

Lab Team Members:
(3 members maximum)

Period:
Date:

How Can Scientific Methods Be Used to Solve a Problem?

Lab
1 - 1

PROCEDURE QUESTIONS

Part A. Observation

2.
 - a. Do you think both flasks contain the same liquid? Explain
 - b. Is your answer to question 2a based on experimentation or guessing?
 - c. Would a scientist guess an answer to a question or experiment first?
 - d. Do both flasks contain the same volume of liquid?
 - e. What gas might be in the upper half of flask A that is not in flask B?
 - f. Is there any direct evidence for your answer to question 2e?
3. Write a hypothesis about whether the contents of the two flasks are the same or different. Write your hypothesis on the next page where it says "HYPOTHESIS".

Part B. Experimentation

Experiment 1. What happens if you shake the liquids?

2.
 - a. After shaking the flasks, do you think they contain different liquids?
 - b. What was present in flask A that might have been responsible for the change in the liquid?

Experiment 2. What happens if you remove some of the liquid in flask B so it contains the same volume of liquid as flask A?

4.
 - a. Do both flasks now appear to contain the same liquid?
 - b. What was added to flask B that was not present before?

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Experiment 3. What happens if shake the flasks more than once?

6. a. Is the time needed for the liquids in flasks A and B to return to their original conditions after one shake about the same?
- b. Is the time needed for the liquids in flasks A and B to return to their original conditions after two or three shakes about the same?
- c. Look at your data in Table 4. Does flask A show an increase or decrease in time needed to return to its original condition as the number of shakes increases from one to three?

Does flask B show a similar change?

8. a. Do three trials give better evidence that the liquid in flask A is “behaving” in a way similar to the liquid in flask B after shaking each flask

once? _____

Twice? _____

Three times? _____

- b. Do three trials give better evidence that an increase in time is needed for the liquid to return to its original condition as the number of shakes increases from one to three

for flask A? _____

for flask B? _____

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HYPOTHESIS

DATA & OBSERVATIONS

Table 1

First Observations	
Similarities	Differences

Table 2

Results of Experiment 1	
Similarities	Differences

Table 3

Results of Experiment 2	
Similarities	Differences

Table 4

[illegible]

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ANALYSIS

Questions 1-4 should help you to interpret what you have observed. Interpretations are reasoning based on observations and experiments.

1. On the basis of your observation in Part A, could you decide if both flasks contained the same liquid?
2. After performing Experiment 1, could you decide if both flasks contained the same liquid?
3. Which experiment or experiments helped you to decide that the liquids in flasks A and B were the same or different? Explain.
4. Besides the liquid itself, what else was needed for the liquid to change color?

Questions 5-7 should help you to form a conclusion.

5. Explain why flask B did not change color when shaken in Experiment 1.
6. Why must the liquids in the half-filled flasks be shaken to produce a color change?
7. Why did more shaking increase the amount of time needed for the liquids in flasks A and B to change back to their original color?
8. Could you have answered the first question in Part A by guessing?
9. Why is experimenting a better method of problem solving?
10. What is meant by the phrase “solving a problem by using scientific methods”?

CHECKING YOUR HYPOTHESIS

1. Was your hypothesis supported by your data? Why or why not?