

## Photo Description

A person holds an orange tool that measures how hot things are. The tool shows the number 113.5 on its screen. The tool can tell temperature without touching something.



## Scientific Phenomena

The Anchoring Phenomenon is non-contact temperature measurement using infrared radiation. All objects emit invisible heat energy called infrared radiation. The infrared thermometer detects this energy and converts it into a temperature reading. This happens because warmer objects give off more infrared energy than cooler objects, allowing the device to measure temperature from a distance without physical contact.

## Core Science Concepts

1. Heat Energy Transfer - All objects give off invisible heat energy that we cannot see but special tools can detect
2. Temperature Measurement - We can measure how hot or cold things are using different kinds of tools
3. Observable Properties - Objects have properties like temperature that we can measure and describe
4. Technology as Tools - Scientists use special tools to help them observe and measure things they cannot see or touch safely

### Pedagogical Tip:

Use concrete examples from students' daily lives when introducing temperature concepts. Have them feel warm and cool objects first before introducing measurement tools to build foundational understanding.

### UDL Suggestions:

Provide multiple ways for students to experience temperature differences through touch, visual color coding (red=hot, blue=cold), and kinesthetic movement activities like "hot potato" games to support diverse learning needs.

## Zoom In / Zoom Out

1. Zoom In: At the invisible level, tiny particles in all objects are always moving. When objects are hot, the particles move faster and give off more invisible heat energy. When objects are cold, the particles move slower and give off less heat energy.
2. Zoom Out: Temperature measurement helps us understand weather patterns, cooking safety, and keeping our bodies healthy. Scientists use temperature tools to study everything from the heat of the sun to the coldness of ice at the North Pole.

## Discussion Questions

1. What do you think would happen if we pointed this tool at an ice cube? (Bloom's: Predict | DOK: 2)
2. How is this different from the thermometer the nurse uses? (Bloom's: Compare | DOK: 2)
3. What are some things in our classroom that might be warm or cool? (Bloom's: Apply | DOK: 1)
4. Why might scientists want to measure temperature without touching something? (Bloom's: Analyze | DOK: 3)

## Potential Student Misconceptions

1. Misconception: The thermometer makes things hot or cold  
Clarification: The thermometer only measures temperature - it does not change how hot or cold something is
2. Misconception: You have to touch something to know its temperature  
Clarification: Some special tools can measure temperature from far away by detecting invisible heat energy
3. Misconception: Only living things give off heat  
Clarification: All objects give off some amount of heat energy, even rocks and toys

## Cross-Curricular Ideas

1. Math Connection: Create a simple temperature chart using cut-out thermometer pictures. Have students practice ordering numbers by arranging temperature readings from coldest to hottest (e.g., 32°F, 70°F, 95°F). This reinforces number sequencing and comparison skills while connecting to real-world measurement data.
2. ELA Connection: Read aloud books about seasons and weather, then have students dictate or draw pictures of when they feel hot and cold. Create a class book titled "When I Feel Hot and Cold" where each student contributes one page with a drawing and simple sentence starter like "I feel hot when..."
3. Social Studies Connection: Discuss how different communities around the world experience different temperatures. Show pictures of children playing in snow, at the beach, and in desert environments. Talk about how people wear different clothes and do different activities depending on whether it's hot or cold where they live.
4. Art Connection: Have students create a "Hot and Cold Color Collage" where they sort magazine pictures and colored paper into two groups—warm colors (red, orange, yellow) for hot things and cool colors (blue, purple) for cold things. This strengthens the visual connection between temperature and color representation used in many scientific tools.

## STEM Career Connection

1. Weather Person (Meteorologist): A weather person uses special tools like infrared thermometers to measure how hot or cold it is outside. They tell us what clothes to wear and if it will rain or snow tomorrow. They help keep us safe by warning about dangerous weather. Average Annual Salary: \$96,000
2. Doctor or Nurse: Doctors and nurses use thermometers to check if people have a fever and are sick. They care for people and use temperature tools to help them get better and stay healthy. Average Annual Salary: \$75,000 (Nurse); \$208,000 (Doctor)
3. Home Inspector or Building Inspector: These workers visit buildings and homes to check if they are safe and working properly. They use infrared thermometers to find places where heat is escaping from buildings, which helps people save money on heating bills. Average Annual Salary: \$63,000

## NGSS Connections

- Performance Expectation: K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change
- Disciplinary Core Ideas: K-PS3.A - Energy and Matter
- Crosscutting Concepts: Patterns - Observable patterns help us make predictions

## Science Vocabulary

- \* Temperature: How hot or cold something is
- \* Thermometer: A tool that measures temperature
- \* Heat energy: Invisible energy that makes things feel warm
- \* Measure: To find out how much of something there is
- \* Tool: Something that helps us do work or learn about things

## External Resources

Children's Books:

- Hot and Cold by Karen Bryant-Mole
- Temperature: Heating Up and Cooling Down by Darlene Stille
- Thermometers by Jim Whiting