Hot Spot Investigators

Activity - Worksheet

Go on a hands-on science mission to explore how solar radiation heats the world around you. Use thermometers to track temperatures and gather data in your community! Discover how colour, material, and time of day affect heat—and use your findings to consider cool-down ideas for your school or community.

Learning Outcomes

- Explore how solar radiation impacts surface temperature
- Compare how colour, material, and sun exposure affect heat absorption
- Collect, graph, and analyze temperature data
- Apply experimental findings to solve real-world energy challenges

Vocabulary

As you work through Step 1 and 2 of this activity, write down any words that are new to you! Take a minute to look up what each word means, and write the definition in your own words.

Example:

Solar Radiation - Refers to the electromagnetic radiation released by the sun (sunlight). This energy can be harnessed and converted into useful forms like heat and electricity through various technologies.

Step 1: Guided Notes for the **Urban Heat Solutions Video** 🔥🌆

🔗 **Urban Heat Solutions Video**
https://www.youtube.com/watch?v=ZQ6fSHr5TJg

📝 After watching, reflect and answer these questions *in your own words*:

What kinds of surfaces or areas were the hottest in the video?
Why do you think that is, based on the materials and colours of those surfaces?

Which places stayed cooler, and what helped keep them cool?

What challenges do people in low-income neighbourhoods face when it comes to extreme heat?

What is the city doing to make things cooler, and how do these solutions help reduce heat?

Step 2: Surface Temperature Investigation

Explore how different materials, colours, and sunlight affect surface heat in your community!

1. Pick 5 surfaces to investigate (e.g., asphalt, grass, concrete, metal, shade).
2. Prediction: I think the hottest surface will be: _____ because _____
   _____
3. Fill out the data for the table below:

Table 1: Hot Spot Log

Data	Surface 1 _____	Surface 2 _____	Surface 3 _____	Surface 4 _____	Surface 5 _____
Temperature Outside (°C)					
Surface Material & Colour					
Surface Temperature (°C) – Morning					
Surface Temperature (°C) – Midday					
Surface Temperature (°C) – Afternoon					

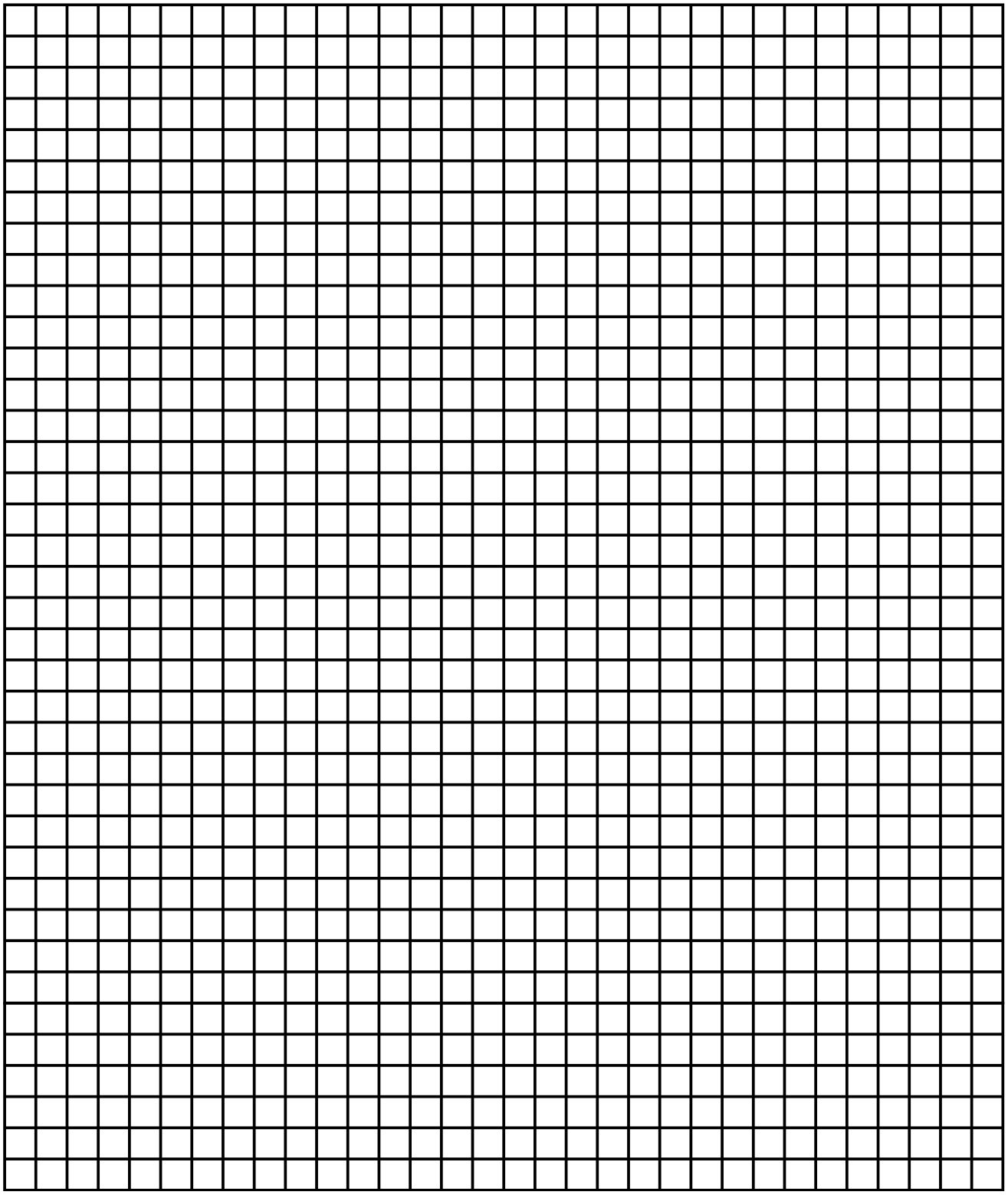
Step 3: Graphing and Analyzing Data 📊

You've collected data — now it's time to make it visual! Use graphs to show how surface temperature changes based on material, colour, and sunlight ☀️🌳

Graph It Out (graph paper or a digital tool)

Clustered Bar Graph:

- What to do: Compare temperatures across different surfaces at three different times of the day: morning, midday, and afternoon. Each surface should have a set of three bars — one for each time of day.
- Steps:
  a. Label your X-axis with your five surfaces (e.g., asphalt, grass, concrete, metal, shade).
  b. Label your Y-axis with temperature values (e.g., 0°C to 40°C, depending on your data range).
  c. For each surface, create three bars (morning, midday, and afternoon) to show the temperature at each time.
  d. Colour-code your bars for each time of day (e.g., morning = blue, midday = red, afternoon = green).
  e. Add a title to your graph like "Surface Temperature Comparison Throughout the Day".



Analyze the Data

Think-Pair-Share:
Prompt: "What's one thing you noticed from your graph?"
🤔 Discuss with a partner. Share your thoughts with the class after!

Guided Questions – Discuss with Your Partner 🤝
Use data from your graph to support your answers!

1. Which surface stayed the hottest all day? 🌡️
   - Think about the bars for each surface. Did one stay consistently higher than the others?
2. What role did shade or sunlight play? 🌞🌳
   - Compare temperatures of surfaces in the sun and those in the shade. How did they differ?
3. Did the colour of the surface seem to matter? 🎨
   - Did dark colours get hotter than light colours? How do you know?
4. Were any results surprising or different from your predictions? 😲
   - Reflect on anything that didn't go as expected.
5. Which surface had the biggest temperature change?📈
   - Compare the difference between morning, midday, and afternoon for each surface. Which one changed the most?
6. How do you think the temperature patterns might change in different seasons or times of day? ❄️🌅
7. Could these results help us build cooler spaces in the summer? 🌆
   - Consider how this data might help architects or city planners design cooler areas.
8. Why might a city care about this kind of data? 🌇
   - How could cities use temperature data to improve buildings, public spaces, or urban planning?

🌟 Want to Take Action?

Now that you know how sunlight is absorbed and reflected—and how this affects temperatures in your community—you can be part of the solution!

🎮 Explore Solutions with GreenLearning's *Flood:ED Simulator*
This interactive tool lets you explore real-world strategies for creating cooler, safer neighbourhoods.

🔗 ***https://greenlearning.ca/Flooded-Simulator/story.html***

💌 Create an eCard!
Create a cooling solution into a creative message for a decision-maker like your principal or mayor! Share what you've learned and speak up for climate action.

🔗 ***https://programs.greenlearning.ca/ecards***

☀️ Build a Solar Oven!
Use your temperature data to find the best spot, then build a solar oven using recycled materials. Test it out with a tasty treat!

🔗 ***https://programs.greenlearning.ca/course/build-a-solar-oven***