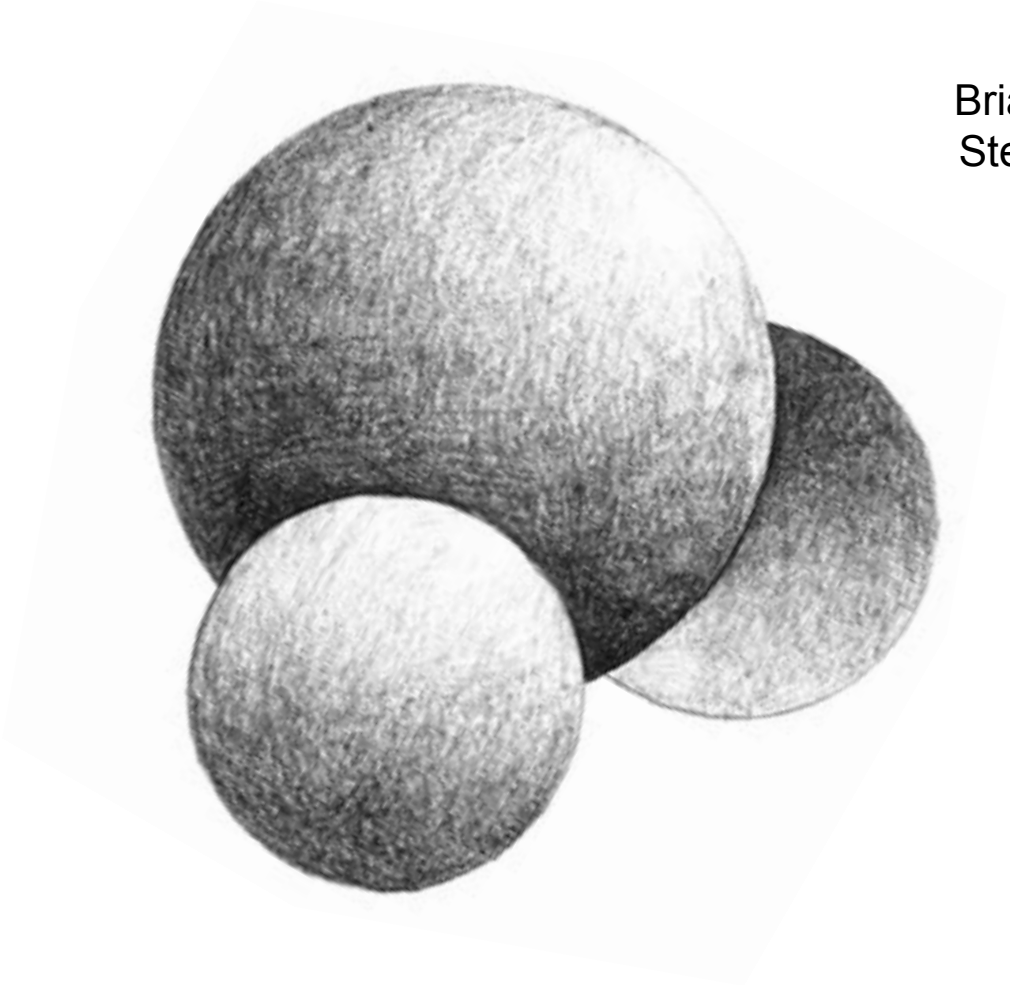
Elements, Compounds and Mixtures

Teacher's Guide
Middle School



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ISBN 1-59234-097-0

Table of Contents

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A Message from our Company . . .

Dear Educator:

Thank you for your interest in the educational videos produced by the Visual Learning Company. We are a Vermont-based, family owned and operated business specializing in the production of quality educational science videos and materials.

We have a long family tradition of education. Our grandmothers graduated from normal school in the 1920's to become teachers. Brian's mother was an elementary teacher and guidance counselor, and his father was a high school teacher and superintendent. This family tradition inspired Brian to become a science teacher, and to earn a Ph.D. in education, and led Stephanie to work on science educational programs at NASA.

In developing this video, accompanying teacher's guide, and student activities, our goal is to provide educators with the highest quality materials, thus enabling students to be successful. In this era of more demanding standards and assessment requirements, supplementary materials need to be curricular and standards based - this is what we do!

Our videos and accompanying materials focus on the key concepts and vocabulary required by national and state standards and goals. It is our mission to help students meet these goals and standards, while experiencing the joy and thrill of science.

Sincerely,

Brian and Stephanie Jerome

National Standards Correlations

National Science Education Standards

(Content standards: 5-8, National Academy of Sciences, c. 1996)

Physical Science - Content Standard B:

As a result of their activities in grades 5-8, all students should develop an understanding that:

- A substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample. A mixture of substances can often be separated into the original substances using one or more of the characteristic properties.
- Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties. In chemical reactions, the total mass is conserved. Substances often are placed in categories or groups if they react in similar ways; metals are an example of such a group.
- Chemical elements do not break down during normal laboratory reactions involving such treatments as heating, exposure to electric current, or reaction with acids. There are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for the living and nonliving substances we encounter.

Benchmarks for Science Literacy

(Project 2061 – AAAS, c. 1993)

The Physical Setting - Structure of Matter (4D)

By the end of 8th grade, students should know that:

- All matter is made up of atoms, which are far too small to be seen directly through a microscope. The atoms of any element are alike but are different from atoms of other elements. Atoms may stick together in well-defined molecules or may be packed together in large arrays. Different arrangements of atoms into groups compose all substances.
- Atoms and molecules are perpetually in motion. Increased temperature means greater average energy of motion, so most substances expand when heated. In solids, the atoms are closely locked in position and can only vibrate. In liquids, the atoms or molecules have higher energy of motion, are more loosely connected, and can slide past one another; some molecules have still more energy of motion and are free of one another except during collisions.

Student Learning Objectives

Upon viewing the video and completing the enclosed student activities, students will be able to do the following:

- Describe an atom as the smallest possible piece of a pure substance that still has the properties of that substance.
- Cite the definition of the term “element” and provide several examples of elements.
- Explain the importance of compounds, and generally describe how compounds are formed when two or more elements chemically combine.
- Create a diagram of a water molecule, consisting of two hydrogen atoms and one oxygen atom.
- Describe the characteristics of mixtures, and provide an example of a common mixture.
- Differentiate between a homogeneous mixture and a heterogenous mixture. Cite an example of each of these mixtures.
- Explain the characteristics of a colloid, and provide an example of a colloid.
- Describe the characteristics of a suspension, and provide an example of a suspension.
- Define a solution as a type of homogeneous mixture in which the components are evenly mixed.
- Differentiate between the solute and the solvent in a solution.
- Describe some of the factors which affect the rate of solubility of a solute in a solvent.

Assessment

Preliminary Assessment:

The Preliminary Assessment, provided in the Student Masters section, is an assessment tool designed to gain an understanding of students' pre-existing knowledge. It can also be used as a benchmark upon which to assess student progress based on the objectives stated on the previous pages.

Video Review:

The Video Review, provided in the Student Masters section, can be used as an assessment tool or as a student activity. There are two main parts. The first part contains questions that can be answered during the video. The second series of ten questions consists of a video quiz to be answered at the conclusion of the video.

Post Assessment:

The Post Assessment, provided in the Student Masters section, can be utilized as an assessment tool following student completion of the video and student activities. The results of the Post Assessment can be compared against the results of the Preliminary Assessment to evaluate student progress.

Introducing the Video

Before viewing the program, gather together examples of elements, compounds, and mixtures. Examples of elements which are easy to find include a piece of copper wire, or aluminum flashing. Examples of compounds might include water, salt, baking soda, or vinegar. Examples of mixtures might include milk, granite, salad dressing, or toothpaste. Place one or more examples of an element, compound, and mixture on a table in front of the class. Ask the class to describe and identify each substance.

Next, tell the students that these substances are quite different from each other. Ask them how they think the substances are different from each other. Write their answers on the board. Explain to students that these materials can be categorized based on whether they are elements, compounds, or mixtures. Write the definition of each of these terms on the board. Now ask students to figure out which of the substances are elements, compounds, and mixtures. Ask them to explain their rationale for categorizing the substances. Explain to students that they use many different examples of elements, compounds, and mixtures everyday. Tell students to pay close attention to the program to learn more about the fascinating characteristics of elements, compounds, and mixtures.

Video Viewing Suggestions

The student master “Video Review” is provided for distribution to students. You may choose to have your students complete this master while viewing the program or to do so upon its conclusion.

The program is approximately 20 minutes in length and includes a ten question video quiz. Answers are not provided to the Video Quiz on the video, but are included in this teacher’s guide. You may choose to grade student quizzes as an assessment tool or to review the answers in class.

The video is content-rich with numerous vocabulary words. For this reason you may want to periodically stop the video to review and discuss new terminology and concepts.

Video Script: Elements, Compounds, and Mixtures

1. Look around you for a few seconds. What do you see?
2. Perhaps you see the inside of a building including windows and doors.
3. Maybe you see desks and chairs.
4. Or, maybe you see books, papers, pencils, and pens.
5. Perhaps you even see other people.
6. Have you ever wondered what all these things are made of?
7. Or, have you ever wondered what makes something like this piece of wood. . .
8. . . . different from this piece of copper wire?
9. What is the difference between ocean water. . .
10. . . . and lake water?
11. During the next few minutes we are going to explore many of these questions and others. . .
12. . . . as we examine some of the fascinating characteristics of elements, compounds, and mixtures.
13. **Graphic Transition – Small Particles**
14. This is a piece of copper flashing.
15. It is sometimes used on roofs to help protect wood underneath it.
16. Let us cut it in half, then cut it in half again, and then cut it in half again.
17. **You Decide!** If it were possible to continue to cut the copper in half, what is the smallest possible piece that we could make?
18. The smallest possible piece is an atom. What is an atom?
19. An atom is the smallest possible piece of a pure substance that still has the properties of that substance.
20. Atoms are the building blocks of matter.
21. All matter, including the human body is made up of atoms.
22. Over hundreds of years, scientists have worked hard to try to understand the characteristics of matter. This is a simplified diagram of an atom magnified millions of times.
23. One of the many things scientists discovered is that there are many different kinds of atoms. They also learned that the characteristics of matter are determined by the kinds of atoms that are in a specific type of matter.
24. A substance or a piece of matter that is made up of just one kind of atom is called an element.

Script: (cont.)

25. Let us take a closer look at elements.
26. Graphic Transition - Elements
27. What does this piece of gold. . .
28. . . . this helium gas filling this balloon. . .
29. . . . and this piece of aluminum have in common?
30. That is right, they are all elements.
31. An element is often thought of as a pure substance because it is made up of just one kind of atom. This piece of aluminum is an element and is made up of aluminum atoms.
32. If we could zoom in on the aluminum atoms in this piece of aluminum, they would all look something like this.
33. And, if we could zoom in on the helium atoms inside this balloon, they would all look something like this.
34. There are over 100 known elements on Earth. Some of these elements occur naturally.
35. And some of these elements are made up by people in laboratories.
36. Keep in mind that different elements are made of different atoms which have different structures.
37. And, elements cannot be changed into a simpler substance.
38. For example, if you were to smash this piece of iron into smaller pieces, or. . .
39. . . . heat it, it is still the element iron.
40. Graphic Transition – Compounds
41. While there are many different elements, a pure form of an element, like sulfur, is rare in nature.
42. Instead, elements are more commonly found linked to other elements.
43. Two or more elements chemically combined form a compound.
44. A compound is matter made of atoms of two or more elements that are chemically bound together.
45. There are millions of compounds on Earth.
46. Many of these compounds are found in living things.
47. And, many are found in non-living things such as these rocks.
48. Most of the foods we eat are made up of chemical compounds.
49. And most of the clothes we wear are made of compounds.
50. Water is a very common compound found most places on Earth.
51. Our bodies need water to survive. . .
52. . . . and we use it for all kinds of things.
53. You Decide! What atoms make up water?

Script (cont.)

54. Water is made up of two hydrogen atoms and one oxygen atom.
55. These atoms combine to form the compound known as water.
56. The smallest piece of water is called a molecule.
57. A molecule is the smallest particle of a compound that still has all the properties of the compound.
58. Molecules are made up of two or more chemically bonded atoms.
59. A water molecule is made up of two hydrogen atoms and one oxygen atom.
60. Graphic Transition – Mixtures
61. Look closely at the salad dressing in this bottle. Notice how there are many different types of things in it.
62. Look at the particles of sand on this beach. Notice how there are many different types of particles that make up the sand.
63. You Compute! How many different ingredients can you identify in this breakfast cereal?
64. There are four different ingredients including oats, sunflower seeds, raisins, and pumpkin seeds.
65. All of these are examples of mixtures. A mixture is matter that consists of two or more substances mixed together but not chemically combined. Unlike a compound, the components in a mixture do not combine chemically and therefore can be separated.
66. In a mixture, each of the different substances maintains its own properties.
67. In vegetable soup, for example, there are many different vegetables including carrots, peas, and celery. Each maintains its individual taste. And when combined with the soup broth they form a mixture we know as vegetable soup.
68. Graphic Transition – Types of Mixtures
69. The rock in this cliff is a type of rock called granite.
70. A close inspection of granite often reveals several different types of minerals.
71. Granite is a mixture made of several different minerals.
72. You Observe! Do the minerals form a regular or irregular pattern?
73. You can see that the minerals form an irregular pattern.
74. A mixture that is not the same throughout is called a heterogeneous mixture.
75. A heterogeneous mixture such as concrete is not very well mixed compared to other types of mixtures. . .
76. . . . and you can see small pebbles and other particles scattered randomly throughout.
77. Oil and vinegar salad dressing is another example of a heterogeneous mixture. If left on the shelf, the oil and vinegar actually separate.
78. Does this toothpaste or. . .

Script (cont.)

79. . . . this grape juice look the same throughout? Yes, they do.
80. These substances are mixtures that appear the same throughout and are called homogeneous mixtures.
81. Substances such as whipped cream are special types of homogeneous mixtures called colloids.
82. Colloids, such as this gelatin, are mixtures in which particles are mixed together, but not dissolved.
83. Instead, the particles are suspended and do not settle out.
84. Colloids often appear cloudy and the particles in a colloid tend to scatter light that enters the mixture.
85. The particles are very small, but are large enough to reflect light.
86. In some mixtures, called suspensions, the particles found in the liquid are large and can settle out. Suspensions are heterogeneous mixtures with larger particles.
87. The water taken from this rushing river contains many particles of dirt and soil.
88. If a sample of the river water is allowed to sit still for several days, these particles settle to the bottom.
89. Many medicines are suspensions. There are directions written on the container to "Shake Well."
90. This is because particles often settle to the bottom over time, and need to become resuspended or redispersed before the medicine can be used.
91. Graphic Transition - Solutions
92. You Compare! What is the difference between ocean water and lake water?
93. Water in the ocean is saltwater, whereas. . .
94. . . . water in lakes is referred to as freshwater.
95. Both are examples of solutions.
96. A solution is a type of homogeneous mixture in which the components are evenly mixed.
97. In a solution one substance is always dissolved.
98. In the process of dissolving, particles of substances separate and spread evenly throughout a mixture.
99. With the case of powdered fruit drink. . .
100. . . . the water is the substance into which the powder is dissolved. The water is called the solvent.
101. And the powdered drink is called the solute.
102. It is very difficult to see the particles in the drink, making it hard to physically separate the solution.
103. Water can dissolve many things and is often referred to as the universal solvent.

Script (cont.)

104. In the case of saltwater, different kinds of salts are dissolved in water giving ocean water a uniform salty taste.
105. And freshwater is a solution containing many dissolved minerals such as iron.
106. Solutions do not necessarily have to be liquids.
107. There are many different kinds of solutions, and hundreds of different examples of each.

108. Graphic Transition – Solutions in Action

109. As we just discussed, many things can be dissolved in water.
110. Sugar, for example, is soluble in water.
111. Oil, on the other hand, is insoluble, and cannot be dissolved in water.
112. The amount of solute that can be dissolved in a solvent is referred to as solubility.
113. If we were to continue adding sugar to this container of water, it would eventually settle out at the bottom.
114. This is because the water can only dissolve so much solute. In other words, the water cannot hold any more sugar. At this point, the solution is said to be saturated.
115. A saturated solution holds all the solute it will dissolve at a certain temperature and pressure.
116. But, by increasing the temperature, for example, the solvent can often dissolve more solute.
117. Other factors affect the rate of solubility, including particle size and movement.
118. This is just a quick look at some of the complex nature of solutions.

119. Graphic Transition – Summing Up

120. During the past few minutes we have explored some of the fascinating features of elements, compounds, and mixtures.
121. We saw how matter is made up of tiny particles called atoms . . .
122. . . . and how matter is made up of different kinds of atoms.
123. We described an element as matter made up of just one kind of atom.
124. And, that an element cannot be changed into a simpler substance.
125. We explored how compounds are formed from two or more elements combining.
126. Water is an example of a molecule made up of two atoms of hydrogen and one atom of oxygen.
127. We saw how a mixture, such as this breakfast cereal, consists of matter that consists of two or more substances mixed together but not chemically combined.
128. We explored some different types of mixtures and their characteristics. . .
129. . . . including heterogeneous mixtures such as concrete. . .
130. . . . and homogeneous mixtures such as toothpaste.

Script (cont.)

131. We briefly discussed the characteristics of colloids. . .
132. . . . as well as another type of mixture called suspensions.
133. Finally, we briefly discussed some of the characteristics of solutions.
134. So, the next time you touch a piece of matter.
135. Brush your teeth with toothpaste.
136. Or mix up some powdered fruit drink; think about some of the things we have discussed the past few minutes.
137. You just might think about elements, compounds, and mixtures a little differently.

Fill in the correct word to complete the sentence. Good luck and let us get started.

1. _____ are the building blocks of matter.
2. An _____ is made up of just one kind of atom.
3. Water is an example of a _____.
4. A _____ is the smallest piece of a compound.
5. Vegetable soup is an example of a _____.
6. Concrete is an example of a _____ mixture.
7. A homogeneous mixture is _____ mixed.
8. Whipped cream is an example of a _____.
9. In a _____ one substance is dissolved.
10. Water is often called the universal _____.

Student Assessments And Activities

Assessment Masters:

- Preliminary Assessment
- Video Review
- Post Assessment

Student Activity Masters:

- Comparing Compounds
- Mixing Mixtures
- Vocabulary of *Elements, Compounds, and Mixtures*

Answers to Student Assessments

Preliminary Assessment (pgs. 20-21)

1. particles
2. atoms
3. element
4. compound
5. molecule
6. mixture
7. heterogeneous
8. homogeneous
9. solution
10. suspension
11. true
12. false
13. false
14. true
15. true
16. true
17. false
18. false
19. false
20. true

Video Review (pg. 22)

1. The smallest possible piece is an atom.
2. Two hydrogen atoms and one oxygen atom make up water.
3. There are four different ingredients including oats, sunflower seeds, raisins, and pumpkin seeds.
4. The minerals form an irregular pattern.
5. The water in oceans is salt water and water in lakes is fresh water. Both types of water are solutions.

Video Quiz (pg. 22)

1. atoms
2. element
3. compound
4. molecule
5. mixture
6. heterogeneous
7. well
8. colloid
9. solution
10. solvent

Post Assessment (pgs. 23-24)

1. false
2. true
3. true
4. true
5. true
6. false
7. false
8. true
9. false
10. false
11. element
12. particles
13. suspension
14. molecule
15. compound
16. atoms
17. homogeneous
18. mixture
19. solution
20. heterogeneous

Answers to Student Activities

Comparing Compounds (pgs. 25-27)

1. Iron has magnetic properties and sulfur doesn't have magnetic properties. Both are in solid form.
2. When in a mixture, the iron is drawn toward the magnet and the sulfur is not. The sulfur doesn't move toward the magnet unless the iron drags the sulfur with it.
3. The iron responded to the magnet.
4. It is possible to separate the iron and sulfur mixture into its individual parts. The iron could be drawn toward the magnet and lifted away from the sulfur.
5. The sulfur and iron mixture changed into a dark grey solid after it was heated. The compound was drawn to the magnet.

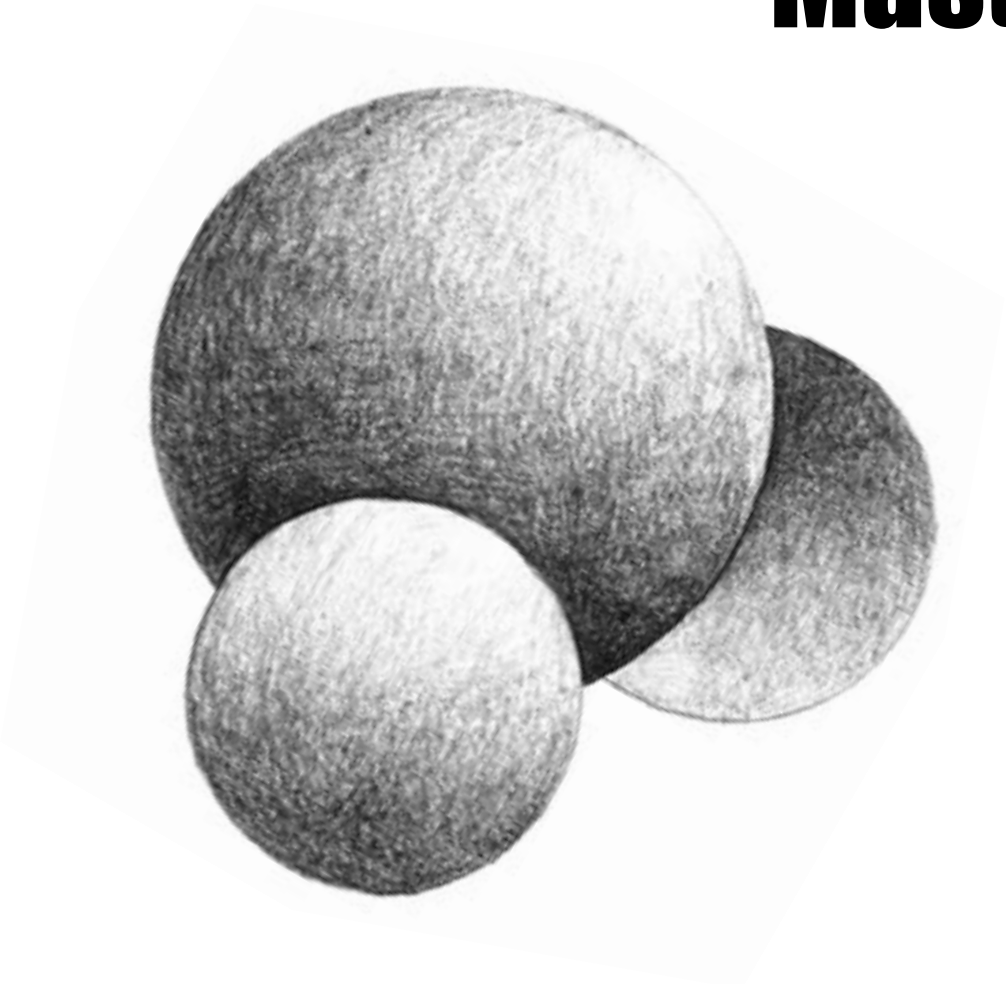
Mixing Mixtures (pgs. 28-29)

1. A homogeneous mixture is a mixture that is the same throughout. A heterogeneous mixture is a mixture that is not the same throughout. Heterogeneous mixtures are not as well mixed as homogeneous mixtures are.
2. The bean-rice-pea mixture was a heterogeneous mixture because it was not the same throughout. It was possible to see the three different ingredients by looking at the mixture.
3. Five possible examples of heterogeneous mixtures include: breakfast cereal, concrete, vegetable soup, oil and vinegar salad dressing, and rocks such as granite.
4. Both milk and the powdered fruit drink are homogeneous mixtures because they are the same throughout.
5. Five examples of homogeneous mixtures include: freshwater, saltwater, toothpaste, grape juice, and whipped cream.

Vocabulary (pg. 30)

1. b - solvent
2. f - heterogeneous
3. d - solution
4. e - colloid
5. i - water molecule
6. c - element
7. g - atom
8. h - homogeneous
9. j - solute
10. a - mixture

Assessment and Student Activity Masters



Name _____

Preliminary Assessment

Directions: Fill in the blank with the correct word. A list of possible answers is provided at the bottom of the page.

1. Matter is made up of tiny _____.

2. _____ are the building blocks of matter.

3. An _____ is made up of just one kind of atom.

4. Two or more elements chemically combined form a _____.

5. A _____ of water is made up of two hydrogen atoms and one oxygen atom.

6. Vegetable soup is an example of a _____.

7. A mixture that is not the same throughout is called a _____ mixture.

8. Seawater is an example of a _____ mixture because it is the same throughout.

9. In a _____ one substance is dissolved in another.

10. In a mixture called a _____ the particles are larger and can settle out.

atoms	mixture
compound	molecule
element	particles
heterogeneous	solution
homogeneous	suspension

Name _____

Preliminary Assessment

Directions: Decide whether the answer is True (T) or False (F).

11. The smallest part of an element is an atom. T F

12. Matter made up of just one kind of element is a compound. T F

13. There are less that 50 known elements on Earth. T F

14. Water is a common compound on Earth. T F

15. The components in a mixture do not combine chemically. T F

16. Oil and vinegar salad dressing is an example of a heterogeneous mixture. T F

17. A homogeneous mixture is not well mixed. T F

18. The particles in a suspension always remain suspended. T F

19. Water is often called the universal solute. T F

20. An increase in temperature and stirring often increase the rate of solubility. T F

Name _____

Video Review

Directions: During the course of the program, answer the questions as they are presented in the video. Answer the Video Quiz questions at the end of the video.

You Decide!

1. If it were possible to continue to cut the copper in half, what is the smallest possible piece we could make?

You Decide!

2. What atoms make up water?

You Compute!

3. How many different ingredients can you identify in this breakfast cereal?

You Observe!

4. Do the minerals form a regular or irregular pattern?

You Compare!

5. What is the difference between ocean water and lake water?

Video Quiz:

1. _____ are the building blocks of matter.

2. An _____ is made up of just one kind of atom.

3. Water is an example of a _____.

4. A _____ is the smallest piece of a compound.

5. Vegetable soup is an example of a _____.

6. Concrete is an example of a _____ mixture.

7. A homogeneous mixture is _____ mixed.

8. Whipped cream is an example of a _____.

9. In a _____ one substance is dissolved.

10. Water is often called the universal _____.

Name _____

Post Assessment

Directions: Decide whether the answer is True (T) or False (F).

1. There are less that 50 known elements on Earth. T F

2. The smallest part of an element is an atom. T F

3. An increase in temperature and stirring often increase the rate of solubility. T F

4. The components in a mixture do not combine chemically. T F

5. Water is a common compound on Earth. T F

6. Matter made up of just one kind of element is a compound. T F

7. The particles in a suspension always remain suspended. T F

8. Oil and vinegar salad dressing is an example of a heterogeneous mixture. T F

9. Water is often called the universal solute. T F

10. A homogeneous mixture is not well mixed. T F

Post Assessment

Directions: Fill in the blank with the correct word. Choose from the list of possible answers at the bottom of the page.

11. An _____ is made up of just one kind of atom.

12. Matter is made up of tiny _____.

13. In a mixture called a _____ the particles are larger and can settle out.

14. A _____ of water is made up of two hydrogen atoms and one oxygen atom.

15. Two or more elements chemically combined form a _____.

16. _____ are the building blocks of matter.

17. Seawater is an example of a _____ mixture because it is the same throughout.

18. Vegetable soup is an example of a _____.

19. In a _____ one substance is dissolved in another.

20. A mixture that is not the same throughout is called a _____ mixture.

atoms	mixture
compound	molecule
element	particles
heterogeneous	solution
homogeneous	suspension

Name _____

Comparing Compounds

Even though it doesn't seem possible our bodies, as well as this piece of paper, and the chair you are sitting on, are made up of millions of tiny particles. These particles are too small to be seen with the naked eye. In fact, millions of these particles would fit into the head of a pin! These tiny particles are called atoms. Atoms are often referred to as the building blocks of matter. An atom is the smallest part of an element that still has all the properties of that element. As you recall, an element is a pure substance which is made up of a single kind of atom. There are over 100 known elements on Earth.

Every time you drink a glass of milk, sprinkle salt on your food, and eat an apple you are eating chemical compounds. Almost everything we eat, touch, and see is made up of chemical compounds. But what exactly is a chemical compound? A compound is a substance that is made up of two or more elements that are chemically combined.

In this activity you will investigate some of the characteristics of both elements and compounds. Remember to use caution when performing the experiment in this investigation. Record your data neatly, and answer the questions at the conclusion of the activity.

Materials: safety goggles, iron filings, powdered sulfur, paper towel, magnet, plastic bag or plastic wrap, heat source (Bunsen burner or candle), test tube, test tube tongs, container with cold water

Directions:

1. Obtain a small amount of powdered sulfur. Place it on a piece of paper towel and carry it back to your desk.
2. Take a few minutes to make some observations about the element sulfur. Record your observations in the data table. What is its color? What does it feel like? Describe its texture. What does it smell like? Don't put your nose too close to it to smell it! Record your observations in the data table.
3. Use a plastic bag or plastic wrap to cover the magnet. Touch the covered magnet to the sulfur and record your observations.
4. Next obtain a small amount of iron filings and place them on a different paper towel. Carefully take them to your desk.
5. Take a few minutes to make some observations about the iron. Record your observations in the data table.
6. Draw the magnet toward the iron filings. Record your observations.

Comparing Compounds (cont.)

7. If iron filings have stuck to the magnet, wipe as many of them off as possible.
8. Mix the sulfur and iron. Record your observations. Also test the magnetic properties of the mixture and record your observations.
9. The next part of the activity will be conducted by your **teacher**.
    a. Your instructor will combine the sulfur and iron filings from several students in a test tube and mix them. The test tube will be about 1/3 to 1/2 full of the mixture.
    b. Next, your instructor will put on protective eye wear.
    c. He or she will then pick up the test tube with the test tube tongs.
    d. The test tube will then be heated over the flame of a Bunsen burner or candle for five minutes. **CAUTION: Care needs to be taken to point the open end of the test tube away from people!**
    e. After five minutes the test tube will immediately be immersed in cold water.
    f. If the test tube does not break, then it should be wrapped with paper towels and carefully broken with a heavy object.
    g. Carefully remove the contents while separating them from the pieces of glass.
10. With your sample of the sulfur iron compound, make some observations in the data table. Also test the magnetic properties of the sample with a magnet.
11. Answer the following questions.

Questions:

1. Compare and contrast some of the properties of sulfur and iron.

2. What were the properties of the sulfur and iron mixture and how did they differ from those of the separate elements?

3. What part of the mixture responded to the magnet?

4. Is it possible to separate the sulfur and iron mixture into its individual parts?

5. Discuss how the properties of the sulfur and iron mixture changed after it was heated.

Name _____

Comparing Compounds (cont.)

Data Table:

	Sulfur	Iron	Sulfur and Iron Mixture	Sulfur and Iron Compound After Heating
Color				
Texture and Feel				
Smell				
Magnetic Properties				

Name _____

Mixing Mixtures

Background: What do the following things have in common: vegetable soup, seawater, shaving cream, and sand on the beach? If you said that all these things are mixtures then you are correct. Mixtures are very important. We eat many mixtures such as salads, cereal, and vegetable soup to name just a few. What exactly is a mixture? A mixture is matter in which two or more substances are mixed together but not chemically combined. A vegetable salad is a mixture of lettuce, tomatoes, onions, carrots, mushrooms, and peppers. The ingredients do not chemically combine, but maintain their own properties.

There are thousands of different examples of mixtures. One way to group mixtures is based on how well mixed they are. Mixtures that do not appear to be the same throughout are called heterogeneous mixtures. Heterogeneous mixtures are the least mixed type of mixture. Vegetable soup, sand on the beach, and concrete are examples of heterogeneous mixtures. In heterogeneous mixtures it is often possible to see the different components in the mixture.

Mixtures that are well mixed are referred to as homogeneous mixtures. These types of mixtures appear the same throughout and it is difficult to see the individual components. Salt water found in the ocean contains many different minerals, salt, and water, yet it appears the same throughout. The air we breathe, which contains many different gases is also an example of a homogeneous mixture.

In this activity you will investigate the properties of both heterogeneous and homogeneous mixtures. You will do this by creating examples of these mixtures.

Materials: dried beans, rice, peas, sunflower seeds, cup, piece of granite, grape juice, water, powdered fruit drink, sugar, magnifying glass

Directions:

1. In a paper cup mix together dried beans, rice, peas, and sunflower seeds.
2. Describe the appearance of the mixture. Decide if it is well mixed or poorly mixed. Is it a heterogeneous or homogeneous mixture? Record your observations in the data table.
3. Obtain a piece of granite from your teacher. Describe its appearance. Use a magnifying glass for a closer examination of the rock. Decide if it is well mixed or not. Is it a heterogeneous or homogeneous mixture? Record your observations in the data table.
4. Your teacher will provide you with a glass of grape juice. Carefully examine the juice. Record your observations in the data table as you did for the other mixtures.
5. Pour a glass of cold water, then add a teaspoon of powdered fruit drink. Stir until the powdered fruit drink has dissolved. Next, add a teaspoon of sugar. Stir until the sugar has dissolved. Observe the drink. Record your observations in the data table.

Name _____

Mixing Mixtures (cont.)

Data Table:

Mixture description	Well mixed or not well mixed	Homogeneous or heterogeneous

Questions:

1. Describe the difference between a heterogeneous mixture and a homogeneous mixture.

2. How do you know the bean-rice-pea mixture was a heterogeneous mixture?

3. List five examples of heterogeneous mixtures.

4. How do you know that both grape juice and the powdered fruit drink are homogeneous mixtures?

5. List five examples of homogeneous mixtures.

Name _____

Vocabulary of Elements, Compounds, and Mixtures

Directions: Unscramble the vocabulary words in the first column. Match the words to the definitions in the second column.

____ 1. loevstn _____

____ 2. ehuosnegeoetr _____

____ 3. loonistu _____

____ 4. iollodc _____

____ 5. awtre ullecoem _____
_____

____ 6. tneeelm _____

____ 7. mato _____

____ 8. megheuosnoo _____

____ 9. osuelt _____

____ 10. txemrui _____

a. a substance in which two or more substances are mixed but not chemically combined

b. the substance that a solute is dissolved into

c. a substance made up of just one type of atom

d. the new substance that is formed when two or more elements are chemically combined

e. a mixture in which particles are mixed together but not dissolved

f. a type of mixture that is not well mixed and that can be separated into its original parts

g. the smallest possible piece of an element

h. a type of mixture that is well mixed and has a uniform composition

i. the smallest particle of the compound water

j. the substance that is dissolved into the solvent