Chapter Science Investigation Name _____

Investigating Mixtures

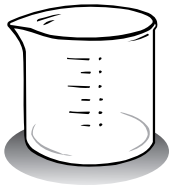
What You Need

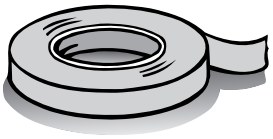
salt

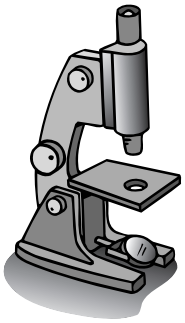
oil

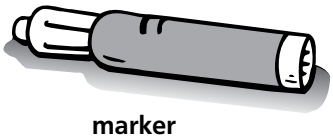

water

gelatin


600-mL beaker


masking tape


microscope
(or good hand lens)


marker


three mayonnaise jars

tablespoon

Find Out

Do this activity to see how different solutes in the same solvent can result in different mixtures.

Process Skills

- Predicting
- Observing
- Communicating
- Inferring
- Interpreting Data
- Controlling Variables
- Experimenting

Time

- 30 minutes the first day
- 5 minutes twice a week for two weeks

What to Do

1. Using the masking tape and marker, label the jars "1," "2," and "3."
2. **Predict** what will happen to the salt, gelatin, and oil mixed with water after two weeks.
3. Place some salt on a slide and view it under the microscope. **Observe** the structure of the salt and **draw** what you see.
4. Pour 200 mL of warm water into jar 1. Mix in five tablespoons of salt. Stir until the salt crystals are completely dissolved. **Observe** the mixture and **record** its appearance.

5. Place the jar in a warm place, next to either a heat register or a window.
6. Mix five tablespoons of the gelatin into 200 mL of warm water and stir until it dissolves. Pour the gelatin into jar 2.
7. **Observe** the mixture and **record** your observations. Place this jar in a refrigerator.
8. Pour 200 mL of warm water and 50 mL of oil in jar 3. Stir, and **record** your observations. Place this jar next to jar 1.
9. **Observe** the mixtures twice a week for two weeks. **Record** your observations.
10. After two weeks, scrape a small amount of the substance out of jar 1 and place it on a slide. **Observe** the structure of the substance. **Draw** what you see.

Prediction: Predictions will vary.

Draw what you see when looking at salt under the microscope.

Drawings will vary.

Observations	Jar 1	Jar 2	Jar 3
Day 1	Observations will vary.		
Day 2			
Day 3			
Day 4			
Day 5			

Draw what you see when looking at the substance under the microscope.

Drawings will vary but should resemble the initial drawing.

Conclusions

1. Compare your predictions with your observations.
Answers will depend on predictions made.

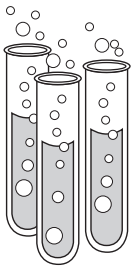
2. What happened to the three mixtures during the two weeks? How did they compare to one another?
Water in salt mixture should evaporate, leaving salt crystals on the glass. Gelatin mixture in a cool place will solidify. In oil mixture, the oil will separate from the water.

3. How would you classify each of these mixtures?
Jar 1 is a solution, or homogenous mixture; jar 2 is a colloid; jar 3 is a suspension.

New Questions

1. If a different kind of oil was used in jar 3, **infer** whether or not your results might have been different.
No, water is not a solvent for oil.

2. What physical properties did you observe in each mixture?
Answers will vary and may include that the salt solution stayed mixed, separating only when the water evaporated. The gelatin stayed suspended in the water. The oil separated from the water almost immediately.



Name _____

ACTIVITY

Investigating Physical Properties

What physical properties of the material do you observe?

	Starting Material	Ending Material
Observations	Answers in the chart will vary.	
Does the material take the shape of the container?		
Mass of material and beaker		
Volume of material		

Calculate the density of the starting and ending material.

	Starting Material	Ending Material
Mass of material and beaker	Calculations will vary based on the recorded mass and volume of the materials.	
Mass of beaker		
Mass of material − mass of beaker		
Mass of material		
Volume of material		
Density of material (mass of material ÷ volume of material)		

Name _____

Conclusions

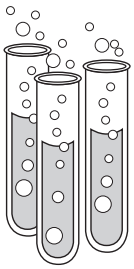
1. Was the starting material most like a liquid, a solid, or a gas? The ending material?
liquid; liquid

2. Compare the physical properties of the ending material with the physical properties of the starting material.
The beginning material was a thin liquid that quickly took the shape of the container. The ending material was a thick liquid that was slow to take the shape of the container.

Asking New Questions

1. What other materials have you seen that have properties similar to the ending material?
Answers will vary but may include egg whites, thick frosting, and so on.

2. What properties would the ending material have to have for it to be classified as a solid or a gas?
The material would have to have a definite shape and volume to be a solid. To be a gas, the material would not have a definite shape or volume.



Name _____

ACTIVITY

Investigating pH

Predict whether each test solution will be an acid or a base.
Record your predictions and observations.

Substance	Prediction	Color of Cabbage Juice	Relative pH
Predictions and observations will vary.			

Name _____

Conclusions

1. Which solutions did you **classify** as acids? Which did you classify as bases?
acids: soft drink, lemon juice, vinegar; bases: detergent, baking soda

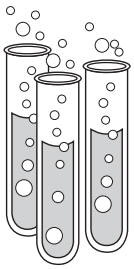
2. What happened when you added distilled water to the cabbage juice? Why?
The distilled water did not change the color of the cabbage juice because the water is neutral.

3. How did your predictions compare with your results?
Answers will vary on the basis of the prediction made.

Asking New Questions

1. What remained the same in each test tube?
the cabbage juice, and the quantity of cabbage juice and the different substances

2. What caused the results to be different in each test tube?
the test solutions



Name _____

ACTIVITY

Separating Mixtures

What changes do you **observe** on the filter paper? **Record** your observations in the chart.

Color of Ink Dot	What Happened
	Colors and observations will vary.

Name _____

Conclusions

1. What happened as the water moved up the paper through the ink dots?
Different colors separated from the ink.

2. Describe the differences you observed in the different colors of ink. Was the change physical or chemical?
Each color of ink has different colors that "streak" the filter paper; physical.

3. Is ink a mixture? Why?
Yes; because the components of the mixture could be separated by physical means.

Asking New Questions

1. If a student from another class showed you filter paper results from several unknown materials, could you identify a sample of black ink?
Answers will vary. If the same marker was used as that used in this activity, students could identify the black ink by comparing the filter papers.

2. Would all washable inks produce the same pattern? Why or why not? What kinds of further information would be helpful to support your conclusion or to answer new questions that you have?
Answers will vary. Accept any reasonable answer; different kinds of washable markers may have slightly different mixtures of colors than other markers. Answers will vary.