

MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.



-Indicates opportunities for integrated English language development (reading, writing, listening & speaking).

Lesson 3 - Heat Transfer and Climate Change

Engage

In-person or online activity:



Introduce Phenomenon

Begin this lesson by show the students the following phenomena:

- [Earth's mean temperatures](#)
- [Greenhouse effect](#) (mp4)

Ask the students: “*What do you notice? What do you wonder?*”

Once students have shared their answers ask them “*How does the heat from the sun warm the Earth?*” Have students share their answers. Students can use an individual [Notice & Wonder](#) slide to record responses or the teacher can record responses on a class slide. A [Jamboard](#) can also be utilized for students to record their “notice and wonder”.

Independent student activity:

Should students have difficulty in sharing ideas, have students complete the [Student think page](#) and follow up with the discussion again.

Explore

In-person activity:

Student Exploration

Students will be performing a lab to answer a question: *How does the surface type and moisture content affect the surface's temperature? This question will be revisited during the elaborate phase of the lesson.*

Explain

Students will be completing the [Albedo lab exploration](#) in groups of 3-4. **Please note the lab calls for heat lamps with reflectors, we will substitute and use a hair dryer instead.** Gather all materials and guide students through the lab. The lab has 2 parts. Both parts require setup time and at least 15 minutes to gather data. The lab can be split into two days if time is a constraint.

Teacher note: Extension cords have been provided in case outlets are not accessible in your classrooms.

Virtual learning modifications:

 This lab can be completed as a live or pre-recorded teacher demo, with students recording the data as the teacher generates it.

[Albedo lab exploration - Google Docs version](#)

In-person or online activity:

Exploration data analysis

Once students have collected all their data, (or recorded the teacher demonstration data), hand out the student [summary questions](#) of the lab. During virtual learning, the teacher may want to be available to answer questions. Once students have finished have them view the following video:

[120 seconds of science with Doc Ryan](#)

Students should also read the information from the [website](#). The link to this website is attached for students on the summary questions.

If students wish to change their answers, you can allow them time to do so.

In-person or online activities: Any of the options below can be used as stand alone activities or as part of a Choice Board.

[Blank Choice Board template](#)

 **BrainPOP-** Students can view the movie and complete the review or graded quizzes as a check for understanding. There are additional activities and related reading that can be completed as well.

[Climate Types](#)

[Heat Transfer](#)

 **Zingy Learning**- Students can complete the interactive lessons and quizzes as a check for understanding. There are short answer questions that can be used in a Google Doc or Form as well.

[MS, Subject-Specific, Earth Science, Unit 2, Lessons 1-5: Air Masses](#)

[MS, Subject-Specific, Earth Science, Unit 3, Lessons 1-6: Atmospheric & Oceanic Circulation](#)

 **Mystery Science** - (3rd grade content review)

[Stormy Skies - Weather and Climate](#)

 **Achieve 3000 Lesson Options** -

[“A Promise To Help the Planet”](#) (6-8)*

[“What’s Happening Under Earth’s Surface?”](#) (6-8)*

Have students complete the 5-step lesson. As the teacher, you will facilitate the learning through the lesson. Be sure to have students read both pages of the article.

**must be logged into Achieve3000 to view.*

 ***Supplemental Reading - TCM Science Readers**

[Investigating Storms](#)

[Tornado Chasers](#)

[Hurricane Hunters](#)

[Climate Change](#) (This title will be used again in Unit 4)

**If you attended Science Saturday (2019), these are the titles that are in your box that go with this standard. They can be used in addition to or in place of the material above. All of the above titles except for Climate Change have a digital PDF copy of the book accessible via the links above.*

Elaborate

Asynchronous activity option:

Claim-Evidence-Reasoning

 Students will be using the CER model to demonstrate their understanding of “*How does the surface type and moisture content affect the surface temperature?*”

Students will create a poster using the CER model to demonstrate their understanding of the phenomena observed

Evaluate

and studied in the lab. Have students use academic vocabulary in their reasoning.

[Blank CER Poster](#)

An explanation of CER can be found [here](#). Teachers can review the CER process with students prior to the assignment if necessary.



In-person or online activity options:

Student Presentations

Option #1 - Once completed, have students present their CER model posters to the class. This can be done in front of the whole class or as a gallery walk. Select students could also share posters with the whole class during a **Zoom** meeting in virtual learning.

Option #2 - Student CER posters can be posted on a Padlet, where other students can view them as a virtual gallery walk. Students can also attach their poster and present it in FlipGrid.