

Measuring in Science

Teacher's Guide Middle School

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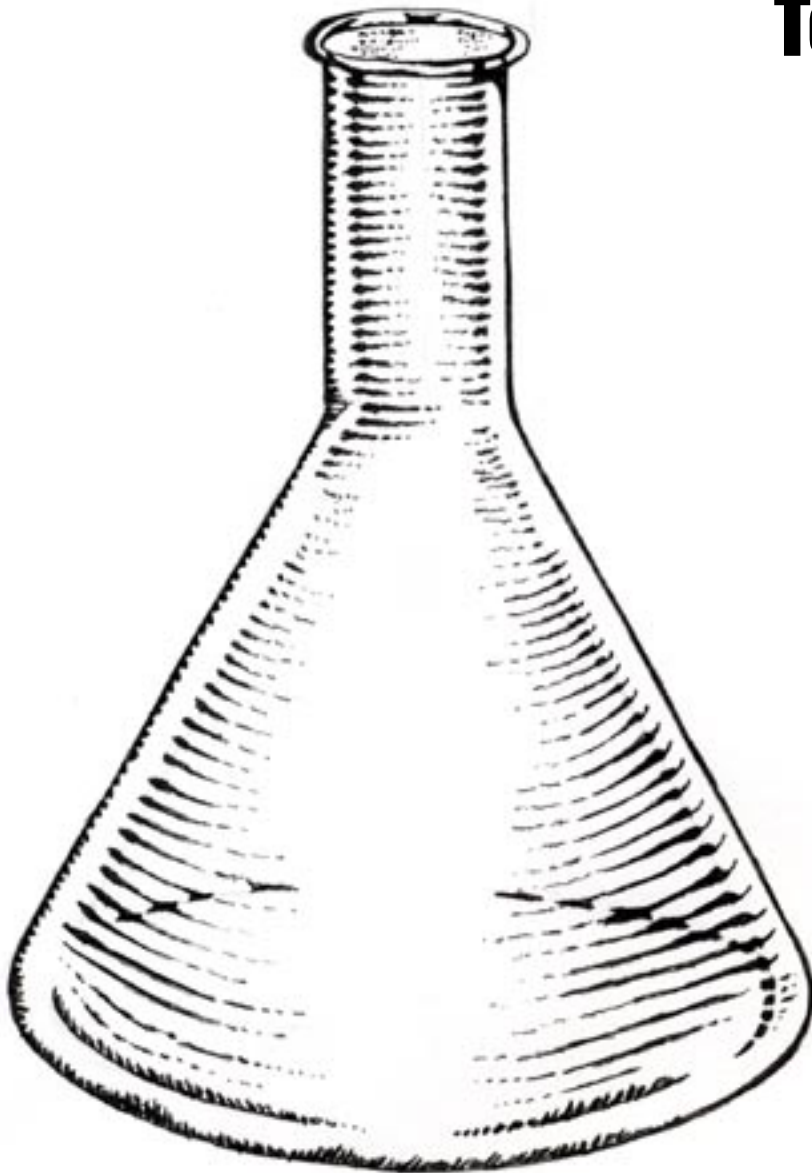
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A Message from our Company...

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)

Science as Inquiry (Content Standard A)

Use appropriate tools and techniques to gather, analyze, and interpret data.

- The use of tools and techniques, including mathematics, will be guided by the questions asked and the investigations students design.

Communicate Scientific Procedures and Explanations

- With practice, students should become competent at communicating experimental methods, following instructions, describing observations, summarizing the results of the other groups, and telling other students about investigations and explanations.

Benchmarks for Science Literacy

(Project 2061 – AAAS, c. 1993)

Technology and Science (3A)

By the end of the 5th grade, students should know that:

- Measuring instruments can be used to gather accurate information for making scientific comparisons of objects and events and for designing and constructing things that will work properly.

Manipulation and Observation (12C)

By the end of the 8th grade, students should be able to:

- Read analog and digital meters or instruments used to make direct measurements of length, volume, weight, elapsed time, rates and temperature, and choose appropriate units.



Student Learning Objectives

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

- Explain measurement as the process by which we describe observations with the use of numbers.
- List some examples of why it is important and necessary to make measurements.
- Differentiate between the English system of measurement and the Metric system of measurement.
- Explain that the Metric system is based on the number ten and multiples of ten.
- Identify simple measuring tools such as rulers, yardsticks, metersticks, and beakers.
- State that the basic unit of length in the metric system is the meter.
- State that the basic unit of mass in the metric system is the gram.
- State that the basic unit of volume in the metric system is the liter.
- Differentiate between length, volume, and mass.
- Describe how length, volume, and mass can be measured.
- Identify the units of measurement that apply to length, volume, and mass from both systems of measurement.
- Explain how temperature is measured and identify the freezing and boiling points of water in both Celsius and Fahrenheit.



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 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 showing students the program, introduce them to the process of measurement. Hold up a ruler, measuring cup, and a scale. Ask them what these three things have in common. Once they have answered this question, ask what types of things they would measure with each of the different tools.

Next, ask students why it is necessary to measure things. Make a list of things we commonly measure in our everyday lives. Also list the tools we use to measure things. Tell students to pay close attention to the program to learn more about the process of measuring in science.

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 twenty 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: Measuring in Science

1. Have you ever weighed yourself on a scale,...
2. counted how many minutes it takes you to run around a track,...
3. or have you ever skied several kilometers?
4. Maybe you kept track of how much time it took for a car to travel a specific distance.
5. Or perhaps you have used measuring spoons when cooking something in the kitchen,
6. Calculated the distance necessary to get a touchdown...
7. Or perhaps you have had to give your pet a specific amount of food...
8. If you have ever had to do the grocery shopping, perhaps you have had to buy the right amount of food.
9. All these activities involve the process of measuring.
10. Measuring is a very important activity that we do everyday.
11. It is also an important process carried out in science.
12. During the next few minutes we are going to explore some of the ways we measure things in our everyday lives, as well as some of the ways things are measured in science.
13. **Graphic Transition – Measuring**
14. What is measuring?
15. Generally speaking, measuring involves the process of using tools to calculate the amount of something such as distance or volume.
16. Numbers are usually used to express a value of measurement.
17. Why is it important to measure things?
18. Suppose you wanted to bake cookies for dessert.
19. After gathering all the ingredients it is time to start mixing.
20. **You Decide!** How do you know how much of each ingredient you need to use?
21. The recipe includes specific measurements for each ingredient so that your cookies will come out soft and tasty instead of hard and bad tasting.
22. By specifically measuring things, we are able to describe them better.
23. Without measurement we would live in a very confusing world.
24. We regularly measure things such as mass,...
25. ...distance,...
26. ...volume,...
27. ...and time, to name just a few.
28. Similarly, in science, measurement is very important in describing and understanding living and non-living things.
29. In science a wide variety of tools are used to measure different things.
30. Some of these tools are quite simple, such as a beaker used to measure liquids.



Script (cont.)

31. While other tools are quite complex, such as a global positioning system that uses satellite signals to measure distances, and to pinpoint exact locations on Earth.
32. Let us take a look at some of the ways you can measure things.
- 33. Graphic Transition – Units of Measurement**
34. If you live in the United States you are used to measuring things, such as the distance of a football field, in yards,...
35. ...distance on roads in miles,...
36. ...and the length of smaller objects in feet or inches.
37. These different units of measurement are based on the English System of measurement.
38. But, if you live in Canada or many other countries, you use a different system of measurement. Scientists also use this other system of measurement.
- 39. You Decide!** What is this other system of measurement called?
40. The system of measurement used by scientists is called the metric system.
41. The metric system is also referred to as the International System of Units, or SI.
42. In many ways the metric system is easy to use because it is a decimal system.
43. This means that it is based on the number ten and multiples of ten.
44. For example, in measuring length in the metric system, 10 millimeters equal 1 centimeter, 100 centimeters equal one meter, and 1000 meters equal one kilometer.
45. All these units of measurement involve multiples of ten.
46. Let us now take a closer look at measuring length.
- 47. Graphic Transition – Measuring Length**
48. American football is played on a field that has a length of 100 yards.
49. Whereas soccer, a game originally developed in Europe is played on a field that is about 100 meters long.
- 50. You Compare!** Which is longer; a meter or a yard?
51. As you can see this meter stick is slightly longer than this yardstick.
52. Both are used to measure length.
53. Height is a measure of length.
54. And distance is also a measure of length.
55. In the metric system the basic unit of length is the meter. There are 100 centimeters in a meter.
56. In the English system length is measured in inches, feet, yards, or miles.
57. This fingernail is about 1 centimeter long.
58. If you look closely at this metric ruler you can see that each centimeter is divided into 10 parts called millimeters.



Script (cont.)

59. A millimeter is quite small. This coin is about 3 millimeters thick.
60. If a longer distance needs to be measured, such as the length of a river, then units called kilometers are used.
61. There are 1000 meters in a kilometer. Road distances, in countries that use the metric system, are measured in kilometers.
- 62. Graphic Transition – Measuring Mass**
63. All objects you see on Earth have mass.
64. Plants and animals have mass,...
65. ...as do our bodies.
66. Mass is the amount of matter in an object.
67. Even though this golf ball is smaller than this tennis ball, the golf ball contains more matter and therefore has a greater mass.
68. The basic unit of mass in the English system is the pound. There are 16 ounces in one pound.
69. Whereas, in the metric system, the basic unit of mass is the gram. This small nut weighs about one gram.
70. This large bag of jellybeans weighs one kilogram.
71. There are 1000 grams in one kilogram.
72. One common way to measure mass is with a device called a balance.
73. A balance balances an object of unknown mass against weights until an equal balance is achieved.
74. This type of balance is called a triple beam balance.
75. Each beam has different size weights, called riders which slide from right to left to balance a given mass.
76. For example, this rock has a mass of 267 grams.
77. Digital scales such as this one are becoming increasingly popular to calculate the mass of objects.
78. Let us now take a look at how volume is measured.
- 79. Graphic Transition – Measuring Volume**
- 80. You Compare!** What has more volume, the balloon or this baseball?
81. Even though the baseball has more mass, it has less volume than the balloon.
82. What is volume? Volume is the amount of space something takes up.
83. The basic unit of volume in the metric system is the liter.
84. This bottle contains 1 liter of drinking water.
85. If you were cooking in a country that uses the metric system you would measure out liquid ingredients in units called milliliters.
86. This measuring spoon contains about 5 milliliters of liquid.



Script (cont.)

87. There are 1000 milliliters in one liter.
88. In science, a graduated cylinder is often used to measure the volume of liquids.
89. This graduated cylinder contains 78 milliliters of liquid.
90. The volume of solids can be measured in a couple of different ways.
91. The volume of solids that have a regular square or rectangular shape can be easily calculated using a metric ruler.
92. By measuring the length, height, and width, and then multiplying all three, the volume can be computed.
93. Volume of solids is commonly expressed in cubic centimeters or cubic meters.
94. With smaller, irregularly shaped solids it is possible to calculate the volume using a process called water displacement.
95. One way this can be done is by filling a graduated cylinder with water to a certain point such as 50 milliliters,...
96. ...then placing the object in the water. See how the level rises to 60 milliliters?
- 97. You Compute!** What is the volume of the rock?
98. The volume is computed by subtracting 50 milliliters from 60 milliliters to get a volume of 10 milliliters.
99. Ten milliliters of water is equivalent to 10 cubic centimeters, making the volume of the rock 10 cubic centimeters.
- 100. Graphic Transition – Metric Magic**
101. One of the wonderful features of the metric system is the way different units of measurement are interchangeable.
102. For example, in the metric system 1 milliliter of water occupies a volume of 1 cubic centimeter and has a mass of 1 gram.
103. This is a cubic centimeter with dimensions of 1 centimeter high, by 1 centimeter wide, by 1 centimeter long.
104. This graduated cylinder holds 1 milliliter of water that is equivalent in volume to 1 cubic centimeter.
105. In turn, one milliliter of water has a mass of 1 gram.
106. Water has a density of 1 gram per cubic centimeter.
107. Density is a measure of how much matter is packed into a certain volume.
108. Objects such as this marble have a density greater than 1 gram per cubic centimeter and sink.
109. Whereas objects such as Styrofoam, have a density of less than one and float.
110. So as you can see, the metric system is very convenient when comparing mass, volume, and density.



Script (cont.)

111. Graphic Transition – Temperature

- 112. When you have a fever it is common to take your temperature with a thermometer.
- 113. A thermometer most often consists of a small glass tube with liquid in it. Today, digital thermometers are increasingly common.
- 114. Normal body temperature is around 98.6° Fahrenheit but, if you are running a fever, it will be higher.
- 115. Fahrenheit is commonly used to measure temperature in countries using the English system.
- 116. But in countries using the Metric system, the Celsius scale is used.
- 117. While 98.6° is normal body temperature in Fahrenheit, the Celsius equivalent is 37°.
- 118. The Celsius scale is commonly used in science and is based on the freezing and boiling points of water.

119. You Decide! What is the temperature of boiling water in degrees Celsius?

- 120. As you can see, the temperature of boiling water is 100° degrees Celsius.
- 121. And the temperature at which water freezes is 0° Celsius.
- 122. The freezing and boiling points of water are quite easy to remember using the Celsius scale.

123. Graphic Transition – Summing Up

- 124. During the past few minutes, we have explored some of the different ways we measure things, both in our daily lives,...
- 125. ...and in science.
- 126. We explored some of the differences between the English system of measurement and the metric system.
- 127. We discussed some of the ways length can be measured, and the different units of length in the metric system.
- 128. The measurement of mass was discussed using a balance.
- 129. And some of the various ways volume can be calculated were also discussed.
- 130. We looked at some of the ways various units are interchangeable in the metric system for mass and volume of water.
- 131. So the next time you do some baking,...
- 132. ...go running,...
- 133. ...or read the temperature on a thermometer,...
- 134. ...think about some of the ways we measure things...
- 135. ...you just might look at your world a little differently.



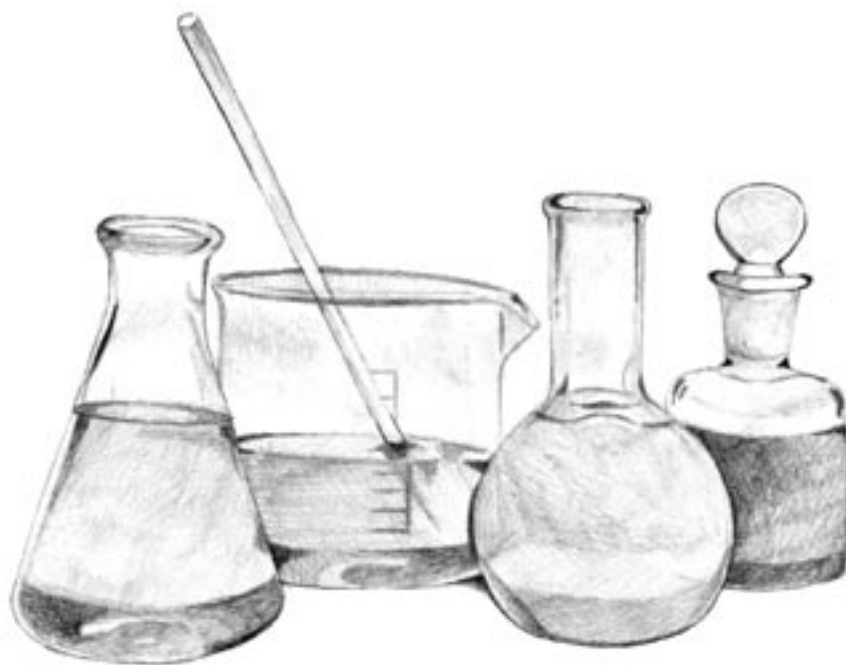
Script (cont.)

136. Graphic Transition- Video Quiz

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

1. The _____ system uses inches to measure length.
2. The metric system is based on multiples of _____.
3. The _____ is the basic unit of metric length.
4. _____ is the amount of matter in an object.
5. This device is called a _____.
6. There are 1000 _____ in a kilogram.
7. This beaker contains 50 _____ of water.
8. One gram of water has a volume of one _____ centimeter.
9. Countries using the metric system measure temperature using the _____ scale.
10. Water freezes at _____ degrees Celsius.

Answers are on page 17.





Student Assessments and Activities

Assessment Masters:

- Preliminary Assessment
- Video Review
- Post Assessment

Student Activity Masters:

- Metric Magic
- Measuring Length
- Measuring Volume
- Vocabulary of *Measuring in Science*



Answers to Student Assessments

Preliminary Assessment (pgs. 20-21)

1. measuring
2. number
3. English
4. decimal
5. length
6. meter
7. gram
8. liter
9. width
10. density
11. true
12. false
13. false
14. false
15. true
16. false
17. true
18. true
19. true
20. false

Video Review (pg. 22)

1. Each ingredient is listed in the recipe with specific measurements.
2. The system of measurement used by scientists is called the metric system.
3. The meter stick is slightly longer than the yardstick.
4. The balloon has more volume than the baseball.
5. The volume of the rock is ten milliliters, which is equivalent to ten cubic centimeters.
6. The temperature of boiling water in degrees Celsius is 100 degrees Celsius.

Video Quiz (p. 22)

1. English
2. ten
3. meter
4. mass
5. balance
6. grams
7. milliliters
8. cubic
9. Celsius
10. 0

Post Assessment (pgs. 23-24)

1. liter
2. decimal
3. width
4. measuring
5. density
6. number
7. length
8. meter
9. English
10. gram
11. true
12. true
13. false
14. false
15. true
16. false
17. true
18. false
19. false
20. true



Answers to Student Activities

Metric Magic (p. 25)

1. length
2. grams
3. milliliters
4. centimeters
5. kilometers
6. kilograms
7. meter
8. volume
9. ten
10. thousand
11. 22
12. 3,000
13. 45 cubic centimeters
14. 33
15. four

Measuring Length (p. 26-27)

Measurements will vary.

1. millimeter, centimeter, meter, kilometer
2. your height and the distance walked.
3. You can measure the length of smaller objects with a metric ruler or meter stick. For longer objects you need a tape measure.
4. There are ten milliliters in a centimeter. A meter contains 100 centimeters.

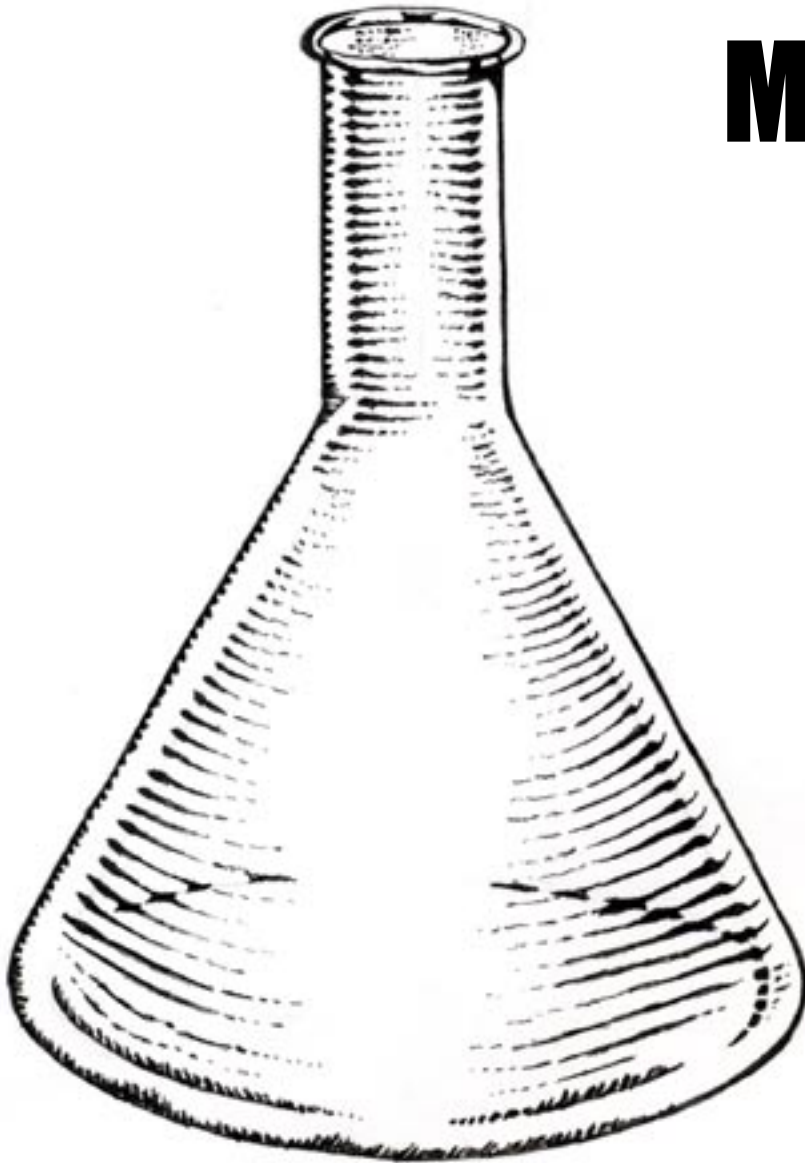
Measuring Volume (p. 28-29)

The answers in the data tables will vary depending on the size of the objects used in the activity.

Vocabulary of *Measuring in Science* (p. 30)

1. h - fahrenheit
2. d - volume
3. f - centimeter
4. i - thermometer
5. b - water displacement
6. j - meter
7. a - gram
8. e - balance
9. g - mass
10. c - Celsius

Assessment and Student Activity Masters



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. _____ involves the process of using tools to calculate the amount of something.
2. A measurement of something almost always contains a _____ and a unit.
3. The two major systems of measurement are the _____ system and the metric system.
4. The metric system is a _____ system based on the number ten and multiples of ten.
5. Height and distance are measures of _____.
6. The basic unit of length in the metric system is the _____.
7. The basic unit of mass in the metric system is the _____.
8. The basic unit of volume in the metric system is the _____.
9. The volume of regularly shaped solids can be calculated by multiplying the length, height, and _____ of the object.
10. _____ is the measure of how much matter is packed into a certain volume.

density
number
decimal
meter
width

liter
measuring
gram
English
length

Preliminary Assessment

Directions: Decide whether the statement is true (T) or false (F).

- | | | |
|---|---|---|
| 11. There are 1,000 meters in one kilometer. | T | F |
| 12. Long distances are measured in yards or meters. | T | F |
| 13. There are 100 milliliters in one liter. | T | F |
| 14. Objects with a density greater than one gram float. | T | F |
| 15. One milliliter of water has a volume of one cubic centimeter. | T | F |
| 16. The United States popularly uses the International System of Units for measurement. | T | F |
| 17. A meter is a little longer than a yard. | T | F |
| 18. In the metric system, the Celsius scale is generally used to measure temperature. | T | F |
| 19. There are 1,000 grams in one kilogram. | T | F |
| 20. A balloon has more mass than a baseball therefore, it has more volume. | T | F |

Video Review

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

You Decide!

1. How do you know how much of each ingredient you need to use?

You Decide!

2. What is this other system of measurement called?

You Compare!

3. Which is longer; a meter or a yard?

You Compare!

4. What has more volume, the balloon or this baseball?

You Compute!

5. What is the volume of the rock?

You Decide!

6. What is the temperature of boiling water in degrees Celsius?

Video Quiz:

1. The _____ system uses inches to measure length.
2. The metric system is based on multiples of _____.
3. The _____ is the basic unit of metric length.
4. _____ is the amount of matter in an object.
5. This device is called a _____.
6. There are 1,000 _____ in a kilogram.
7. This beaker contains 50 _____ of water.
8. One gram of water has a volume of one _____ centimeter.
9. Countries using the metric system measure temperature using the _____ scale.
10. Water freezes at _____ degrees Celsius.

Post Assessment

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

1. The basic unit of volume in the metric system is the _____.
2. The metric system is a _____ system based on the number ten and multiples of ten.
3. The volume of regularly shaped solids can be calculated by multiplying the length, height, and _____ of the object.
4. _____ involves the process of using tools to calculate the amount of something.
5. _____ is the measure of how much matter is packed into a certain volume.
6. A measurement of something almost always contains a _____ and a unit.
7. Height and distance are measures of _____.
8. The basic unit of length in the metric system is the _____.
9. The two major systems of measurement are the _____ system and the metric system.
10. The basic unit of mass in the metric system is the _____.

English
number
measuring
meter
gram

decimal
length
width
density
liter

Post Assessment

Directions: Decide whether the statement is true (T) or false (F).

- | | | |
|---|---|---|
| 11. One milliliter of water has a volume of one cubic centimeter. | T | F |
| 12. There are 1,000 meters in one kilometer. | T | F |
| 13. A balloon has more mass than a baseball therefore, it has more volume. | T | F |
| 14. The United States popularly uses the International System of Units for measurement. | T | F |
| 15. In the metric system, the Celsius scale is generally used to measure temperature. | T | F |
| 16. Long distances are measured in yards or meters. | T | F |
| 17. There are 1,000 grams in one kilogram. | T | F |
| 18. There are 100 milliliters in one liter. | T | F |
| 19. Objects with a density greater than one gram float. | T | F |
| 20. A meter is a little longer than a yard. | T | F |

Metric Magic

Directions: Using your knowledge of the metric system, answer the following questions.

1. Centimeters and kilometers are units of _____.
2. Small amounts of food are measured in _____.
3. When you are cooking you measure liquids in units of _____.
4. Your height is measured in _____.
5. If you travel in a train, you would measure the distance traveled in _____.
6. Your weight is measured in _____.
7. A _____ stick is used to measure the length of a carpet.
8. The basic unit of _____ is the liter.
9. There are _____ millimeters in a centimeter.
10. A kilometer contains one _____ meters.

One of the great things about the metric system is that it is based on units of ten. Another amazing feature is that one milliliter of water occupies one cubic centimeter and has a mass of one gram. Complete the metric conversions using this information.

11. Twenty-two milliliters of water has a mass of _____ grams.
12. Three liters of water contains _____ milliliters.
13. Forty-five milliliters of water has a volume of _____.
14. Water having a volume of 33 cubic centimeters has a mass of _____ grams.
15. Four thousand grams of water has a mass of _____ cubic liters.

Measuring Length

If someone asked you how far a walk it is to school, you would describe the length of your walk in miles or kilometers. And, if someone asked you how tall you are, you would describe your height as so many feet and so many inches, or in centimeters. These are all measurements of length. We use measurements of length all the time in sports we play, distances we drive, and in scientific measurements.

Chances are you have several instruments in your home used to measure length. Rulers, yardsticks, and tape measures are tools used to measure length. Scientists commonly use metric units of length such as millimeters, centimeters, meters, and kilometers. Remember, there are 100 centimeters in a meter. And, there are ten millimeters in one centimeter. In this activity you will use a metric ruler and a meter stick to measure the length of several things in your classroom.

Directions: Use a meter stick and metric ruler to measure things provided by your teacher. Record your measurements in the data table provided. Answer the questions on the following page.

Object	Length in Centimeters (cm)	Length in Meters (m)
Your height		
Length of paper clip		
Diameter of a coffee cup		
Width of classroom		
Height of desk		
Length of your foot		
Width of a piece of hair		

Measuring Volume

Background:

We measure things all the time. When you cook you measure out ingredients. When you step on a scale, you are measuring your weight. When you use a tape measure to see how long a board is, you are measuring length. And, when you pour a certain amount of milk into a measuring cup, you are measuring volume.

In this activity we are going to measure volume. Volume is the amount of space something takes up. Almost everything you see has volume—including this piece of paper and the chair on which you are sitting. Things that contain matter have volume.

As you know, measurement is the process of describing matter with numbers. Measurement involves the use of numbers. We can measure volume in many ways. The means by which we measure volume depends on whether we are measuring the volume of a liquid or a solid.

The volume of liquids is measured in a variety of ways, such as with measuring cups, beakers, graduated cylinders, or measuring spoons. In the metric system the basic unit of volume is the liter. There are 1,000 milliliters in a liter.

The volume of regularly shaped solids is easily measured with the use of a metric ruler. By measuring the length, height, and width of an object, and then multiplying the three you can find the volume. The units of smaller objects such as books are reported in cubic centimeters. Whereas, the volume of larger objects is reported in cubic meters. It is also possible to find the volume of smaller, irregularly shaped solids using a method called water displacement. In this activity we will use water displacement to measure the volume of irregularly shaped objects and also to find the volume of regularly shaped objects.

Measuring Volume of Regularly Shaped Objects:

It is possible to easily calculate the volume of regularly shaped objects such as boxes, books, and pads of paper. All you need to do is to measure the length, height, and width, then multiply these to get the volume (length x height x width = volume). Using a metric ruler calculate the volume of objects provided by your teacher. Record your observations in the data table on the next page.

Measuring Volume

Object	Length (in cm.)	Height (in cm.)	Width (in cm.)	Volume in Cubic Centimeters (cm.)
Cardboard box				
Book				
Pad of paper				
Chalkboard Eraser				

Measuring Volume of Irregularly Shaped Objects:

Finding the volume of irregularly shaped objects can be a little bit more difficult. But, with a technique called water displacement you can find the volume of objects such as small stones, coins, paperclips, and pencils. In the process of water displacement, all you need to do is obtain a graduated cylinder or small beaker. Fill it with water to a specific point and record the amount. Then, carefully place the object in the water. The water level rises. Record the new volume of water. Then subtract the first volume from the second volume. Since one milliliter of water equals one cubic centimeter, the value obtained represents the volume of the object in cubic centimeters.

Object	Initial Volume of water (ml.)	Volume of Water with object (ml.)	Volume of Object (ml.)	Volume in Cubic Centimeters (cm.)
Coin				
Paper clip				
Small rock				
Pen				

Vocabulary of Measuring in Science

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

____ 1. htefhiaren _____

____ 2. uvelmo _____

____ 3. eeecittmnr _____

____ 4. mmeerrtteho _____

____ 5. twrae ptcndleimsea

____ 6. tmree _____

____ 7. agmr _____

____ 8. aeacnbl _____

____ 9. sams _____

____ 10. useclis _____

a. The basic unit of mass in the metric system.

b. A technique used to calculate the volume of irregularly shaped solids.

c. Temperature scale generally used in the metric system.

d. The amount of space something takes up.

e. An instrument used to measure mass which measures an unknown mass against known mass.

f. A measure of length in the metric system. There are 100 in one meter.

g. The amount of matter in an object.

h. Scale used to measure temperature in the English system.

i. Tool used to measure temperature.

j. The basic unit of length in the metric system; equal to 100 centimeters.