weather? K-PS3-1.
- ** Differentiation for advanced students could include students try to ident. where the pictures were taken and identify a place that they know that is similar to the pictures. (K-ESS2-1:CCC) (K-PS3-1: NGSS)

Day # 4 Extend/Elaborate: How can my students apply their new knowledge to other situations? 20-30 min. Inquiry components embedded in lesson.

- Have the students **reflect** upon their experiences and the Primary Source(s). (SS.IS.2. K-2, SS.IS.3. K-2) Discuss and record as they contribute.
- Have the students write down questions they **wondered** about and **want more information** on. (SS.IS.1. K-2)
- What are some types of weather that were discussed in the text? from previous day
- What warms the earth and helps create types of weather?
- Review the following pictures: Provide individual copies for students that struggle to attend to whole group instruction, provide graphic organizer for students needing additional support beyond the class chart.

- Sun Shelter
- Shelters
- Sunny Day
- Rainy Day
- Snowy Mountain

- Ask students to describe how it would feel if they were in the picture?
  What do you think would happen if the sun was gone? (CCC: Cause and effect/ students will describe working in groups)
  Why do you think the sun is important to the weather? K-PS3-1.
- ** Differentiation for advanced students could include students to try to identify where the pictures might be located, and places they know of that are similar. (K-ESS2-1 CCC) (K-PS3-1.NGSS) (K-ESS3-2)

Day #4 Evaluate: How can I help my students self-evaluate and reflect on the learning? 30 Min.

- -Take class to an area that has a sunny spot and a shady spot. Ask students to stand in the sunny spot for a few minutes and describe how they feel. Then have them stand in the shady spot and describe and compare how they feel. K-PS3-1 , K-ESS3-2
- -Have students work together to explore reasons for why they felt different in the sun vs. the shade. Allow students to give each other feedback. (Misconception could be that the sun goes away when they are in the shade. Explain that the sun is still there but the object that is providing the shade blocks the sun)
- -Teacher can extend student learning by having students set a cup of ice in the sun and one in the shade. Have students predict and record what happened. Discuss.

Explanation:

Lesson Plan #1 Sun Warms the Earth: Design a Shelter Culminating Activity
(2 Days 20-30 min each day) K-2-ETS1-1
Prep:
-Have students in groups of 4 or less students
-Have building materials arrange so that students can choose the materials they want to use to build their shelter.(CCC ---Asking questions (for science) and defining problems (for engineering)
-Materials can include: clay, cloth, construction paper, cardstock, cardboard, small dowels, craft sticks, straws, pipe cleaners, tape, glue, etc.

Engage: How can I get students interested in this?

-Review with students what happened to the cup of ice that was in the shade/sun.
What can happen if you stay in the sun all day? Would the same thing happen if you were in the shade all day?
What do you do to stay cool when you go outside on a sunny day?
-Review the following picture:
Sunny Beach
Do you see anything different among the people in the picture. Encourage them to lead to: Ask students to identify the people in the picture that might be hot and which people might be cooler? Why? (Shade from the umbrella keeps them cool.)
-Types of shelters:
Sun Shelter
Shelters
Have students draw a picture of themselves in a shady spot. Have students include the title Shade and identify the sun and the cool spot in their picture. (SL.K.5) **Connect**
What problems happen if something is in the sun too long? How can you solve this problem? (CCC)

Explore: What tasks/questions can I offer to help students puzzle through this?

-How does shade help prevent some of those problems? Explain that they will build a structure to provide shade. (-Refer to earlier pictures of shelters.) (SL.K.5)

**Provide groups with the opportunity to review their answers to the following questions with the teacher, parapro and/or class leader. Utilize this time to identify and address any misconceptions or struggles they might encounter.

Steps:

1. Plan: What will your structure look like? What part of your structure will provide the shade? What do you need to build it? How will your structure stand up? How will you know if it works?
2. Build your structure with your chosen Materials.
3. Test your structure by placing it in a sunny area for 1hr. with a cup of ice in the shade and one outside the shelter.
4. Record your results

Explain: How can I help students make sense of their observations?

-Did you have a problem with your shelter? How can you change it to work better?
-Make necessary revisions to your structure.
-Share results with the class.

Extend/Elaborate: How can my students apply their new knowledge to other situations?

Have student make changes based on class feedback.
How can you use shade to keep cool?
What materials would not be good for making this kind of structure?

Evaluate: How can I help my students self-evaluate and reflect on the learning?

Student Project Rubric Key
4 - Student demonstrates full understanding without prompting and support
3 - Student demonstrates some understanding but needs some prompting
2 - Student demonstrates basic understanding but requires prompting and support.
1 - Student demonstrates a limited understanding

Student made plans for designing a structure by drawing ideas and listing materials needed.	4	3	2	1
Student built a structure using the plans and tested the structure.	4	3	2	1
Student identified if their structure successfully solved the problem.	4	3	2	1
Student shared his/her final design reporting their observations and conclusions.	4	3	2	1

Total _____/16