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- to involve parents in their children's science education and experiences
- to foster an appreciation for physical science

Each activity has a Teacher Resource section that includes – besides helpful hints and suggestions – a scoring rubric, as well as Internet connections for those students who wish to go further and carry out the Follow-Up Activities.

These activities are designed to stand alone as supplements to your instruction. While the activities can be performed in any order according to your teaching plans, please note that some activities are similar in matter and setup to others. For example, *Activities 3 and 4 (Gases of Burning, Part 1: Oxygen, and Gases of Burning, Part 2: Carbon Dioxide)* use similar materials and procedures. These are listed in the following section, Explanation of Activities. It would save you time and effort and reinforce student understanding to perform them in conjunction with each other.

Much of science is a combination of problem solving, the scientific method and just plain hard work. Properly used, this book can be fun for students while still helping them strive to reach the high standards that you expect from them in your classroom.

11. How Can We Separate the Parts of a Mixture?

TEACHER RESOURCE PAGE



Instructional Objectives

Students will be able to:

- identify the properties of a mixture
- demonstrate the techniques of decantation, filtration and evaporation
- observe and record data
- distinguish between homogeneous and heterogeneous mixtures
- explain that the physical properties of a mixture's components can be used to separate the components



Science Benchmark

Years 7–8

Content description
Abilities necessary to do scientific inquiry
Understandings about scientific inquiry
Properties and changes of properties in matter
Abilities of technological design
Science as a human endeavour
Nature of science

Years 9–10

Content description
Abilities necessary to do scientific inquiry
Understandings about scientific inquiry
Structure and properties of matter
Abilities of technological design
Nature of scientific knowledge

Years 7–8

National Science Curriculum
Students practise safe, responsible and ethical behaviour when conducting investigations using standard equipment
Students plan and conduct scientific investigations in ways that lead to the collection, interpretation and presentation of valid data
Students investigate use a range of physical separation techniques

Years 9–10

National Science Curriculum
Students plan experimental procedures which include the accurate control and measurement of variables
They use scientific language and representations when communicating their results and ideas
Students understand what happens during a chemical reaction and are able to describe observed reactions



Vocabulary

- **decant:** to pour off the liquid part of a mixture while leaving the solid behind
- **evaporation:** the change of a liquid to a gas
- **filtration:** the process of removing suspended particles from a suspension or other type of mixture
- **heterogeneous mixture:** a mixture in which the composition is not uniform and varies throughout the sample
- **homogeneous mixture:** a mixture such as coffee or tea that is uniform in composition throughout the sample

11. How Can We Separate the Parts of a Mixture?

STUDENT ACTIVITY PAGE



Objective

To learn how to distinguish between homogeneous and heterogeneous mixtures

Before You Begin

In this activity, you will separate the different materials in a mixture by using the properties of each material. You will observe samples of potting soil and salt that have been given to you. Next, you will combine them into a mixture. Then you will use the properties you observed to separate them. There are two kinds of mixtures. In **homogeneous mixtures**, all the components are uniformly mixed. For example, a glass of lemonade or a cup of coffee is a homogeneous mixture. In **heterogeneous mixtures**, the parts can be easily separated. Separating the parts of a mixture is a task chemists often face. For example, purifying drinking water involves many of the techniques you will explore in this activity.



Materials

- sodium chloride (table salt)
- potting soil
- two 250-ml beakers
- two 100-ml beakers
- 25-ml graduated cylinder
- stirring rod
- funnel
- filter paper
- water
- ring stand and ring
- evaporating dish
- tripod and wire gauze
- ⚠ gas burner or alcohol heater
- ⚠ matches
- ⚠ safety goggles

= Safety icon



Procedure

Safety note: You must wear goggles while performing this activity.

1. Using the 25-ml graduated cylinder, place 15 ml of soil into one small (100-ml) beaker and 15 ml of salt into the other small beaker. Be sure to clean and dry the graduated cylinder after measuring the soil.
2. Observe each of these and list their properties in the data table.
3. Add a small amount of water to each beaker. Record your observations in the data table.

11. How Can We Separate the Parts of a Mixture?

STUDENT ACTIVITY PAGE

- Combine 15 ml of soil and 5 ml of salt in the 250-ml beaker. Stir it with the stirring rod. In the data table, describe the mixture you have made. Is it a homogeneous mixture or a heterogeneous mixture? Describe this in the chart.
- Add enough water to half fill the beaker. Use the stirring rod to mix the mixture.
- In the data table, describe the appearance of the mixture with the water added.
- Let the mixture stand until most of the soil has settled. Using the technique pictured in Figure 1, **decant** the liquid so that most of the soil remains behind. To decant means to pour off a liquid while leaving suspended solids behind. Holding the stirring rod against the lip of the beaker with the mixture blocks the soil from pouring out.
- Dispose of the remaining soil in the bin. **Do not pour it down the sink.** Wash and dry the beaker, which you will use later.
- Set up the ring stand as shown in Figure 2.
- Fold the piece of filter paper in half and then into quarters, as shown in Figure 3. Tear off a small part of one of the corners of the filter. Open up the folded filter paper to form a cone.

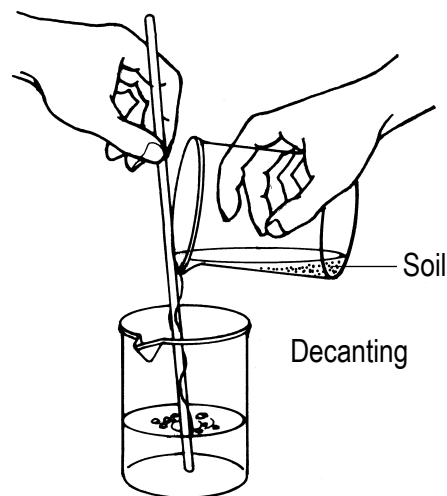


Figure 1

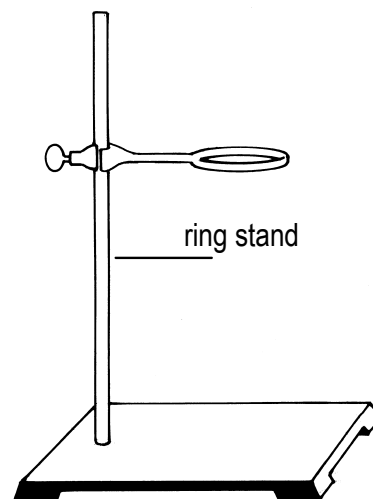


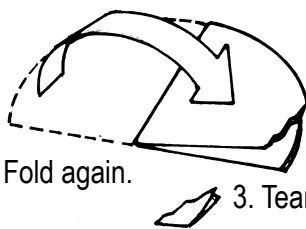
Figure 2

Figure 3

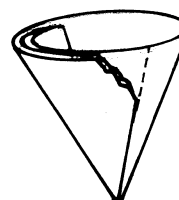
1. Fold and crease lightly.



2. Fold again.



3. Tear off corner.



How to fold filter paper