

### GED 2002 Teachers' Handbook of Lesson Plans

Content Area Science	Lesson Title <i>Mixing in the Kitchen</i>	Correlation to Framework 03.01/03.04	Lesson Number 41
<p><b>Objectives/Learner Outcomes</b></p> <p>At the end of this lesson, the learner will be able to:</p> <ul style="list-style-type: none"> <li>• Understand that solutions, suspensions, colloidal dispersion, and emulsions are all types of mixtures</li> <li>• Identify examples of different types of mixtures</li> <li>• Identify characteristics of a mixture, solution, suspension, emulsion, and colloidal dispersion</li> </ul>		<p><b>Materials/Resources/Internet Sites/Handouts/Worksheets</b></p> <ul style="list-style-type: none"> <li>• Handout – <b>Types of Mixtures</b></li> <li>• Handout – <b>Mixture Concentration Game</b></li> <li>• Handout – <b>To Dissolve or Not to Dissolve – That is the Question?</b></li> <li>• Handout – <b>Mixtures and Solutions Experiments</b></li> <li>• Handout – <b>Mixtures in the Kitchen - Recipes</b></li> <li>• Internet Resources               <ul style="list-style-type: none"> <li>○ Brain Pop <a href="http://www.brainpop.com">http://www.brainpop.com</a> (Movies) Compounds and Mixtures</li> <li>○ Physical and Chemical Changes <a href="http://www.iit.edu/~smile/ch9312.html">http://www.iit.edu/~smile/ch9312.html</a></li> </ul> </li> </ul>	
<p><b>Pre-Requisite Knowledge</b></p> <p>The learner should be able to:</p> <ul style="list-style-type: none"> <li>• Compare and contrast information</li> <li>• Perform basic science experiments</li> <li>• Make predictions</li> </ul>		<p><b>Key Words</b></p> <ul style="list-style-type: none"> <li>• Mixture</li> <li>• Solution, solute, solvent</li> <li>• Suspension, globules</li> <li>• Colloidal dispersion</li> <li>• Emulsion</li> <li>• Homogeneous</li> <li>• Heterogeneous</li> <li>• Insoluble</li> <li>• Soluble</li> <li>• Saturated</li> </ul>	
<p><b>Anticipatory Set/Introduction</b></p> <p>Most foods, drinks, and even cosmetics are mixtures of one type or the other. They are made of different substances that when put together create something that may look, smell, taste, or feel totally different from their original parts. Many of the substances that we use are solutions. Today, we are going to take a general look at the different types of mixtures and then focus on solutions.</p>			

### Preview Questions for Lesson

- What is a mixture? Have students provide their own definition and give an example. List examples on the board.
- What is the difference between a mixture and a solution?

### Instructional Outline

Before beginning this lesson, you may wish to review information on mixtures by accessing the following website which provides an excellent overview of the different types of mixtures and examples of each. Saskatchewan Learning, Science 10 Learning Resources, Saskatchewan, Canada at: [http://www.saskschools.ca/curr\\_content/science10/index.html](http://www.saskschools.ca/curr_content/science10/index.html) (Unit A). Provide students with a copy of the Handout – **Types of Mixtures**. Review the vocabulary terms with students so they have a clear understanding of each. Review the examples of each type of mixture with students. See if they can list even more examples from items that they may have in their kitchens.

Use the template to set up the **Mixture Concentration Game**. You will need one set per team of students. Cut out the individual pieces and set them up for students. Have students play the **Mixture Concentration Game** where they will match the type of mixture with an example.

Provide students with a copy of the Handout – **To Dissolve or Not to Dissolve – That is the Question!** Have students work in teams and determine the solubility of various substances. Have students record their results.

As a group, use some of the recipes provided on the handout and create the various types of mixtures. You may elect to do one or two of the recipes and then encourage students to do others at home.

### Process/Activities

During this lesson, students will:

- Read about the types of mixtures and learn basic vocabulary
- Play the **Mixture Concentration Game**
- Classify mixtures according to type
- Conduct experiments and create their own mixtures and determine whether given substances are soluble or insoluble in water

### Product/Evaluation/Summary

When students have completed this lesson, they will provide the teacher with:

- a completed mixture classification worksheet; and
- the results of their experiments to create mixtures and determine solubility of substances in water.

<b>Teaching to Different Types of Learners</b>			
	<b>Visual</b>	<b>Auditory</b>	<b>Kinesthetic/Tactile</b>
<b>Learning Activity</b>	Provide written instructions for the activity.	Provide oral instructions to ensure students understand what is expected of them.	Have students skim through each paragraph to get a rough idea of what the paragraph is about before reading for details.
<b>Special Differentiation Strategies</b>	Put the vocabulary words on the overhead so students can follow along as you discuss each.  Provide the students with highlighters so they can underline important points in the handout.	Have students watch and listen to a cooking demonstration either on television or by having a local chef visit the class and discuss how he/she uses various types of mixtures to create different foods.	Have a chef visit the class and lead the students through a basic cooking demonstration, such as making salad dressings.
<b>Evaluation</b>	Have students write down their own recipes for creating different types of mixtures, such as their own recipe for salad dressing, jello, etc.	Have students taste different types of mixtures, such as the sugar and water, vinegar and water, salad dressing, mayonnaise, etc., and explain the differences in taste and texture.	Have students create their own recipes and share them with the class. They can prepare items at home and bring them into class. Have them discuss the steps needed to prepare their recipe and whether it involved mixtures, solutions, suspensions, etc.
<b>The Family and Adult Literacy Connection</b>  Have parents complete some of the same experiments in their own kitchens with their children and record their results. Provide students with a copy of the <b>Mixture Concentration Game</b> so that they can play with their children at home. This will help reinforce the learning for the adult and provide their children with real-life science application.		<b>ESE/ESOL Accommodations</b>  Students with disabilities may be overwhelmed if provided with too much information at one time. Break down the experiments into smaller segments. Take more time to discuss the various types of mixtures with students so that they have a clear understanding. Have students explain to you the necessary steps in the experiments to ensure that they understand what is expected of them.	

## GED 2002 Teachers' Handbook of Lesson Plans

### Types of Mixtures

A mixture consists of two or more pure substances. There are two terms that are generally used when describing mixtures.

- **Homogeneous** – meaning that the mixture looks the same throughout. Example: a cup of coffee with sugar.
- **Heterogeneous** – meaning that you can see more than one color or type of matter in a mixture. Example: vegetable soup.

There are several types of mixtures. It is important to understand the characteristics of each type of mixture.

- **Solutions** are mixtures made by mixing a solute and a solvent. The **solute** is the substance that dissolves. The **solvent** is the substance that causes the solute to dissolve. Solutions are homogeneous. An example of a solution would be coffee or tea with sugar. The sugar is the solute and the coffee or tea is the solvent. The sugar dissolves in the coffee or tea and the mixture looks the same throughout.
- **Suspensions** are mixtures in that combine a solid and a liquid. The solid does not dissolve. The solid will separate from the liquid when left standing. Suspensions are heterogeneous. An example of a suspension is sand and water. When mixed, the sand is suspended in the water, but it will settle to the bottom of the container when left alone.
- **Emulsions** are a type of suspension. They are heterogeneous. Emulsions consist of two liquids that do not mix. Emulsions will settle into layers when they are left standing alone. An example of a suspension is Italian salad dressing. The salad dressing is a mixture of oil, water, and other spices.
- **Colloidal dispersions** are mixtures that have characteristics like a solution and a suspension. They sometimes appear to be homogeneous, but are really heterogeneous. However, unlike a suspension, colloidal dispersions will not settle over time. An example of a colloidal dispersion is mayonnaise, which includes oil, vinegar, and an egg which is used to bind the mixture together.

Examples of Mixtures			
Solutions	Suspensions	Emulsions	Colloidal Dispersions
Salt and water	Soil and water	Oil and vinegar	Liquid laundry starch and water
Alcohol and water	Sand and water	Kerosene and water	Pottery clay and water
Sugar and water	Clay and water	Oil and water	Mayonnaise

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**Mixture Concentration**

<b>Suspension</b>	<b>Sand and Water</b>	<b>Mixture</b>	<b>Salad</b>
<b>Solution</b>	<b>Salt water</b>	<b>Emulsion</b>	<b>Oil and Water</b>
<b>Colloid</b>	<b>Mayonnaise</b>	<b>Homogeneous</b>	<b>Looks same throughout</b>
<b>Heterogeneous</b>	<b>Two substances are visible</b>	<b>Solute</b>	<b>Substance to be dissolved</b>
<b>Solvent</b>	<b>Substance that dissolves another substance</b>	<b>Soluble</b>	<b>Can be dissolved</b>
<b>Insoluble</b>	<b>Substance that cannot be dissolved</b>	<b>Suspension and Emulsion</b>	<b>Italian Salad Dressing</b>

## GED 2002 Teachers' Handbook of Lesson Plans

### Mixtures and Solutions Experiment

For this experiment you will need:

- Small jars, bowls, or small plastic bags that can be sealed
- Water
- Cooking oil
- Sand
- Sugar
- Baking soda
- Baking powder
- Vinegar
- Vanilla extract
- Dish detergent
- Molasses
- Hand or body lotion

#### Part I: Checking for Solubility

Try to dissolve each of the substances listed above in water. You do not need to use large amounts of water for these experiments. You will need no more than 1/4-1/2 cup of water and then a teaspoon or tablespoon of each substance.

Record whether each substance is insoluble or soluble. Organize your data in a table.

#### Part II: Creating Mixtures

Try mixing different combinations of the ingredients listed above. In some cases, you may need to shake the mixture rather than stir. Determine which of the items will create a solution.

1. 1 teaspoon of oil in a 1/4 cup of water
2. 1 teaspoon of sand in 1/4 cup of water (let stand for a few minutes)
3. 1 1/2 teaspoons of molasses in a 1/2 cup of water
4. 1 teaspoon of sugar in 1/2 cup of water
5. 1 teaspoons of baking soda in 1/2 cup of water
6. 1 teaspoon of baking powder in 1/2 cup of water
7. 1 teaspoons of vinegar in 1/2 cup of water
8. 1 teaspoon of vanilla extract in 1/2 cup of water
9. 1 teaspoon of dish detergent in 1/2 cup of water
10. 1 teaspoon of lotion in 1/2 cup of water

## **GED 2002 Teachers' Handbook of Lesson Plans**

### **Emulsions in the Kitchen**

#### **Vinaigrette**

##### Ingredients

- 2 tablespoons oil
- 1 tablespoon vinegar
- Salt and Pepper
- Paprika (if desired)

Pour ingredients in a small jar; shake until mixed well.

#### **Mayonnaise**

##### Ingredients

- 2 egg yolks
- 1 cup oil
- 1 teaspoon Dijon mustard
- 1 tablespoon vinegar
- Salt and pepper as desired

Mix the eggs with the mustard and seasoning

Pour the oil gradually into the yolks while beating. As the oil is incorporated, the mayonnaise will begin to rise. Make sure it is firm before adding the vinegar.

#### **Balsamic Vinaigrette**

##### Ingredients

- 1 tablespoon olive oil
- scant cup of vegetable oil
- 2 tablespoons red wine vinegar
- 2 tablespoons balsamic vinegar
- 1-1/2 Tablespoons light brown sugar
- salt and pepper

Place all ingredients in a jar, seal tightly and shake until the sugar has dissolved.