Temp Probe

Body Temperature

Overview

Have you ever felt really warm after running around or really cold after standing outside in chilly weather? Today, we're going to explore why that happens. Our bodies are amazing at keeping a steady temperature, no matter if we're moving around a lot or the weather changes. Let's find out how our body does this and why it's so important!

Grades: Middle School
Time: 45 Minutes
Subject: Life Science
Topics: Temperature Regulation, Circulatory System

Background

The human body has a remarkable ability to maintain a stable internal temperature, a process known as **thermoregulation**. The average core body temperature for humans is around 37°C (98.6°F), with a normal range typically between 36.5°C and 37.5°C (97.7°F to 99.5°F). This stable temperature is important because the body's organs, like heart and brain, can only work properly within a narrow temperature range. If your body gets too hot or too cold, it can cause problems.

During exercise, muscle activity generates heat, causing the body's temperature to rise. To prevent overheating, the **circulatory system** increases blood flow to the skin, allowing heat to dissipate into the environment. Sweating also helps cool the body. As the sweat evaporates, it cools the body down.

When it's too cold, the body conserves heat by reducing blood flow to the skin, shivering to generate warmth, and creating "goosebumps" to trap heat. This balance helps keep the internal temperature steady at around 37°C (98.6°F), so the body can function properly.

We can help our bodies keep a stable temperature by adopting healthy habits like eating a balanced diet, which provides the energy needed for heat production; drinking enough water to support bodily functions such as sweating and blood flow; dressing appropriately for the weather; and planning activities based on the temperature and humidity.

What You Will Need/Prep

- databot with temperature sensor
- IOS/Android Smart Device
- Elastic medical wrap
- Install Vizeey™ on your Smart device.
- Scan the QR code to load the experiment.
- Test your databot™ connection.
- You will be prompted to select and connect to databot™ each time you launch an experiment.
- If there are two or more databot™'s listed, the one closest to your device will be highlighted.
- Study the background information and terms and prepare to explore!

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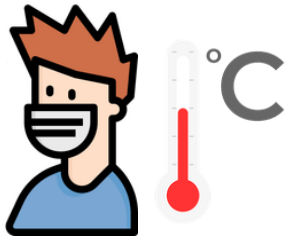
Temp Probe

In this lab, you will measure skin temperature before and after exercise to understand how your body responds to physical activity. You'll learn how the circulatory system works to regulate body temperature and why maintaining a healthy temperature range is essential for preventing disease and supporting overall health.



Learning Objectives

In this investigation you will master the following knowledge and skills:

- Visualize, collect and analyze data
- Measure and record temperature in C or F
- The body's ability to maintain a stable internal temperature is essential for proper function and health.
- The circulatory system helps regulate temperature by adjusting blood flow to the skin's surface to release or retain heat.

Important Terms

Temperature regulation: also called **thermoregulation**, is the process your body uses to keep its internal temperature steady. Even when it's really hot or cold outside, or when you're being active, your body works hard to stay at about 37°C (98.6°F).

Circulatory system: the system in your body responsible for transporting blood, oxygen, nutrients, and waste materials. It acts like a delivery network, ensuring that every part of your body gets what it needs to stay alive and function properly. Parts of the Circulatory System are heart, blood vessels and blood.

Interesting facts

Your Body Loses Heat in Water Faster Than Air: Water transfers heat 25 times faster than air, which is why you feel colder swimming in cool water than standing in the same temperature air!

Your Body as a Thermometer: Ever touched a surface and instantly known if it was hot or cold? Your skin senses temperature, but it can be tricked—holding one hand in warm water and the other in cold, then putting both in lukewarm water makes the temperatures feel reversed!

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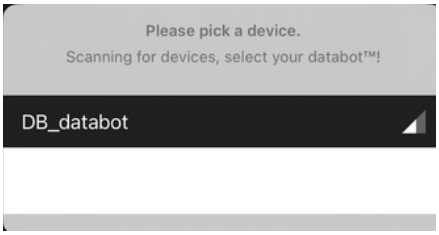
Using Vizeey

In order to work with the experiment you need to launch the Vizeey application and click on + in the upper right corner.

Then select “Add experiment from QR code” and scan the QR code prepared for this experiment. Your experiment will appear in the list.

When you start the experiment you will be immediately offered to connect to your databot. Make sure that databot is enabled.

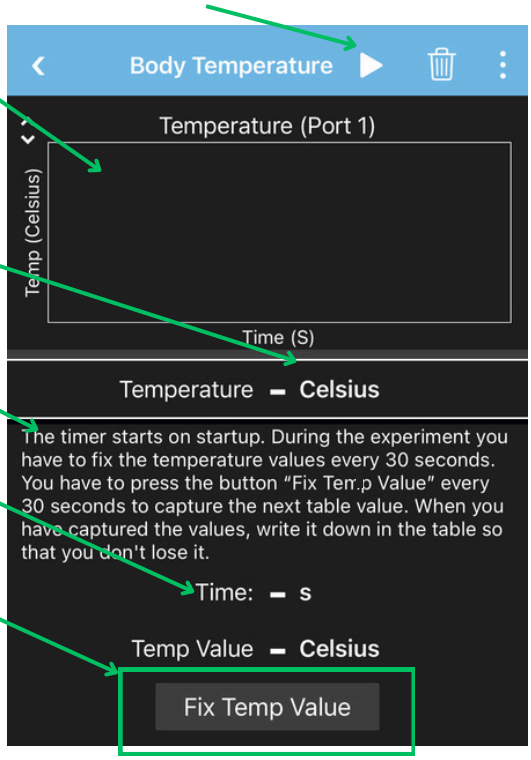


Don’t forget to check that the temperature probe is connected to the Temp 1 port.

Once in the Experiment

Press this button to start the experiment.

- Here you will see a graph of temperature change over time.
- Current temperature
- General information about the experiment
- Stopwatch from the start of the program (If you want to reset the timer to 0 you need to restart the experiment).
- The temperature value you can fix at the current moment by pressing the button.



During the experiment, you need to record the temperature values every 30 seconds.

Press the "Fix Temp Value" button every 30 seconds to capture the next values for your data table.

Once you have captured the values, write them down in the table to avoid losing any information and prepare to capture the values at the next 30 second mark. Be fast and accurate!

Temp Probe

Part 1: Initial Observations and Questions

What do you think will happen to your skin temperature after you exercise?

Write your thoughts or questions below:

_____

_____

_____

Part 2: Hypothesis

Temperature Hypothesis: Predict how your skin temperature will change after exercise compared to when you are at rest. Prediction:

_____

_____

Part 3: Experiment Procedure

Measuring Skin Temperature Before and After Exercise

Divide into groups of 2 or 3, one is the person whose temperature will be measured, the second and/or third person fixes the temperature in Vizzey app and enters the data into the table.

Setup

- Turn on databot and connect the temperature probe to it.
- Place the databot's temperature sensor gently against the back of your hand or wrist.
  - It should be completely wrapped and pressed to the body.
  - Elastic medical wrap would be handy for this - it will stretch and hold the temp probe firmly against the skin.
  - The tip of the sensor should not be sticking out so it is not reading the air temperature.
  - Hold databot firmly in your hand to avoid dropping it when exercising.

Correct

Wrong

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Part 3: Experiment Procedure

Measuring Skin Temperature Before and After Exercise

Baseline Measurement (At Rest):

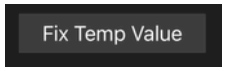
- Turn on databot (using the small button on the left side) and open the Vizeey app.
- Tap on **"Body Temperature"** in Vizeey to load the experiment.
- You will be prompted to connect to databot.
  - Hint- if there is more than one databot in use, the one closest to you will be in blue!
  - A solid blue light on databot means you are connected.
- Start your experiment using:
  - Use these icons at the top of the screen in Vizeey to start and to pause the experiment.
- Wait about 8-10 minutes for the sensor to match the skin temperature.
  - During this time, follow your instructor's guidance for reading or other study while you wait for the sensor to adjust.

The external body temperature in different parts of the body may be different, so do not be surprised if the skin temperature is lower than 36.6 degrees Celsius.

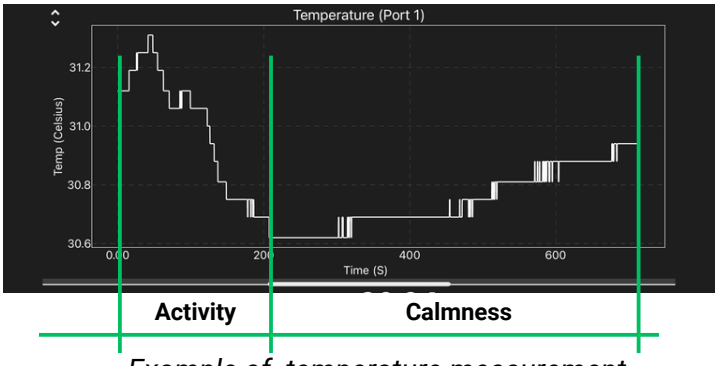
- Once the body temperature is equalized, get ready to start the experiment. Use stop button and restart the experiment again using

Exercise Activity

- The person whose temperature is measured should perform light exercises (e.g., jumping jacks, running in place or others) for 2-3 minutes.
- The other student(s) should fix the temperature data using every 30 seconds and record it into the table *"During Exercise"*.



- As soon as 2-3 minutes have passed, stop exercising but don't stop measuring.
  - The student with the temperature probe should sit still for 10 min.
  - If you want to see how the skin temperature returns to its initial state, take measurements every minute and enter the data in the *"After Exercise"* table



Example of temperature measurement

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Part 3: Experiment Procedure

Data Collection Tables

During Exercise

Time (s)	Temperature (°C)
0	
30	
60	
90	
120	
150	
180	
210	
240	

After Exercise

Time (s)	Temperature (°C)
240	
300	
360	
420	
480	
540	
600	
660	
720	
800	

Part 4: Data Analysis

1. Graphing Your Data:

Create a line graph to compare skin temperature before and after exercise.

- X-axis: Time (seconds)
- Y-axis: Temperature (°C)
- Use different colors or labels for "During Exercise" and "After Exercise" conditions.

2. Observing Patterns:

Examine how your skin temperature changed from exercise to post-exercise measurements. Consider what this pattern suggests about how your body responds to physical activity.

Part 5: Concept Questions

Data Interpretation:

1. How did your skin temperature change during exercise compared to when you were at rest? _____

_____

2. Why do you think your skin temperature increased (or decreased) after exercise?

_____

_____

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Part 5: Concept Questions

Understanding Body Temperature Regulation:

1. How does the circulatory system help your body regulate temperature during exercise?

_____

_____

2. What are some ways the body tries to cool down when it gets too warm?

_____

_____

Part 6: Reflection

1. What did you learn about how your body's temperature changes during physical activity? _____

_____

2. Why is it important to stay hydrated and rest after exercise to help your body maintain a healthy temperature? _____

_____

3. How does keeping a stable temperature help prevent disease and promote healthy body function? _____

_____

Part 7: Healthy Habit Tips

To maintain a healthy body temperature, here are some habits that support temperature regulation and overall health:

- Stay Hydrated: Drinking water helps your body cool down during exercise and maintains fluid balance.
- Rest After Exercise: Allow your body to recover, which helps it return to a normal temperature range.
- Wear Weather-Appropriate Clothing: Dressing appropriately for the weather helps prevent overheating or excessive cooling.
- Eat a Balanced Diet: Provides your body with the energy needed to support temperature regulation processes.