PocketLab

Name: _____

Period: _____ Group Name: _____

Lab Activity: Color and temperature of objects

Introduction:

On a hot, sunny day, would you rather wear dark or light-colored clothes? Have you ever walked across dark pavement barefoot on a hot day? How did that feel? Would you rather walk on the dark pavement or a lighter colored sidewalk along green grass? In this experiment you will investigate how the color of objects can affect it's temperature.

Objective:
In this experiment, students will:

1. Observe how temperature changes in objects of different color.
2. Use evidence collected during the lab to better understand how color, light, and temperature are related.
3. Explain the results of the experiment using scientific reasoning.

Answer these prediction questions:

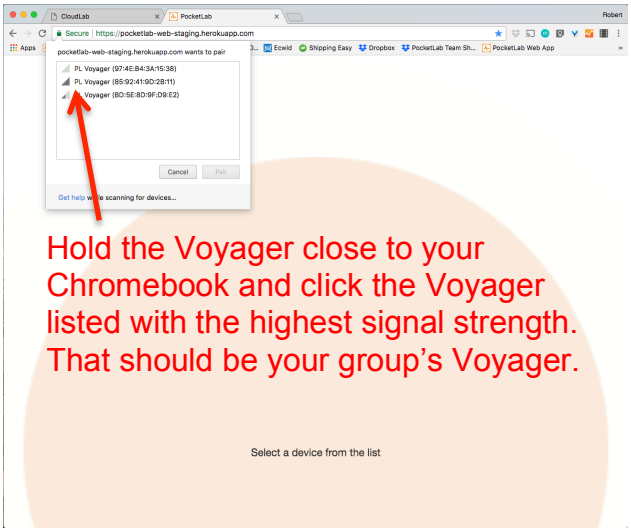
1) On a hot, sunny day, would you rather wear dark or light-colored clothes?
2) Have you ever walked across dark pavement barefoot on a hot day? How did that feel?
3) Would you rather walk on the dark pavement or a lighter colored sidewalk along green grass?
4) Write a hypothesis that predicts the answer to the lab's big question: **When heating similar objects of different color, how will the color affect the change in temperature? Why?**

Collecting data with PocketLab

In part 1 of the lab activity, your group will collect data using PocketLab Voyager and the PocketLab app (The screenshots were taken using the PocketLab web app. The PocketLab mobile app will look slightly different).
-Your group will collect data on ONE of the colors and will share that collected with the entire classroom.
-For your lab report, you will be able to use data collected by other groups on the colors they tested.
-Together, all the groups will collect enough data to draw a valid conclusion about the lab's Big Question.

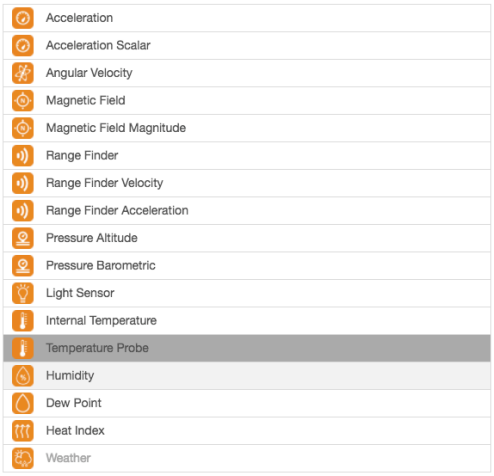
Follow the steps below:

1. Go to the PocketLab web app (in a Chrome browser) using the following address: https://pocketlab-web-staging.herokuapp.com/ or open up the PocketLab mobile app.
2. Turn on the PocketLab Voyager by clicking the button on the top.
3. If using the web app, click the text that reads, "Click here to connect". If using the mobile app, the PocketLab Voyager should automatically connect.
4. Web app only: A pop-up box should appear showing all the PocketLab Voyagers that are turned on. Hold your PocketLab Voyager close to your computer/Chromebook. Click the PocketLab Voyager with the highest "signal strength."



5. Click on the “Change Graph” icon . Click “Temperature Probe” and unclick “Acceleration.”

6. Plug in the temperature probe into the side of the PocketLab Voyager.



You are now ready to collect data for your groups designated Color for the rest of the class.

Data collection for your groups designated color.

1. Each group will get a container of water and a different color of construction paper.
2. Cover your container with the construction paper using tape.
3. Place the containers in direct sunlight or in front of a heat lamp.
4. Place the temperature probe in the container.
5. The probe will measure the temperature change of the water over time.
6. Begin recording data. You will record data for approximately 20 minutes.
7. Stop your recording after 20 minutes. Take note of the temperature at the beginning, middle, and end of your experimental run.
8. Save your data and take a screenshot of the graph.
9. Share your data with the rest of the classroom.

Data Analysis

1. Collect all the data from the different groups in your classroom so you can analyze the results.

2. Examine each graph and data for each color tested. Use the data collected to answer the data analysis questions.

Data Analysis questions:
-In which containers did the temperature rise? Explain how you know with evidence collected by the groups in your classroom.
-Did the temperatures in each of the containers rise at the same rate? Explain how you know with evidence collected by the groups in your classroom.
-What was the initial and final temperature for each of the different containers?

Write a Lab Report

In your lab report include:

1. Your original hypothesis and prediction questions from the beginning of the lab.
2. The objective or scientific question you wanted to answer with the lab activity.
3. What materials you used in the experiment.
4. A detailed description of how the lab was set up and how you tested your hypothesis.
5. A summary of your data and the answers to your data analysis questions.
6. Any observations you made with your group.
7. A conclusion paragraph that answers the following questions:
   -Did the color of the construction paper affect the temperature of the water? If so, how did each color affect the temperature? Explain how you know using evidence collected during the lab.
   -Was your hypothesis correct?
   -How do you think color, light, and temperature are all related?
   -Think back to the questions from the introduction of the lab. How do those questions relate to the experiment?