



Temperature Regulation

Name: _____
Period: _____
Date: _____

PART A: Heat Loss

Question: Is heat lost more quickly in air or water?

Hypothesis: _____

Materials:

- Room temperature water and hot water
- Two film canisters
- Two plastic cups
- Two thermometers
- Stopwatch

Procedures:

1. Obtain two plastic cups. Leave one plastic cup empty, and fill the other with approximately half an inch of room temperature water.
2. Fill both film canisters with hot water and immediately place one in each plastic cup. (NOTE: The room temperature water should be high enough to surround the film canister, but should not overflow into the film canister. If the water overflows, you will need to set up your experiment again, this time using less room temperature water.)
3. Immediately put one thermometer in each film canister. Take the starting temperature in each film canister, and record this in the table below.
4. Keep the thermometers submerged in the film canisters, and record a temperature reading every minute for five minutes.
5. After collecting the data, remove the thermometers from the canisters and complete the questions below.

Time	Temp (°C) of Canister in Air	Temp (°C) of Canister in Water





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Conclusion Questions:

6. What conclusions can you draw from the data you collected?

7. Was your hypothesis correct?

PART B: Insulation

Question: Can a layer of fat reduce the amount of heat lost to the environment?

Hypothesis: _____

Materials:

- One large container
- Ice water
- Hot water
- Two film canisters
- Two plastic cups
- Two thermometers
- Stopwatch

Procedures:

1. Fill the large container with ice water.
2. Use a spoon to fill one plastic cup half full of shortening. Leave the other plastic cup empty.
3. Place both plastic cups in the container of cold water. (The cups should be surrounded by cold water, but the water should not overflow into the cups.)





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4. Fill the two film canisters with hot water, and immediately place them in the plastic cups. Press the canister down into the shortening, but make sure there is at least one centimeter of shortening below the canister. Also ensure that shortening surrounds the sides of the canister.
5. Quickly put one thermometer in each film canister. Take the starting temperature, and record this in the table below.
6. Record a temperature reading every minute for five minutes.
7. After collecting the data, remove the thermometers from the canisters and complete the questions below.

Time	Temp (°C) of Canister in Air	Temp (°C) of Canister in Water

Conclusion Questions:

8. What conclusions can you draw from the data you collected?

9. Was your hypothesis correct?





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10. Summarize the process of counter-current heat exchange in dolphins. You may include diagrams in the space below.

