

**Discipline:** Science and Technology

**Standards Category:** Physical Science, Chemistry and Physics

**Lesson Focus:** Composition of matter

<b>PA Standard(s):</b>	<b>Related TESOL Standard(s):</b>
3.4.12A: Apply concepts about the structure and properties of matter	Goal 2: To use English to achieve academically in all content areas. Standard 2: Students will obtain, process, construct, and provide subject matter information in spoken and written form.

**Key Objectives in Accordance with TESOL Level:**

<b>Pre-Conversational/ Beginning</b>	<b>Intermediate</b>	<b>Advanced</b>
Students will be able to: <ul style="list-style-type: none"><li>• Distinguish between substances and mixtures by using Total Physical Response (TPR).</li><li>• Differentiate between solutions, colloids and suspensions using TPR.</li><li>• Classify objects as an element, a compound, and a heterogeneous or homogeneous mixture with labels.</li></ul>	Students will be able to: <ul style="list-style-type: none"><li>• Distinguish between substances and mixtures by creating a concept map.</li><li>• Differentiate between solutions, colloids and suspensions.</li><li>• Classify objects as an element, a compound, and heterogeneous or homogeneous mixtures by recording in the Science learning log.</li></ul>	Students will be able to: <ul style="list-style-type: none"><li>• Distinguish between substances and mixtures with written explanation of their differences.</li><li>• Differentiate between solutions, colloids and suspensions and describe particular uses.</li><li>• Classify objects as an element, a compound, or homogeneous mixture and record in the Science Learning Log.</li><li>• Explain in writing the difference among elements, compounds and mixtures.</li><li>• Write an expository piece on the process of milk homogenization.</li></ul>

**Suggested Level:**  
High School

**Lesson Focus:**  
Composition of matter

**Teaching Strategies:**  
Whole group instruction

**Assessment Strategies:**  
Label

Learning logs

Chart

Expository writing

**Materials:**

1. Vocabulary list and labels including the following words
  - a. Element = copper
  - b. Compounds = sugar
  - c. Substance = element or compound
  - d. Heterogeneous mixture = unevenly mixed solution ex: pizza
  - e. Homogeneous mixture = evenly mixed solution ex: salt water
  - f. Solution = homogenous mixture = vinegar
  - g. Colloid = heterogeneous mixture ex: mayonnaise
  - h. Suspension = heterogeneous mixture with settling particles ex. Italian salad dressing

*Include a visual representation or real item for each vocabulary word for the beginning and intermediate ELL*
2. Copper foil
3. Package of salt
4. Piece of solder
5. Aluminum foil
6. Chalk or baking soda
7. Piece of granite
8. Vile of sugar water
9. Science Learning logs
10. Observation and data chart

**Procedures:** (ESL Suggestions in Italics)

1. In the previous class mix in a paper cup 10 g of crushed calcium carbonate tablets, 20 g of sand, 30 g of small, clean rocks and 5 g of water. Let it sit over night.
2. In their Science learning log students describe the state and appearance of the mixture. *Beginning ELL students may draw. Provide them with simple vocabulary words that they may use to label in their journal. Such as powder, liquid, water, the appropriate color*
3. Observe in the next class the state of the mixture. It is now concrete.
4. Introduce the concepts of elements and compounds by using physical examples (refer to materials list) *Place vocabulary labels with the physical examples to aid the ELL*
5. Display examples of mixtures that homogeneous and heterogeneous (refer to materials list)
6. Present examples of a colloid (mayonnaise) and a suspension Mixture (salad dressing), distinguish the difference between the non-settling and settling particles.
7. Complete the Data and Observation Charts to identify and classify the items 2-8 of the materials list. Partner a beginning ELL with an advance or high intermediate *so they can work together to classify the physical items. Beginning students can point to the correct label to demonstrate understanding*

## **Assessments:**

### **Beginning**

1. Provide the students with visuals or realia of elements and compounds and instruct them to display the label that it correctly represents. Substitute different visuals other than the ones used during the lesson to test for understanding. Ex: elements = silver, titanium, nickel Compounds = water, air, multi-vitamins
2. Offer a variety of realia mixtures that represent solutions, colloids and suspensions. Instruct the students to point to the label that correctly represents the mixture.

#### **Examples:**

**Solutions** = cold syrup, soda, mouthwash

**Colloids** = gelatin, peanut butter, catsup, shaving crème

**Suspension** = orange juice with pulp, vinaigrette dressings, thin salsa

Further differentiate by pointing to the difference between homogeneous and heterogeneous mixtures.

3. Use the learning log to illustrate and label 3 items found in their home refrigerator that are any type of solution.

### **Intermediate**

1. Create a concept network map to reveal their understanding of Elements, compounds, solutions, and heterogeneous and homogeneous mixtures including colloids and suspensions.
2. Record in their learning log examples of items found at home that represent elements, compounds, solutions, colloids and suspensions.
3. Make list of all the liquids consumed or used in one day and classify them as a solution, colloid or a suspension.

### **Advanced**

1. Describe in the learning log the differences among elements compounds, and mixtures.
2. Create list of homogeneous and heterogeneous mixtures and determine if they are colloids are a suspension.
3. Research to discover what part of milk is homogenized and write an expository piece on the process.

# Composition of Matter

## Data and Observation Chart

Names: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

<b>Object</b>	<b>Identity</b>	<b>Classification</b>
<b>1. Copper foil</b>		
<b>2. Package of salt</b>		
<b>3. Piece of solder</b>		
<b>4. Aluminum foil</b>		
<b>5. Chalk</b>		
<b>6. Piece of granite</b>		
<b>7. Vile of sugar water</b>		

## Social Studies

<b>Title</b>	<b>PA Academic Standard(s)</b>	<b>Organizational Level</b>	<b>Suggested Grade Level</b>
Following rules	5.2.3A, B	Primary	K
Conflict resolution	5.2.3C	Primary	1
Leadership	5.2.3D	Primary	2-3
Elections	5.3.3E, F	Intermediate	4
Location of places	7.1.3B	Intermediate	5
The branches of the federal government	5.3.9B	Middle	6
Cultural diffusion	7.3.9B	Middle	7-8
Understanding timelines	8.1.9A	Middle	7-8
U.S. – Russian relations	5.4.12C	High School	9
Famous individuals in U.S. History	8.3.12A	High School	10
Regional conflict and cooperation	8.4.12D	High School	11
Global economy and trade agreements	6.4.12C	High School	12