**Grade Level:** Kindergarten/First Grade

**Subject Area:** Science – Climate Change

**Lesson:** The Sun’s Energy

1. **Objective:**

This lesson is designed to introduce “young” students to the background knowledge they will need in order to later learn about climate change issues more in depth. Students will learn that the sun warms the earth and the earth warms the air (atmosphere). Students will understand that the sun is the source of energy for Earth and that this energy comes in the form of light, which is converted into heat. This heat is what warms the air around us. When air is heated, the particles move apart and the air moves faster, making the air thinner. Depending on the surfaces (ocean, clouds, desert, snow, etc.), different amounts of heat are given off. This causes air temperatures in the atmosphere to change which leads to weather changes. **(ES.1, EI.1, ESS1.B)**

1. **Materials:**

Candy melts

Gummy candies

Rocks

Thermometers

Styrofoam cups

Temperature chart (chart paper for recording findings)

Rubber bands

Black and white paper

Chart paper for a KWL

Student notebooks

1. **Procedures (could do activities over several days):**
2. Complete a KWL using chart paper (What do you know about the sun? ...)
3. Place the two types of candies in a place that receives direct sun (window pane). Have students observe what is happening and record their observations in their notebooks. Discuss with the students what could cause the candies to change from a solid to a liquid.
4. Repeat with the rocks, except this time place one of the rocks in the shade. Discuss why the rocks have a difference in temperature.
5. Have students go outside and as a class, measure the air temperature in both the sun (on pavement) and shade. Discuss with students whether the temperature was different and why it was different. Discuss the difference between night and day and how the temperature could change.
6. Colors activity: Wrap one cup with black paper and secure the paper with a rubber band. Do the same to the other cup, except using white paper. Place a thermometer in each cup and fill both with water. Place in the shade for approximately 30 minutes and then check the temperature (should be the same). Then, place the cups in the direct sunlight for 30 minutes and check the temperature. Have students record the results and discuss why there was a change in temperature (black is higher than the white). Students will learn that the black/dark was higher in temperature because it absorbed more of the light as heat energy.
7. **Reflection**

Do students understand the role the sun plays in heating the earth?

What kind of surface holds more heat?

Do students understand that dark colored things absorb more light and create more heat?

1. **Conclusion**

This is an introductory lesson designed for young children in order to develop background knowledge that can be later built upon as more detailed climate change lessons are presented.

**Grade Level:** Kindergarten/First Grade

**Subject Area:** Science – Climate Change

**Lesson:** Water

1. **Objective:**

Students will understand that light energy from the sun results in the heating of water (oceans) which causes it to go into the atmosphere as water vapor, a greenhouse gas. **(ES.1, EI.1, Ess1.B)**

1. **Materials:**

2 small glass jars

Water

Paper tape

Wide mouth jar including lid

Hot water

Ice cubes

Lamp

Metal pie plate

Blue paper

Cotton

Glue

Student notebooks

Book – Little Cloud by Eric Carle

Cotton balls

iPads

Internet site: [www.spaceplace.nasa.gov](http://www.spaceplace.nasa.gov) (Cloud Picture Scrambles)

1. **Procedure (may complete activities over several days)**
2. Create a water cycle. This can be done in small groups or with the whole class. Fill one of the small glass jars with approximately one inch of water. Place the second glass jar on top (mouth to mouth) and tape together. Place the taped jars in a sunny location. Have students record their observations in their notebooks. Students should be noticing condensation beginning to occur (simulating rain). Explain to students what a water cycle is. The top jar is representing the “air” and the bottom jar is representing the “earth” and “oceans.” Explain that when the sun warms the water, evaporation occurs. As this evaporated water gets cooler, it rains.
3. Clouds. In this activity, students will learn about clouds. Pour approximately two inches of hot water into a wide mouth jar and close the lid. Let it sit for about 15 minutes. Fill the metal pie plate with a layer of ice cubes. Remove the lid from the jar and quickly place the ice-filled pie plate on top of the mouth of the jar. Make sure you are working in a dark room for this portion of the activity. Hold a lamp behind the jar and ask the students to observe what is happening. They should be able to see a cloud form (ice cools the air and moisture forms).
4. Read the book, “Little Cloud” by Eric Carle. Discuss the different types of clouds: stratus, cirrus, cumulus, and cumulonimbus. Have students create a “cloud book” where they create the different types of clouds using cotton balls and glue. Students may also play “Cloud Picture Scrambles” at the iPad station, which is available on the [www.climatekids.nasa.gov](http://www.climatekids.nasa.gov) site.
5. **Reflection**

Do students understand what evaporation means?

Do students have a basic understanding of the water cycle?

Do students understand how a cloud forms?

1. **Conclusion**

This lesson is designed to introduce young students to the water cycle and how it impacts weather and climate change. This lesson would connect to lessons on the two kind of water (salt and fresh) and also lessons on soil moisture (how much water can particular types of soil absorb, etc.).