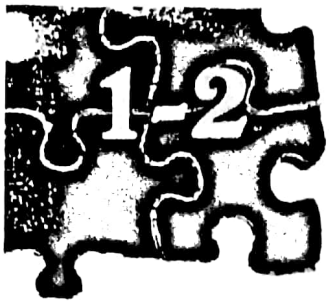


What are science skills?

Objective ▸ Identify and use science skills to solve problems and answer questions.

TechTerm

▸ **hypothesis** (hy-PAHTH-uh-sis): suggested solution to a problem

Science Skills Scientists use many skills to gather information. These skills are sometimes called science skills. You use science skills, too. You probably used some science skills today. When you use most science skills, you use your five senses. The five senses are seeing, hearing, touching, smelling, and tasting.

Eleven science skills are used in this book. You will even see skill symbols for nine skills. These symbols are shown below. They will let you know when you are using a skill. Researching and communicating also are important skills. You will use these skills, too. Soon, you will be thinking like a scientist.

Analyze: Which science skill makes observations more exact?

Researching Have you ever done research for a science project? When you do research, you look for something again. You study or investigate. You can do research by reading books, magazines, and newspapers. You can also perform experiments to do research. Experimenting is a kind of research.

Identify: What are two ways to do research?

Communicating When you talk to someone, you are communicating, or sharing ideas and information. If you write a letter, you are communicating. Scientists communicate all the time. They write books and magazine or newspaper articles about their work. If you read about a scientist and a new discovery, the scientist has communicated with you. Sharing information is very important to scientists.

Describe: What are you doing when you communicate with someone?

Think Scientifically

Observing When you observe, you use your senses. You must pay close attention to everything that happens.

Measuring When you measure, you compare an unknown value to a known value. Measuring makes observations more exact.

Inferring When you infer, you form a conclusion based upon what you think explains an observation.

Classifying When you classify, you group things based upon how they are alike.

Organizing When you organize, you work in an orderly way. You put your information in order.

Predicting When you predict, you state ahead of time what will happen based upon what you already know.

Hypothesizing When you hypothesize, you state or suggest a solution to a problem. A **hypothesis** (hy-PAHTH-uh-sis) is a suggested solution to a problem based upon what is already known or observed.

Modeling When you model, you use a copy of what you are studying to help explain it. A model can be a three-dimensional copy, a drawing, or a diagram.

Analyzing When you analyze, you study information carefully.

LESSON SUMMARY

- Scientists use many skills to gather information.
- Eleven science skills are used in this book.
- Researching includes talking, reading, and experimenting.
- Communicating means sharing information.
- Other science skills are observing, measuring, inferring, classifying, organizing, predicting, hypothesizing, modeling, and analyzing.

CHECK *Answer the following.*

1. What are your five senses?
2. Name two ways a scientist can communicate a new discovery to people.

Complete the following.

3. When you group things based upon how they are alike, you are _____ them.
4. A suggested solution to a problem is a _____ .
5. If you put information into a table, you are _____ the information.

APPLY *Complete the following.*

6. **Describe:** Describe two ways in which you used science skills today. What skills did you use? How did they help you to solve a problem?

Match each skill to its symbol.

7. ▲	a. organizing
8. ◤	b. modeling
9. ▲▲	c. classifying
10. ❱	d. predicting

11. Which skill do you think is the most important? Give reasons for your choice.

Ideas in Action

IDEA: You make or use many different measurements every day.
ACTION: Describe five situations in which you use measurements during a day.

ACTIVITY

ORGANIZING DATA

You will need a sheet of graph paper, lined paper, and a pencil.

1. Study each set of data.
2. Decide the best way to organize each set of data. You may want to use a table, some kind of graph, a diagram, or another way you think will work.
3. Be sure to give each table, graph, or diagram a title. Tables should have headings for each column.

Questions

1. How did you organize each set of data?
2. Compare the way you organized the data with the ways two classmates organized the data.

Data 1: Animals

fishes; snakes; coral snake; tuna; trout; boa constrictor; birds; robin; rattlesnake; blue jay; bass; sparrow; duck; swordfish

Data 2: Blood Types in a Given Population

O	45%
A	40%
B	10%
AB	05%

Data 3: Uses of the Peanut

livestock food; peanut butter; salad oil; machine oil; glue; textile fiber; soap; face powder; shaving cream; shampoo; margarine; packing oil for fish; explosives; medicines; insulation; candy; plastic filler.

Understanding the Metric System

The metric system is convenient and easy to understand because it is based on the principle of the decimal system.

It is necessary to:

1. Learn the names of the 3 basic units for length, volume, and weight.

Basic Property	Metric Unit	English Unit
Length	Meter (m)	Foot (ft.)
Volume	Liter (l)	Quart (qt.)
Weight	Gram (g)	Pound (lb.)

2. Learn the meanings of the prefixes which are used to indicate the subdivisions and multiples of the basic units.

Prefix	Meaning
Deci	1/10 of the unit
Centi	1/100 of the unit
Mili	1/1000 of the unit
Kilo	1000 times the unit

3. Learn the definitions of the commonly used metric units.

A. For Length

1 Kilometer (km) = 1,000 meters (m)
1 Centimeter (cm) = 1/100 of a meter (100 cm = 1 m)
1 milimeter (mm) = 1/1000 of a meter = 1/10 cm
(1000 mm = 1 m)
1 micron (M) = 1/1,000,000 of a meter

B. For Volume

1 Kiloliter (KL) = 1000 litres (l)
1 mililiter (ml) = 1/1000 of a liter
1 cubic centimeter (cc) = 1/1000 of a liter = 1 ml
(1000 ml = 1000 cc = 1 liter)

C. For Weight

1 Kilogram (Kg) = 1000 grams (g)
1 miligram (mg) = 1/1000 of a gram
(1000 miligrams = 1 gram)

4. Learn the English equivalents of commonly used metric units.

	Metric System		English System
Length	1 meter	=	39.37 in.
	2.54 cm	=	1 in.
Volume	1 liter	=	1.06 qts.
Weight	1 Kg	=	2.2 pounds
	454 g.	=	1 pound

Also remember:
A meter is roughly a yard.
A foot is about 30 cm.
A milimeter is about the thickness of a pencil lead.

METRIC STREET U. S. A.

K	-	H	-	DK	-	M, L, G	-	d	-	c	-	m
KILO	-	HECTO	-	DEKA	-	UNIT (METER, LITER, GRAM)	-	deci	-	centi	-	milli
1000	-	100	-	10	-	1	-	0.1	-	0.01	-	0.001
THOUSAND	-	HUNDRED	-	TEN	-	ONE	-	tenths	-	hundredths	-	thousandths

To change a larger unit to a smaller metric unit move the decimal to the right.
(LARGE TO SMALL: MOVE DECIMAL TO THE RIGHT)

To change a smaller unit to a larger metric unit move the decimal to the left.
(SMALL TO LARGE: MOVE DECIMAL TO THE LEFT)

Metric System Length Part I

THE METRIC SYSTEM LENGTH

1

(A) Which letters on the metric ruler at the bottom of the page span a distance of one centimeter? (A)

(B) How many centimeters long is the metric ruler at the bottom of this page? (B)

2

Using the metric ruler on this page determine the distance in centimeters between each pair of marks listed in (A), (B) and (C).

(A) M and R (A)

(B) T and I (B)

(C) M and S (C)

3

(A) List the letters on the metric ruler at the bottom of the page that span a distance of one millimeter. (A)

(B) How many millimeters long is the metric ruler on this page? (B)

4

How many millimeters between the marks listed in (A), (B) & (C) on the meter ruler at the bottom of this page?

(A) X and Z (A)

(B) Y and Z (B)

(C) S and Z (C)

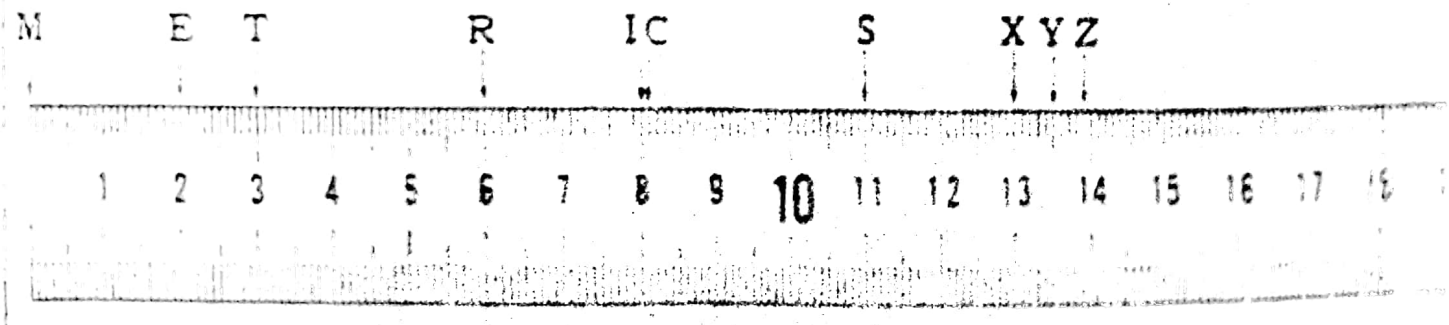
5

Find the difference in length in millimeters between MX and MI, MY and MC, and MZ and MX, then convert these lengths to centimeters.

(A) MX – MI (A)

(B) MY – MC (B)

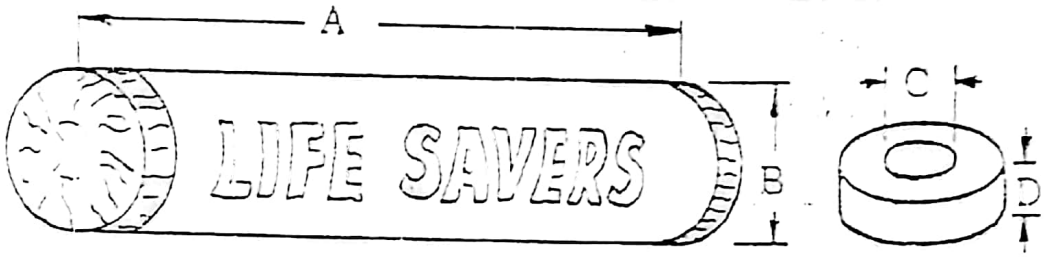
(C) MZ – MX (C)



Metric System - Part B

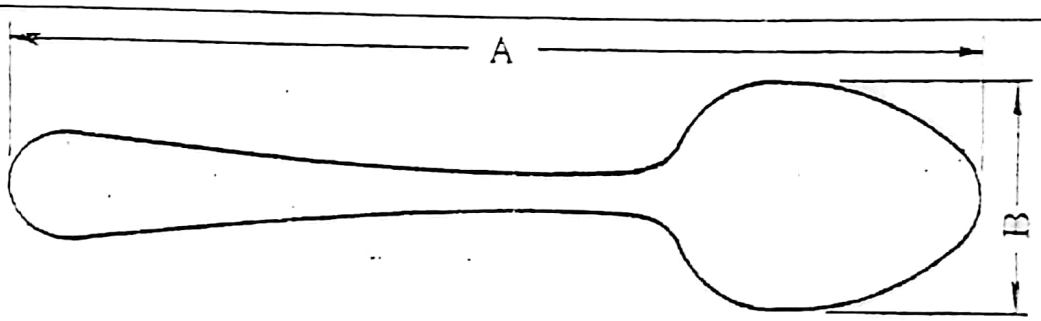
Get a metric ruler and use it to make the measurements shown on this page. If you do not have a metric ruler you may cut out the one at the bottom this page and use it to make your measurements. Make your measurements in either centimeters or millimeters.

1



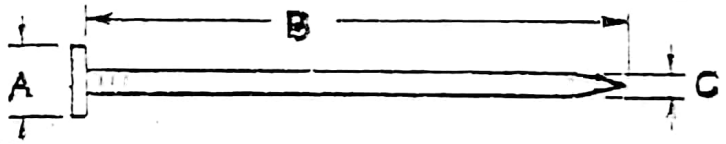
1 (A) _____
(B) _____
(C) _____
(D) _____

2



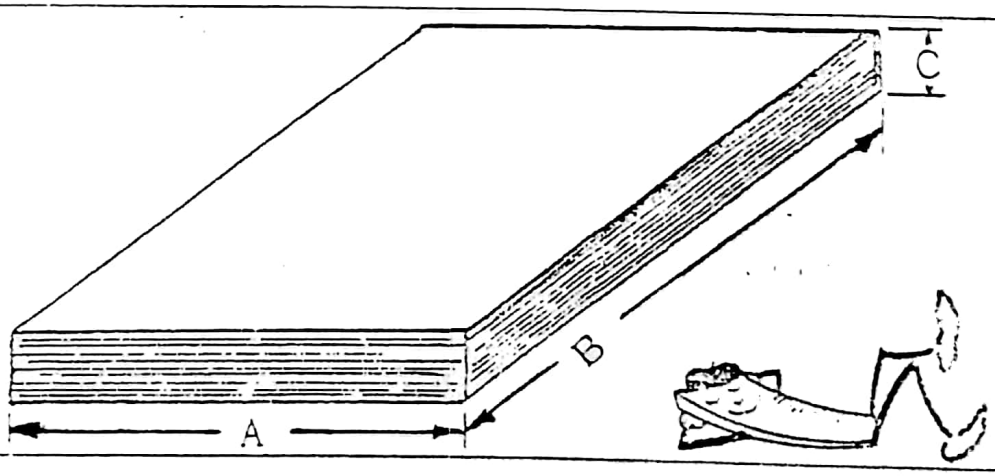
2 (A) _____
(B) _____

3

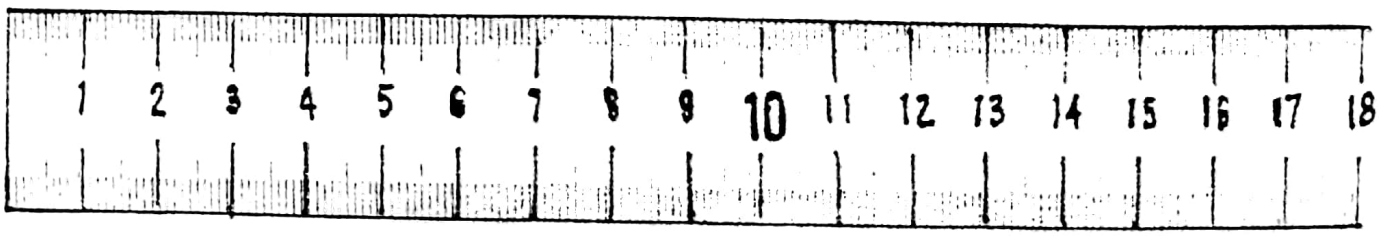


3 (A) _____
(B) _____
(C) _____

4

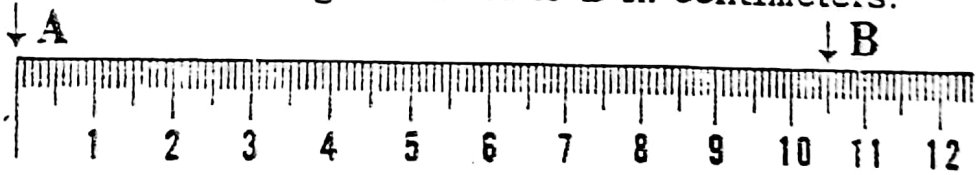
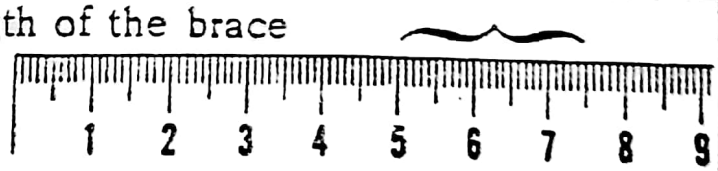


4 (A) _____
(B) _____
(C) _____



Metric System - Length Quiz

THE METRIC SYSTEM: LENGTH

question	answer
1 List the following metric system units of length in order of large to small – meter, millimeter, centimeter.	1
2 Write the unit abbreviations for the metric units – meter, centimeter, millimeter.	2
3 There are 100_____ in a meter.	3
4 What is the basic unit of length in the Metric System?	4
5 What is the length from A to B in centimeters? 	5
6 How many millimeters are there in one centimeter?	6
7 What is the length of the brace in millimeters? 	7
8 Express 21 millimeters in terms of centimeters.	8
9 What is the length from the beginning of the meter stick to point A in centimeters? 	9 
10 How many millimeters is 70.3 centimeters?	10

THE METRIC SYSTEM - THE USE OF THE METRIC RULER

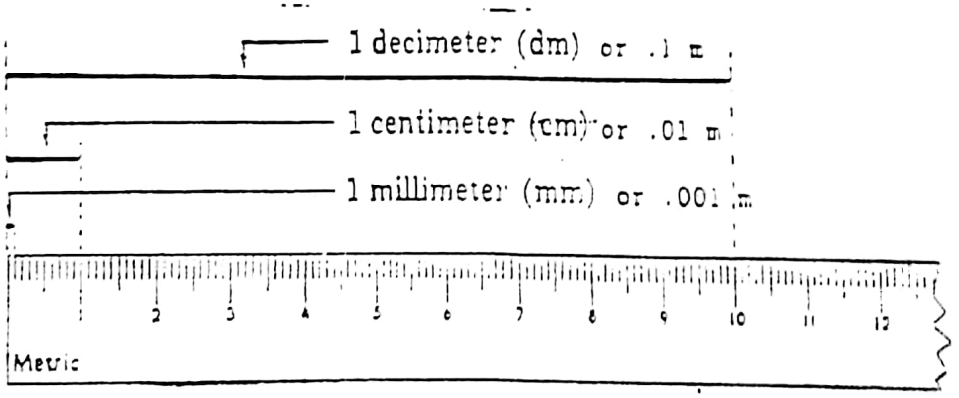
etric Prefixes

List the metric units in the indicated order or sequence:

1. _____ = 1000 meters
2. _____ = 100 meters
3. _____ = 10 meters
4. _____ = 1 meter
5. _____ = .1 meter
6. _____ = .01 meter
7. _____ = .001 meter

B. The Meter Stick

A meter stick is divided into smaller sections known as centimeters (cm) which are in turn divided into millimeters (mm). A portion of a meter stick is illustrated below:



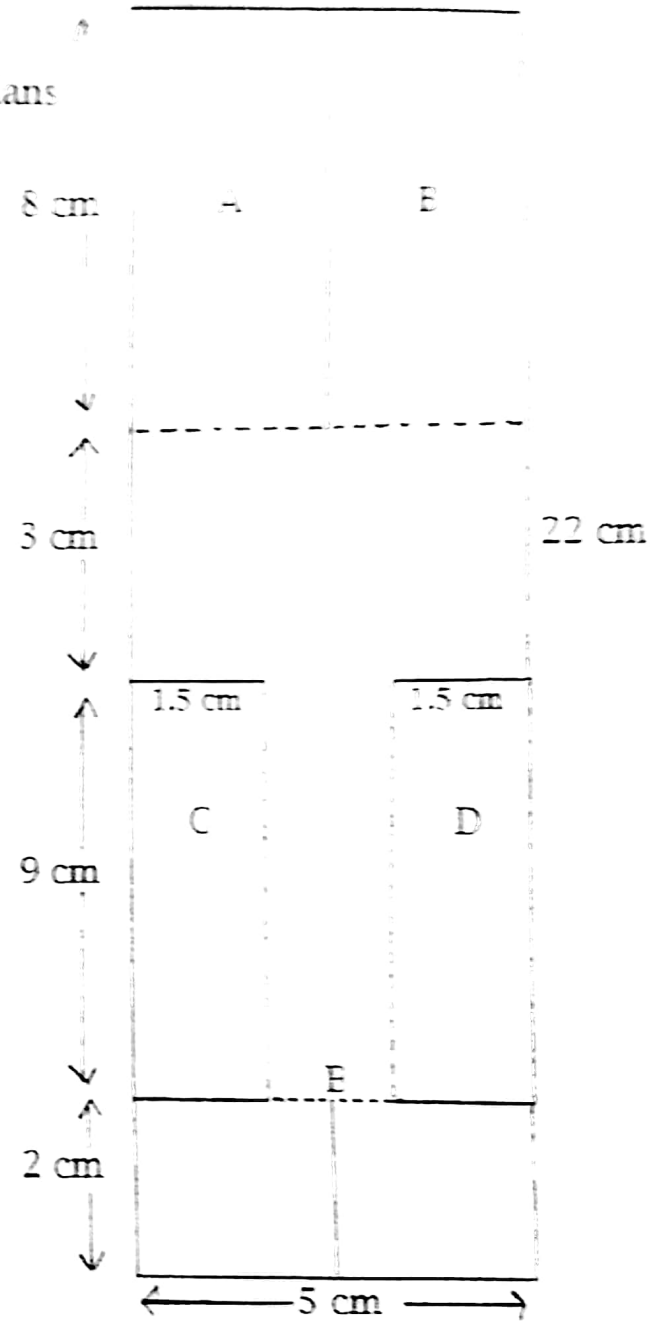
8. How many millimeters are there in a centimeter? _____
9. How many centimeters are there in a meter? _____
10. How many millimeters are there in a meter? _____
11. How many centimeters are there in an inch? (Check your notes!) _____
12. How many meters are there in a kilometer? _____
13. What part or fraction of a meter is a centimeter? _____
14. What part or fraction of a centimeter is a millimeter? _____
15. What part or fraction of a kilometer is a meter? _____
16. How many inches are there in a meter? (Check your notes!) _____

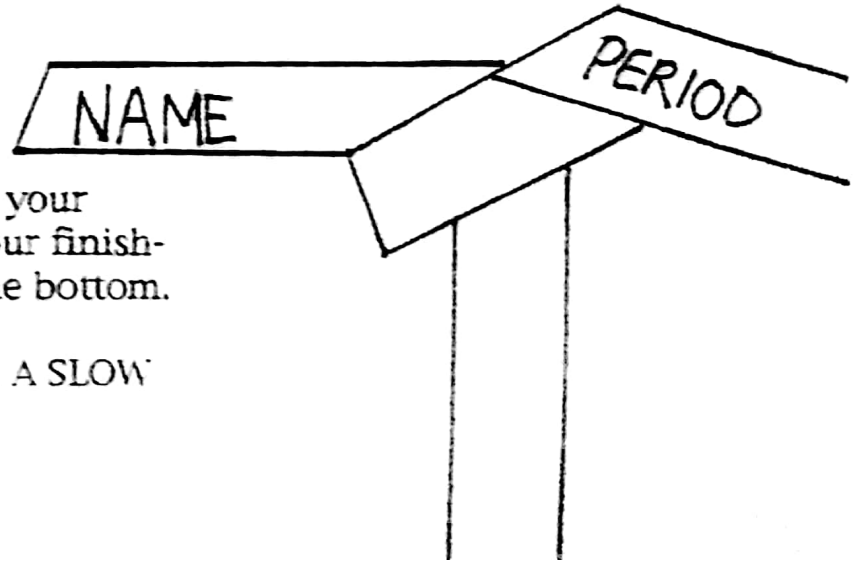
Scanned by CamScanner

Metricopter Plans

1. Each person mush have his own metricopter.
2. Study the metricopter design on the right. Notice that it is in metric units.
3. Notice the drawing is scaled down. It is not the right size.
4. Make your metricopter full size according to the dimensions on the drawing. Do not trace this design.
5. Use notebook paper. Cut out a rectangle 22 cm LONG and 5 cm WIDE.
6. Mark off the rest of the dimensions shown in the design.
7. Cut out along SOLID LINES only.
8. Fold section "A" towards you. Fold section "B" away from you.
9. Fold section "C" in towards section "D".
10. Fold section "D" in towards section "C". They will overlap.
11. Fold up at line "E".
12. Write your name and period on your metricopter wings. Compare your finished product with the sketch at the bottom.

******A SUCCESSFUL METRICOPTER IS A SLOW FALLING METRICOPTER******





MEASURING METRICS

I. Of the following pairs of metric units, circle the smaller of the two:

1. mm or dm
2. cm or mm
3. meters or decimeters
4. cm or dm
5. cm or m

II. Mark each of the following TRUE or FALSE:

6. 10 cm is not larger than one decimeter.
7. 100 mm is not more than 10 cm.
8. One meter is not less than 99 cm.
9. 109 mm is not more than 10 cm.
10. 750 mm is not less than one meter.

III. In which metric units (meters, liters, grams, none) would you measure each of the following:

11. The length of a TV show
12. The speed of a race car
13. How high an airplane flies
14. The size of a carton of milk
15. The size of a package of hotdogs

IV. Tell why each of the following is wrong:

16. Let's buy a three liter bag of corn-chips.
17. I drank a two meter bottle of soda.
18. My orange tree is eight grams high.

V. Complete the following:

19. 20 mm= _____ cm
20. 3.0 cm= _____ mm
21. 3 dm= _____ cm
22. 40 cm= _____ dm
23. 275 mm= _____ cm
24. 14.7 cm= _____ mm
25. 300 mm= _____ dm

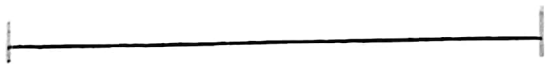
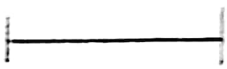
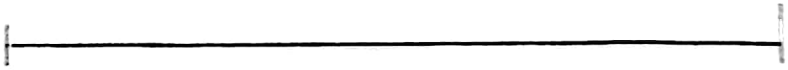
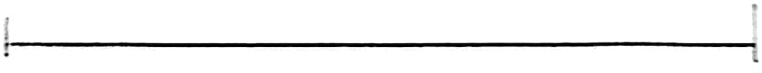
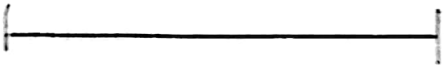
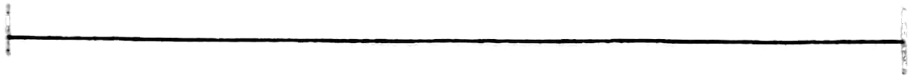
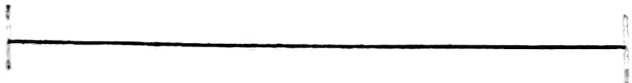
WHICH MEASUREMENT IS MOST LIKELY CORRECT

1.	Length of our room	15 m	15 dm	15 cm	_____ m
2.	Height of your desk	75 mm	75 cm	75 dm	_____ cm
3.	Width of your thumb	22 mm	22 m	22 cm	_____ mm
4.	Height of the classroom door	220 dm	220 m	220 cm	_____ m
5.	Length of your shoe	25 mm	25 cm	25 dm	_____ cm
6.	Length of this paper	280 m	280 dm	280 mm	_____ mm
7.	Your teacher's height	18 cm	18 dm	18 mm	_____ dm
8.	A meter stick's length	10 dm	10 cm	10 mm	_____ m
9.	Width of your hand	100 mm	100 dm	100 cm	_____ mm
10.	The width of our classroom	100 cm	100 dm	100 m	_____ m

Extra challenge:

11. estimate the length of a 12" ruler _____ cm
12. now measure it accurately _____ cm
13. What is the difference between your estimate and your measurement? _____ cm

Measure each of the following lines and record their lengths:

14.  _____ mm
15.  _____ cm
16.  _____ dm
17.  _____ cm
18.  _____ dm
19.  _____ cm
20.  _____ mm

Practicing Measurement Skills

Pick up a metric ruler and look carefully at the scale. You will see lots of little lines and every so often a much longer line marked with a number. The longer lines are centimeter (cm) marks, and the shorter lines are one-tenth of a centimeter (0.1), or millimeter (mm) lines.

1. Using your metric ruler, draw a line that is 3 centimeters long.

2. Draw a line that is 7 centimeters long.

3. a. Draw a line that is 1 centimeter long.

   b. Now draw a line that is 10 millimeters long.

4. How many millimeters are there in 1 centimeter? _____

5. What part of a centimeter is 1 millimeter? _____

The metric ruler can measure distance easily in millimeters or centimeters. If you wa to measure in millimeters, just multiply the numbers on the scale by 10. For example, th line marked 7 now becomes 70.

6. a. Measure the length of the following line in mm.

   _____

   Length = _____ mm

   b. Measure the length of the following line in mm.

   _____

   Length = _____ mm

To measure distances between two numbers on the number scale, count the millimete or smaller, lines between the numbers as tenths of a centimeter (0.1). For example, look Figure 1. The arrow is pointing to a millimeter line between 5 and 6 centimeters. You notice that this millimeter line is the third line beyond the 5 centimeters. If each milli- meter line is 0.1 centimeter, then 3 millimeter lines is 0.3 centimeter. Now, add 5 centi meters to the 0.3 centimeter. The answer is 5.3 centimeters.

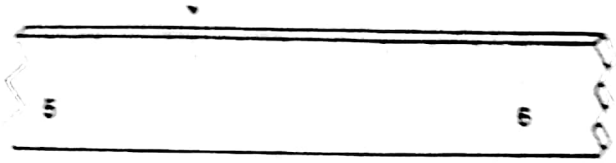


Figure 1

7. a. Measure the length of the following line in cm.

_____

Length = _____ cm.

b. Measure the length of the following line in cm.

_____

Length = _____ cm.

8. You have just seen how easy it is to measure distance in centimeters or millimeters. Measure the length and width of Figure 2 in centimeters and millimeters.

Length = _____ cm = _____ mm.

Width = _____ cm. = _____ mm.

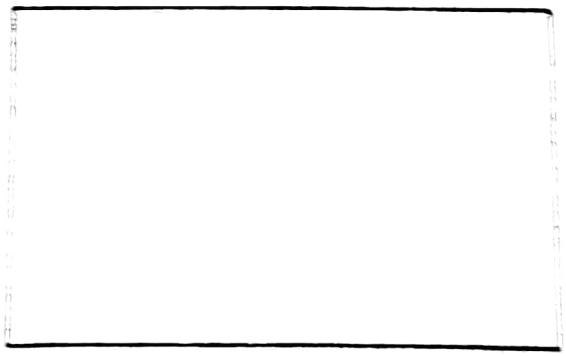


Figure 2

If you look over the work you have done, you should be able to answer the following questions without redoing any measurements.

9. a. How do you change a measurement from centimeters to millimeters?

_____

b. How do you change a measurement from millimeters to centimeters?

_____

Name
Date
Class

METRIC MEASURING

Directions: Use a metric ruler to find the length of each line in centimeters and millimeters.

1. 

_____cm _____mm

2. 

_____cm _____mm

3. 

_____cm _____mm

4. 

_____cm _____mm

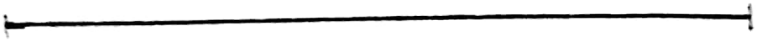
5. 

_____cm _____mm

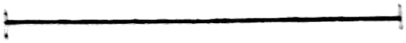
Directions: Use a metric ruler to find the length of each line in centimeter and find the metric conversion

6. 

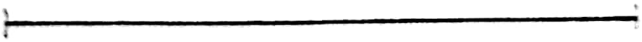
_____cm _____dm

7. 

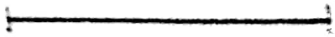
_____cm _____dm _____m

8. 

_____cm _____dm _____m _____dkm

9. 

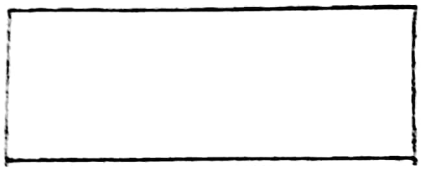
_____cm _____dm _____m _____dkm _____hm

10. 

_____cm _____dm _____m _____dkm _____hm _____km

Name
Date
Class

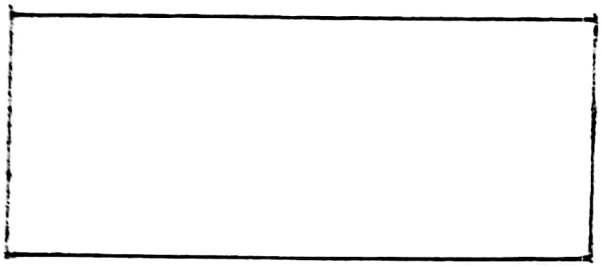
Directions: Find the perimeter of each rectangle in centimeters and millimeters.

11. 

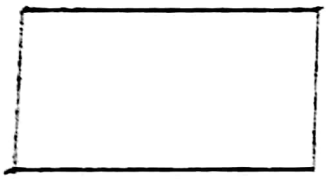
Formula: P=L+L+W+W

L +
L +
W +
W =
_____

_____cm _____mm _____cm

12. 

_____cm _____mm

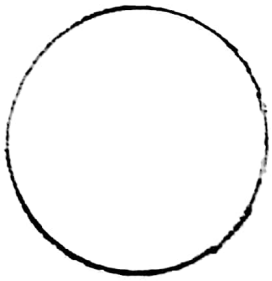
13. 

Formula: P=2L+2W

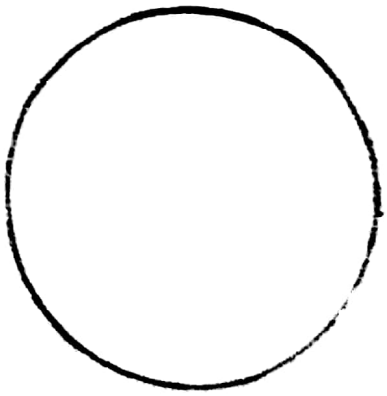
2xL=
+
2xW=

_____cm _____mm _____dm

Directions: Find the diameter of each circle using metric units.

14. 

_____cm _____m

15. 

_____cm _____mm _____m