Science 3-5: I’m Melting! An Introduction to Heat

Intended Audience: Students with significant cognitive disabilities

# **Standards:**

SC.3.P.10.1 Identify some basic forms of energy, such as light, heat, sound, electrical, and mechanical.

SC.3.N.1.2 Compare the observations made by different groups using the same tools and seek reasons to explain the differences across groups.

SC.3.N.1.3 Keep records as appropriate, such as pictorial, written, or simple charts or graphs, of investigations conducted.

SC.4.P.10.1 Observe and describe some basic forms of energy, including light, sound, electrical, and the energy of motion.

SC.4.N.1.2 Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.

SC.4.N.1.6 Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.

SC.5.P.10.1 Investigate and describe some basic forms of energy, including light, heat, sound, electrical, chemical, and mechanical.

# **Learning Objectives:**

 1. Students will identify differences in the sun’s ability to provide heat.

 2. Students can feel and describe changes in heat energy from the sun.

 3. Students can observe and record changes in an object in direct and indirect sunlight.

# **Vocabulary:**

1. heat: energy that causes something to become warmer

2. energy: usable power that comes from heat and other sources

3. gas: a substance that is like air and has no fixed shape

4. core: the center part of the sun

5. light: the brightness and illumination from the sun

# Materials:

* Read works article: [The Importance of Light](https://www.readworks.org/article/The-Importance-of-Light/ffdbf5e9-816a-4d77-b454-8646995dbfe1#!articleTab:content/)
* Video: [Here Comes the Sun](https://www.youtube.com/watch?v=6FB0rDsR_rc)
* Prepare prior to instruction: chart or organizer to graph observations and details
* Find prior to instruction: an area for direct sunlight and an area for indirect sunlight or shade
* m&m’s (or other candy/food that might melt) or ice cubes
* Paper plates
* Science journals

# **Essential/Guiding Questions:**

 1. What if there were no heat energy or light from the sun?

 2. Why do we need heat?

 3. What happens when an object is exposed to heat?

# Lesson Presentation:

**Activating Prior Knowledge:**

1. Gathering students in a shaded area outside of the classroom. Ask students “What do you feel?” (Answers will vary.) Move students to an area with direct sunlight. Ask “Do you feel anything different?” (Answers will vary.) Tell students that they are going to learn about the heat that comes from the sun.

2. Stay in each location for a brief time (15- 30 seconds), and return to the classroom Gathering Area.

3. Students can write their responses in Science journals or share out in a whole group.

**Modeled instruction:**

1. Play the video, [Here Comes the Sun](https://www.youtube.com/watch?v=6FB0rDsR_rc). Clarify content when necessary.

2. Define the vocabulary from the video: heat, energy, gas, core and light. Use visuals from the video as well as photos and images to support understanding.

3. Read the article, [The Importance of Light](https://www.readworks.org/article/The-Importance-of-Light/ffdbf5e9-816a-4d77-b454-8646995dbfe1#!articleTab:content/).

4. Show students the images that are imbedded in the article website. Ask students “What is the difference between these two images?” “What happens when there is no sun?” Discuss the difference between the second image (blackness) and a day when “there is no sun”, i.e. a rainy day, a cloudy day.

5. Tell students that tomorrow they’ll learn more about how the Sun affects us and objects.

**Supported/Guided instruction:**

1. Replay the video, [Here Comes the Sun](https://www.youtube.com/watch?v=6FB0rDsR_rc). Pause the video and ask predetermined questions.

2. Review the vocabulary from the video: heat, energy, gas, core and light. Have students use the visuals, photos and images in a graphic organizer to be used in a later observation.

3. Read the article, [The Importance of Light](https://www.readworks.org/article/The-Importance-of-Light/ffdbf5e9-816a-4d77-b454-8646995dbfe1#!articleTab:content/). If appropriate, provide students with a copy. Identify the main idea and underline it: identify key details and circle them. This may also be done in a small group setting.

4. Have students revisit what they wrote in their Science journal or the list that was shared out. Ask the question, “If the Sun provides heat, what will happen to m&m’s (or other candy or food that might melt)?

5. Have students write predictions in their Science journal or share out.

6. Tell students that next they’ll explore and observe what happens when m&m’s (or ice or other substitute) are exposed to shade (or indirect heat) and direct sunlight.

**Independent Work:**

1. Provide each student (or pair) with a graphic organizer/chart to record data. Explain the graphic organizer/chart and how data should be recorded.

2. Provide each student (or pair) with a paper plate and a small amount of m&m’s (or an ice cube).

3. Divide the class in half: half of the class will observe changes in the shade/indirect heat and the other half will observe changes in direct heat. Go outside, and in predetermined locations, have students put their m&m’s on the plate.

4. Set a visual timer for 10 or 15 minutes depending on the heat outside. Students will record their observations on their chart.

5. Return to the classroom and discuss findings in whole or small groups. Steer the discussion with probing questions.

6. Students can document their findings in their Science journals with words, sentences, pictures, etc.

**Small group suggestions:**

1. Students can work in small groups to discuss their observations with peers. Make sure the groups have students from both the indirect and the direct sunlight settings to compare observations.

2. Students can read a related article or book from the list in Additional Resources. Text may be on the students’ independent/instructional level or may be read as a read aloud by an adult.

# Assessment:

1. Students will identify, observe and record their observations and tell why certain changes happened.

2. Teachers should utilize district created rubrics to score student work.

# UDL:

**Multiple means of representation:**

1. Students can use a graphic organizer to share observations.

2. Students can share their observations orally with an adult.

3. Students can discuss their observations with a peer.

4. Students can create a video presentation to share their observations.

5. Students can write entries in their Science journals.

6. Students can draw pictures to show observations and findings.

7. Students can work individually, in pairs, or in a small group.

8. Students can work independently with peer or adult supports.

**Multiple means of expression:**

1. Students can use an iPad or other touch device to show similarities and differences.

2. Text to speech options are available for computers, iPads and other hand held devices. Google Chrome offers free extensions, such as Selection Reader and Select and Speak-Text to Speech, and apps, such as Text to Speech, Text to Speech with Google Drive, and TTS Reader- Unlimited Text-to-Speech.

3. Speech to text options are also available from Google. Extensions include Voice Note II-Speech to Text, Online speech recognition, and Co: Writer Universal. Voice Note II is also available as an app; Speech notes-Speech to Text Notepad is available as well.

4. Additional information about text to speech and speech to text options are available through your district Assistive Technology Department.

5. Expression may come in the form of verbal responses, signed responses, pointing/gestures, eye gaze, or through the use of a low or high tech device.

6. All students should have access to expressive language/technology that is appropriate for their specific need.

**Multiple means of engagement:**

1. Provide students with choices of how to interact with materials.

2. Provide students or small groups with various places in the classroom in which to work, i.e. floor, desks, at the board.

3. Limit distractions in the work areas.

4. Encourage collaboration with peers in partners or small groups.

5. Allow students to work independently.

6. Allow students to be positioned for maximum learning engagement.

7. Provide students with additional materials, if necessary.

# Assistive Technology Recommendations:

1. All students should have a means of expressive communication and a way to be actively engaged in learning.

2. Response modes may include, but are not limited to: eye gaze, gesturing or pointing to pictures/words/phrases, signing, low tech devices (Go Talks, etc.), or dynamic devices (iPad, etc.)

3. Lesson vocabulary, photos/pictures and graphic representations should be created and/or printed prior to the lesson to provide all students with an opportunity to be engaged in discussion.

# Technology Needed:

* Smartboard, student computers

# Additional Resources:

* [Science Experiments to Learn about the Sun](https://igamemom.com/science-experiments-to-learn-about-sun/)
* Related Readworks.org article: [Why Does the Sun Burn Us?](https://www.readworks.org/article/Why-Does-the-Sun-Burn-Us/04cac25a-c935-4398-886c-1d019acd3dcd#!articleTab:content/)
* Related Readworks.org article: [In the Center of a Group of Planets](https://www.readworks.org/article/In-the-Center-of-a-Group-of-Planets/3ed4f057-dd44-4163-a6ea-fcf3b69f8a4c#!articleTab:content/)
* Sciencea-z.com: [Resources and lesson ideas for heat energy](https://www.sciencea-z.com/main/UnitResource/unit/11/physical-science/grades-3-4/heat-energy)
* Video: [How the Sun Heats the Earth](https://www.youtube.com/watch?v=dg_DOM1OQoo)
* Book: The Energy that Warms Us: A Look at Heat, by Jennifer Boothroyd
* Book: Energy: Heat, Light and Fuel, by Darlene R. Stille, illus. by Sheree Boyd
* Song: [The Heat Energy Song](https://www.youtube.com/watch?v=khZrs-UBq28)

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