**Science Lesson Plan**

**Title:** Introduction to Mixtures  
**Topic/Strand:** Mixtures and Solutions  
**Grade Level:** 5th Grade  
**Teacher:** Adelyn Lyon  
**Curriculum:** FOSS Mixtures and Solutions  
**Estimated Time:** 90 minutes

### 1. Overview

Using science tools to effectively make observations about the physical properties of substances is an important standard that 5th grade students need to develop in order to access more challenging science laboratory work in later grades. Access to science standards is not always effectively provided, as many science lessons do not adequately address the language needs of a science activity. This lesson helps 5th graders explore three specific substances – gravel, sodium chloride, and diatomaceous earth – and how the physical properties of the substances can change when a mixture is made of the substance and water. Students will work in small lab groups and will be given structured language supports when discussing, observing and recording observations of substances and mixtures.

Students begin by observing and writing about the physical properties of the substances. Then, they mix the substances with water to form a mixture, and predict which kinds of filters will successfully separate the mixtures. Finally, the students will test their predictions and reflect on the results.

### 2. Learning Goals and Standards

**Goals:**

Science Learning Goals:

1. Students will come to know and understand that various materials (substances) may have different physical properties (S1)
2. Students will come to know and understand that mixtures are an intermingling of two or more materials, and that some mixtures can be separated using filters. (S2)

Language Learning Goals:

1. Students will be able to communicate effectively with classmates and the teacher about the physical properties of substances and the study of mixtures (ELD1)
2. Students will be able to use concepts and academic vocabulary to complete writing activities that support concept development related to the study of mixtures (ELD2)
3. Students will be able to follow multi-step directions given verbally and in written form (ELD3)

**Standards:**

- English Language Arts Standards (5th Grade)
  - **READING.**
    - Vocabulary & Concept Development 1.4: know abstract, derived roots and affixes from Greek and Latin and use this knowledge to analyze the meaning of complex words.
  - **LISTENING AND SPEAKING.**
    - Comprehension 1.1: Ask questions that seek information not already discussed. Organization & Oral Communication 1.5: Clarify and support spoken ideas with evidence and examples.
- English Language Development (ELD) standards, 3rd - 5th Grade.
  - **WRITING.**
    - Organization & Focus (Early Advanced): Use more complex vocabulary and
sentences appropriate for language arts and other content areas (e.g., math, science, history—social science).

- Language Conventions (Early Advanced): Produce independent writing with consistent use of correct capitalization, punctuation, and spelling.

- **READING.**
  - Word Analysis (Advanced): Apply knowledge of word relationships, such as roots and affixes, to derive meaning from literature and texts in content areas.
  - Comprehension (Intermediate): Understand and follow some multiple-step directions for classroom-related activities.

- **LISTENING AND SPEAKING.**
  - Comprehension, Organization, & Delivery of Oral Communication (Early Advanced): Make oneself understood when speaking by using consistent standard English grammatical forms, sounds, intonation, pitch, and modulation but may make random errors.
  - Comprehension, Organization, & Delivery of Oral Communication (Early Advanced): Recognize appropriate ways of speaking that vary according to the purpose, audience, and subject matter.
  - Comprehension, Organization, & Delivery of Oral Communication (Early Advanced): Ask and answer instructional questions with more extensive supporting elements.

3. **Assessments**

- Student Artifacts: mixtures worksheets and science notebooks (meets learning goals: S1, S2, ELD 1, ELD 2, and ELD 3)
- Teacher artifact: formative assessment note sheet – used to assess target students who are English learners and/or have learning/language disabilities. (meets learning goals: S1, S2, ELD 1, ELD 2, and ELD 3)

4. **Resources and Preparation**

   **Materials From FOSS kit (for each group)**
   - 6 plastic cups
   - 6 self stick notes
   - 3 craft sticks
   - 2 hand lenses
   - 1 screen
   - 1 FOSS funnel
   - 2 filter papers
   - 1 container, ½ liter
   - 1 syringe – 50mL
   - 1 basin

   From FOSS kit (for class)
   - 2 containers of gravel
   - 2 containers of diatomaceous earth (“powder”)
   - 2 containers of kosher salt
   - 5 spoons, 5-mL
   - 2 pitchers
   - 6 popsicle sticks, 2 each labeled G, D, and S

   **Provided by teacher**
   - Water
   - Paper towels
   - Chart Paper (for lab rules)
   - Bucket (optional)
   - Rulers (2 per group)
   - Handouts
   - Investigation 1 Overview
   - Properties of Matter worksheet
   - Separating Mixtures worksheet
   - Lab directions (one per group)
   - Visuals
   - Chemical lab rule poster (teacher made)
   - Use of document camera (or other source) to display all worksheets
## 5. Instructional Plan

<table>
<thead>
<tr>
<th>Segment/Activity</th>
<th>ELLISA Practice</th>
<th>Vocab</th>
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<tr>
<td><strong>1. Prepare to investigate (~25 minutes)</strong></td>
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<td>Unit Launch / Preview</td>
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<td>• <em>What is chemistry?</em> The branch of science that deals with the composition, structure, and properties of matter. Learning about the makeup of substances gives us knowledge about how things go together and how they can be taken apart. Learning about changes in substances is important for several reasons: changes can be controlled to produce new materials; changes can be used to give off energy to run machines. [from FOSS overview]</td>
<td>Visual aids SDAIE</td>
<td>chemistry mixture solution</td>
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<tr>
<td>• Over the next X weeks, we will be studying mixtures and solutions to introduce you these important ideas in chemistry.</td>
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**Goals for today:**
- Today we will learn about separating mixtures based on the properties of substances

**Lesson preview**
- During today’s lab, you will be doing three things:
  - Make observations about three materials when they are dry
  - Make observations about these materials when you mix them with water
  - Try to separate these mixtures with filters
- We will be doing these activities to answer the question: Question of the day: “How do you separate mixtures based on the properties of substances?”
- After the lab, we will discuss our observations and what we learned from our investigation

**What do learners know about the subject already? (pre-assessment)**
- Different types of matter have different properties. *Properties of matter include things like* weight, height, how big it is, density, color, transparency, hard/soft) ELD: *property* in science has a different meaning from the everyday meaning (land, something you own).
- What is a *mixture*? [Use Visual Aid] [a substance containing two or more materials with different properties.]
  - Who had cereal and milk this morning for breakfast? [mixture]
  - Who eats salad? [that’s a mixture too!]
- [CX] Can you think of some mixtures you have seen or used at home? [Think-pair-share] [steel (carbon+iron), bronze (copper+tin), salad dressing, potting mix, cement, trail mix, burrito, sandwich]
- Separate means [verb: to divide into parts] What are some things you separate?

Go over the lab rules
Go over the three lab activities
### 2. Investigate & Discuss Data (~50 minutes)

**Part 1. Observing the physical properties of three materials**

Introduce three materials that will be observed: gravel [collection of small, rounded stones or pebbles], diatomaceous earth [a very fine powder made from the fossils of diatoms, a small hard-shelled single-cell organism; connect to greek root diatom [single celled organism] and latin suffix –aceous [like, similar to, full of]]; and sodium chloride [common table salt]

Students make observations and collect data, using recording sheet
Circulate around the room, engage in instructional conversations, collect formative assessment data

Whole class: Review data from part 1 - observing the physical properties of three materials. What properties did you observe for gravel? for the diatomaceous earth? for the sodium chloride?

[Listen for claims or inferences that students make that rely on information other direct observation]

**Part 2. Observing the physical properties of three materials when water is added**

Notebook set up for predictions and observations
Whole class: Elicit predictions from students:
What do you think will happen when you add water to the gravel? to the diatomaceous earth? to the sodium chloride?

Students make observations and collect data
Circulate around the room, engage in instructional conversations, collect formative assessment data
Whole class: Review data from part 2 - observing the physical properties of three materials. What happened? What changed? What remained the same? What happened to the salt?

[CX] What happens when you add water to a drink mix like hot cocoa?

**Part 3. Separating mixtures with filters**

- What is a **filter**? [noun: something you use to separate mixtures] [Use Visual Aid] [Bring in screens, coffee filter, colander] Can you give some more examples of filters? [tea bags, aquarium filter, air filter]
- [CX] Have you ever used a filter outside of school, or seen a filter being used?

Whole class prediction: What do you think will happen when you use a screen to filter the gravel and water mixture? the powder and water mixture? the salt and water mixture?

Students make observations and collect data
Circulate around the room, engage in instructional conversations, collect formative assessment data
Repeat predictions, observations and data collection using the paper filter
Whole class: Review data from part 3 - separating mixtures with filters
What happened when you tried to filter the gravel and water mixture? the powder and water mixture? the salt and water mixture?

Discuss what happened with the salt mixture
3. Sense making and lesson closure (~15 minutes)
Ask students to talk to their partner about what they learned today. (I learned that …)
Whole class discussion:
- What is a mixture?
- How do you separate mixtures?
Ask students to write in their science notebooks a few sentence about what they learned today (I learned that …)
Review key science ideas:
+ all matter has physical properties that can be observed or measured
+ a mixture is something combining two or more materials with different properties
+ You can separate some mixtures using a filter
Preview the next science lesson by posing questions: why couldn’t we filter the sodium chloride mixture? What do you think we call mixtures that can’t be filtered?

| IC Vocab | mixture separate filter |
| Lit Vocab | |

6. Related Resources
Full Option Science System (FOSS), California Edition, Mixtures and Solutions Unit for 5th Grade
http://www.fossweb.com/teacher-home