

Background and Objectives: This is an introductory hands-on lesson to begin talking about the greenhouse effect.

Michigan Content Standards:

S.RS.06.17 Describe the effect humans and other organisms have on the balance of the natural world.

K-7 Standard S.IP: *Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.*

S.IP.M.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

S.IP.06.11 Generate scientific questions based on observations, investigations, and research.

S.IP.06.12 Design and conduct scientific investigations.

S.IP.06.13 Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens, thermometer, models, sieves, microscopes) appropriate to scientific investigations.

S.IP.06.14 Use metric measurement devices in an investigation.

S.IP.06.15 Construct charts and graphs from data and observations.

S.IP.06.16 Identify patterns in data.

Inquiry Analysis and Communication

K-7 Standard S.IA: *Develop an understanding that scientific inquiry and investigations require analysis and communication of findings, using appropriate technology.*

S.IA.M.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

S.IA.06.11 Analyze information from data tables and graphs to answer scientific questions.

S.IA.06.12 Evaluate data, claims, and personal knowledge through collaborative science discourse.

S.IA.06.13 Communicate and defend findings of observations and investigations using evidence.

Relevant Vocabulary: greenhouse effect; temperature;

Materials: (Listed in student handout)

Procedure: (Listed in student handout)

Assessment: Discussion of the Results and Conclusion questions. Since this is used as an introductory lesson, the answers should be used to spur discussion and interest.

Student Handout:

Greenhouse Effect-Introductory Experiment

Question: How does a container being open or closed affect the rate at which the air heats?

Hypothesis:

Materials: 2 thermometers
2 paper cups filled with soil
Sealable plastic bag
One lamp
Colored pencils
Graph paper

Procedure:

1. Place a thermometer on top of the soil in each cup.
2. Enclose one of the cups in a sealed plastic bag.
3. Place the cups six to eight inches from the lamp and as close to each other as possible.
4. Record the starting temperature of the air above each cup of soil in the data table below.
5. Record temperatures every five minutes for thirty minutes.
6. Make a double line graph of the data from your data table.

Greenhouse Effect

Time(min.)	0	5	10	15	20	25	30
Open Container Temperature							
Closed Container Temperature							

Results and Conclusions:

1. Did the air in the open or closed container heat faster? Explain.
2. How many degrees did the temperature of the air in the open container rise? In the closed container?
3. Why do you think this happened?
4. How is the earth like a greenhouse?
5. How are the plastic bag and a car with rolled-up windows like a greenhouse?
6. What other questions about the greenhouse effect and weather could you investigate?

Extension: Does air in an open or closed container cool faster?

Adapted from: Investigations in Science-Weather, Hands-on experiments. Creative Teaching Press, 1995