



T A L E N T
M A K E R C I T Y

THE BUS PROJECT

TODAY'S EXPLORATION: Materials to Keep Things Warm

Grade Level : 2

Overview: Students will identify materials that students can use to keep things warm.

NGSS: 2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

Practices

- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Obtaining, Evaluating, and Communicating Information

Crosscutting Concepts

- Cause and Effect

Materials:

- Clothes and other potential insulation materials:
 - Recyclables or trash: old jeans, old towels, styrofoam, cardboard, or any other waste item that could be used as insulation
 - Traditional insulation (optional)
- Cleaned and empty used bottles with lids, or reusable water bottles for each team or student
- A large amount of warm water
- Timer (cell phone, computer, or traditional timer)
- [Data Recorder](#) (make a digital copy, print, or handwrite)
- Thermometers for each team or student (optional)

Investigation:

1. Collect items that students can use as insulation around your house or collect from the community. (Optional) If available, gather some traditional housing insulation as well.
2. Collect old plastic bottles with caps, or students can use reusable water bottles.

3. Students can work independently or on teams of 3-4 students. Have each team choose three materials to focus their investigation.
4. Fill three water bottles per team with warm water (of the same temperature). Check the starting temperature of the water and record it in the [Data Recorder](#). Or check the temperature qualitatively by identifying it as hot, warm, lukewarm, cool, or cold.
5. Each team will then wrap their water bottles with the three materials they chose. Try to wrap them in equal thickness to one another. Start the timer.
6. After 5 minutes, check the temperature of each bottle and record the results. Repeat the temperature check qualitatively by identifying as hot, warm, lukewarm, cool, or cold. Make assessments every 5 minutes for as few as 15 minutes.
7. After completing the temperature checks, there can be a discussion about what materials worked the best and which would be most affordable.
8. When the students decide, they should work together to create a product (email, poster, video, etc.) explaining their findings to the Bus Project. They should outline why their ideas would be best for the Bus Project using information they have learned.

Product or Artifact Possibilities:

- Completed [Data Recorder](#)
- Product (email, poster, video, etc.) outlining the reasons their ideas are suitable for the Bus Project

Guiding Questions:

1. Can some materials cause things to stay warm longer than others?
2. What is insulation?
3. Are some materials more effective and more affordable to use as insulation?

What Are We Discovering?

Some materials work better than others at keeping things warm. We can collect information about the materials by doing tests. Some materials are also more affordable because they can be collected and donated at no cost. What we learn in an investigation can be communicated to others in various ways.

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- A thermometer can be used to identify specific quantitative temperature

Or

- Temperature can be checked qualitatively using hot, warm, lukewarm, cool, and/or cold.

Chosen Materials	Starting Temperature	After 5 minutes	After 10 minutes	After 15 minutes
1 -				
2 -				
3 -				