Module 10: Solutions
Topic 1 Application: Observing Mixtures Scientific Investigation

Before you begin the scientific investigation below, make sure to download the *Observing Mixtures Scientific Investigation Report*. As you complete this scientific investigation, fill in any needed information on the report template. If you need more information about each section of the report, please visit the Developmental module.

Introduction

Observing a solution is a simple task. You have learned that mixtures are divided by particle size. Solutions have the smallest particle sizes, colloids are in between, and suspensions have the largest particle size. In this activity, you will observe a solution and test for the Tyndall Effect.

Objectives

In this scientific investigation, you will:

- observe different solutions; and
- test different solutions for the Tyndall Effect.

Hypothesis

Using the Procedure and Data Collection section below, read through the procedural information for this scientific investigation. Based on your understanding of the procedure, develop your own hypotheses which describe your expected results. You should consider the following question: Which mixtures will exhibit the Tyndall Effect? How will the mixtures differ? Record these hypotheses in the Hypothesis section of your *Observing Mixtures Scientific Investigation Report*.

Equipment and Materials

- 1 small cup or beaker
- A spoon or stirring rod
- 1 teaspoon of salt
- Dirt or soil
- Cooking oil
- 1 package plain gelatin
- Flashlight or headlamp

Procedure

1. Fill the beaker or cup with 50 mL or ½ cup of water.
2. Add about 1 teaspoon of salt to the water and use the spoon or stirring rod to stir well.
3. Examine the mixture. Record any observations.
4. Use the flashlight or headlamp to shine light into the mixture to see if it displays the Tyndall Effect. Record any observations in the data table on your *Observing Mixtures Scientific Investigation Report*.
5. Empty the solution into a waste collection bin or chemical sink.
6. Repeat steps 1-5 by adding 1 teaspoon of dirt (soil). Record any observations in the data table on your *Observing Mixtures Scientific Investigation Report*.

7. Repeat steps 1-5 by adding 1 teaspoon of cooking oil. Record any observations in the data table on your *Observing Mixtures Scientific Investigation Report*.
8. Repeat steps 1-5 by adding 1 package of plain gelatin to the water. Record any observations in the data table on your *Observing Mixtures Scientific Investigation Report*.

Data

Use the data table provided on your *Observing Mixtures Scientific Investigation Report* to record your data from this scientific investigation. The data table is also shown below.

	Salt	Soil	Oil	Gelatin
Observations				
Did the mixture exhibit the Tydnall Effect?				

Data Analysis

In the Data Analysis section of your *Observing Mixtures Scientific Investigation Report*, provide the responses to the following questions:

1. What is the difference between a heterogeneous and homogeneous mixture?
2. Why did certain solutions exhibit the Tyndall Effect when others did not?
3. Was each mixture a solution, suspension, or colloid?

Conclusion

Using the Conclusion section of your *Observing Mixtures Scientific Investigation Report*, compose three to four sentences describing an overall conclusion about the Tyndall Effect in the solutions you observed. Base your conclusions on your data. Were your hypotheses true or false, and how do you know? Use the data and notes that you collected from your experiment to form your conclusion. Make sure that your include information that your gained from data analysis to support your conclusion.

Experimental Sources of Error

On your *Observing Mixtures Scientific Investigation Report*, provide responses to the following questions: Are there any sources of error? If so, what are they, and what could be done to minimize error?

Once you have completed the *Observing Mixtures Scientific Investigation Report*, please submit your work to the dropbox.