

Separating a Mixture Using Sieving and Magnetism

Florida State Standard: SC.5.P.8.3 – Investigate and describe how materials can be separated based on physical properties.

Florida State Benchmark: SC.5.P.8.4 – Identify the properties of materials and determine methods of separation based on those properties.

A. TEACHER:

B. GRADE LEVEL: 5th Grade

C. SUBJECT: STEM/Science

D. DATE:

E. DURATION: 1 Hour

F. LESSON FOCUS: Mixture Separation Techniques (Magnetism, Sieving)

G. MATERIALS:

- Mixture of Iron Filings, Sand, and Small Stones (1 cup of each)
- Sieve or Colander
- Magnet
- Plate or Shallow Dish
- Bowl or Container

H. LESSON OBJECTIVES:

- Students will understand the principle of separating mixtures based on physical properties.
- Students will apply magnetism to separate iron filings from a mixture.
- Students will use sieving to separate sand from small stones based on particle size.

I. PROCEDURES:

- 1. Introduction (10 minutes):**
 - Start by discussing mixtures and separation techniques. Ask students how they think we can separate materials in a mixture. Introduce the experiment where they will separate iron filings, sand, and small stones using magnetism and sieving.
- 2. Experiment (30 minutes):**
 - **Step 1:** Prepare the mixture by combining 1 cup of iron filings, 1 cup of sand, and 1 cup of small stones in a bowl.
 - **Step 2:** Use a magnet to attract and remove the iron filings. Move the magnet through the mixture and collect the iron filings. Place the iron filings on a plate or shallow dish.
 - **Step 3:** Sift the remaining mixture using the sieve to separate sand from small stones. Shake the sieve gently, and allow the sand to fall through while the small stones stay in the sieve.

- **Step 4:** Collect the separated sand into a bowl and the small stones into a separate container.
- 3. **Observation (10 minutes):**
 - Ask students to observe the separation process and note the differences between the iron filings, sand, and small stones. Discuss the properties of each material that made it possible to separate them.
- 4. **Generalization (5 minutes):**
 - Explain how magnetism works to separate iron filings (since they are magnetic) and how sieving uses the particle size to separate sand from stones. Discuss how these techniques are applied in real-world situations, such as mining or recycling.
- 5. **Assessment (5 minutes):**
 - Ask students to answer questions from the test-yourself section, including how magnetism and sieving were used in the experiment, and why understanding physical properties is essential in separating mixtures.
 - Evaluate students' understanding through a brief class discussion or written response.

Note 1 (Safety):

Ensure that students handle the magnet carefully to avoid pinching their fingers. Remind students to keep the magnet away from electronic devices to avoid interference. Make sure the work area is clear of any unnecessary materials to prevent accidents. If any spills occur, clean them up immediately to avoid slipping or other hazards. Always supervise students during the experiment to ensure proper safety protocols are followed.

Note 2 (Accommodation for ELL, ESE, etc.):

For English Language Learners (ELL), provide visual aids and demonstrations of the experiment steps. Use simple language and encourage peer support by pairing students with stronger language skills. For ESE students, consider providing additional assistance and offering a modified version of the experiment if needed, with simplified instructions or materials. Allow extra time for processing and ensure that the learning environment is supportive and inclusive for all students.