

Objective: Students will explore the concept of urban heat islands (UHIs), understand their causes and effects, and investigate potential solutions to mitigate their impact.

Materials Needed:

- Thermometers
- Infrared thermometers (if available)
- Heat maps of local area
- Soil samples from different locations (urban vs. rural)
- Plant samples (grass, leaves)
- Measuring tape
- Stopwatch
- Data recording sheets
- Chart paper and markers

Safety Considerations:

- Ensure all materials are handled properly.
- Follow classroom rules to prevent accidents.
- Use infrared thermometers with teacher supervision.

Introduction:

1. **Discussion:** Start with a discussion on what students know about heat in cities compared to rural areas.
2. **Video:** Show a short video explaining urban heat islands and their effects on the environment and human health.

Lab Activity:

Part 1: Observing Temperature Differences

- Divide students into small groups.
- **Step 1:** Use thermometers to measure and record the temperature of different surfaces (e.g., asphalt, grass, soil) in various locations around the school.
- **Step 2:** Compare the temperatures and discuss why some surfaces are hotter than others.

Part 2: Investigating the Causes of UHIs

- **Step 3:** Examine soil and plant samples from urban and rural areas. Discuss differences in texture, color, and plant cover.
- **Step 4:** Use infrared thermometers to measure the temperature of samples and record data.

Part 3: Exploring Solutions

- **Step 5:** Discuss potential solutions to reduce UHIs, such as planting more trees, using reflective building materials, and creating green roofs.
- **Step 6:** Design a simple model or plan to implement one solution in their local area.

Reflection Questions:

1. What are the main causes of urban heat islands?
2. How do urban heat islands affect people and the environment?
3. What solutions can help reduce the impact of urban heat islands?

Assessment:

- **Data Analysis:** Have students graph the temperatures recorded from different surfaces and analyze patterns.
- **Presentation:** Each group presents their findings and proposed solutions to the class.
- **Reflection Essay:** Write a short essay reflecting on what they learned and how they can apply this knowledge in their community.

Standards Alignment:

- **Massachusetts STE Standards:** This lab aligns with 6.MS-ESS3-3 and 6.MS-ESS3-4, focusing on Earth's systems and human impact.

Conclusion: Wrap up the lab by discussing the importance of understanding and addressing urban heat islands to create sustainable and livable cities. Encourage students to think about how they can contribute to solutions in their own community.