

Title: “Measuring Up”

Brief Overview:

This Concept Development Unit will introduce the students to nonstandard and standard units of measurement. Students will use different objects to measure such as counting bears, base ten blocks, paper clips, pennies, etc. to identify nonstandard units of measurement. They also will be introduced to the centimeter, decimeter, and meter. Each lesson will include a literature connection, discussion exploration, and assessment.

Pre-Requisite-Basic knowledge of place value

NCTM Content Standard/National Science Education Standard:

Students will:

- Understand how to measure using nonstandard and standard units.
- Measure with multiple copies of units of the same size such as paper clips laid end to end
- Use repetition of a single unit to measure something larger than the unit.
- Use tools of measure
- Select an appropriate unit and tool for the attribute being measured

Grade/Level:

Grades 1-2

Duration/Length:

Three Days/50 minutes each day

Student Outcomes:

Students will:

- Know the difference between nonstandard and standard units of measurement.
- Know the difference between a centimeter, decimeter, and meter
- Learn how to manipulate a metric ruler
- Learn how to convert measurement units
- Measure objects using nonstandard units of measurement
- Measure objects to the nearest centimeter

Materials and Resources:

- Paper clips
- Pennies (10 rolls)

- Snap cubes
- String (yarn)
- Counting bears
- Book: How Long Is It? Learning to Measure with Nonstandard Units by: Elizabeth Kernan
- 1lb bag of skittles
- Meter stick
- Metric ruler
- Sewing tape measure
- 5 by 25 centimeter strip of tag board
- Chart paper
- Tape
- Single base 10 cubes
- Base 10 rods

Development/Procedures:

Lesson 1

Preassessment – Ask the question: What tools can you use to measure objects such as your hand, foot, blackboard, classroom, height, and desk? (Record answers on chart paper. Suggested answers include string, rulers, hands, snap cubes, pencil, and crayons.)

Launch – Read the book, How Long Is It: Learning To Measure With Nonstandard Units: By: Elizabeth Kernan. Discuss the various objects they used in the story. (See **Student Worksheet #1.**) List various nonstandard units of measurement.

Teacher Facilitation – Introduce the rules of measurement:

1. nonstandard items need to touch
2. measure from end to end
3. measure in a straight line
4. do not mix nonstandard items i.e.; no blocks and pencils to measure one object. Use all the same objects.

Start measuring objects using nonstandard units of measurement: Objects to measure:

- desk
- pencil
- chalkboard eraser
- book

Use the following items to measure:

- paper clips
- pennies
- snap cubes
- string/yarn
- counting bears

Student Application – Distribute snap cubes to pairs of students. Working in pairs, students will complete the following worksheets: **Student Worksheets #2a and 2b**. Estimate and then Measure.

Embedded Assessment- Observe what each student is doing. Make sure they are following the rules of measurement.

Reteaching/Extension – Discussion Questions:

What nonstandard unit would be easier to measure your wrist, a penny, or a piece of string? Why?

Lesson 2

Preassessment - Give each student a copy of **Student Worksheet #3**. Use counting bears to help bear find his way home. Students should estimate then complete the worksheet. Students should help the bear find his way home.

Launch – Working in pairs. Give each student one single base-ten cube and one single base-ten rod. Distribute **Student Worksheet #4**. Give students five minutes to complete the worksheet.

Teacher Facilitation – Review the nonstandard things we have used to measure with including bears, pennies, paperclips, strings, etc. Discuss with students that there is a standard unit of measuring. The single base-ten cube = 1 centimeter in length. Distribute centimeter cubes and ten rods to pairs of students. Allow time for them to discover how many centimeter cubes equals one ten rod. Explain that the ten-rod is not only equal to ten centimeters but has a special name: a decimeter. Next, distribute meter sticks and allow time for students to discover that one hundred centimeters equals one meter and ten decimeters equals one meter. Write the following on the board and have students copy in their math journals:

1 cube is 1 centimeter (1 cm) long on each side

1 base-ten rod is 1 decimeter (1dm) long = 10 centimeters

10 base-ten rods is 1 meter (1m) long = 10 decimeters = 100 centimeters

Student Application – Remind students to use the Rules for Measurement. Have students complete **Student Worksheet #5a and 5b** using a metric ruler. Estimate then measure.

Embedded Assessment – Ask students: If you were measuring your desk, what unit of measurement would give you an exact measurement? Nonstandard: paper clips, bears, pennies, etc. or Standard: metric ruler

Reteaching/Extension – Have students complete **Student Worksheet #6a and 6b** using cubes and metric ruler.

Lesson 3

Preassessment – Revisit the rules of measurement using nonstandard units of measurement, and standard units of measurement.

Launch – Review the measurement concept that 10 centimeters equal 1 decimeter, 100 centimeters equal 10 decimeters which in turn equals 1 meter. Also discuss the measurements' abbreviation (may include on the word chart).

Teacher Facilitation – Discuss with the students a list of items that a meter stick would best measure (car, blackboard, door, table, height, etc.). Workings in pairs have students complete **Student Worksheet #7**.

Student Application – Divide the students into groups of 4 for Center activities. Centers will be rotated every 10 minutes so that each group has ample time to participate.

First Center:

Each student will create meter ruler using tag board decimeter cutouts. Make copies of **Teacher Resource #1** for students. Have each student complete, cut, and tape decimeters rulers together.

Skittle Mania:

In this center, the students will explore the number of Skittles needed to make 1 meter. The students will figure out how many skittles will make a meter if 1 Skittle is equal to 1cm. Have meter stick and paper available for students to investigate and record.

Body Measurements:

The students will use a tape measure to explore different body measurements. See **Student Worksheet #8**.

Embedded Assessment – Monitor the students progress at the different centers.

Reteaching/Extension –

Have students trace an outline of their shoes. Student should measure their outlines in centimeters.

Summative Assessment:

Students will complete a Brief Constructed Response. See **Student Worksheets #9a, 9b, and Teacher Resource #2**

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Non-Standard Measurement

Name_____ Date_____

After reading How Long Is It: Learning to Measure with Non Standard Units, list various non standard units of measurement:

1)

2)

3)

4)

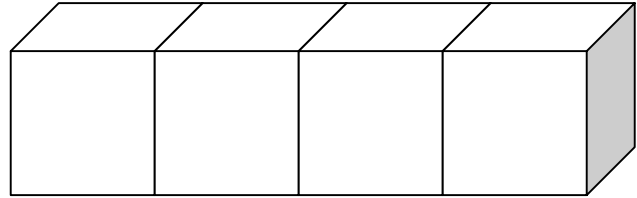
5)

Measuring With Cubes #1

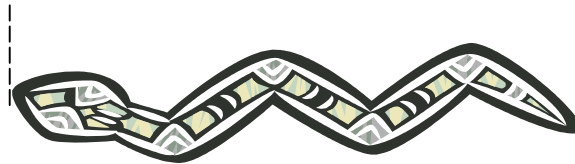
Name _____ Date _____

First, measure with cubes.

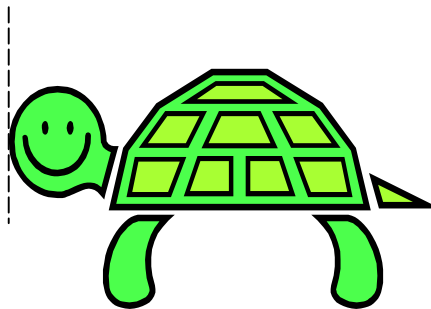
Next, count the cubes.



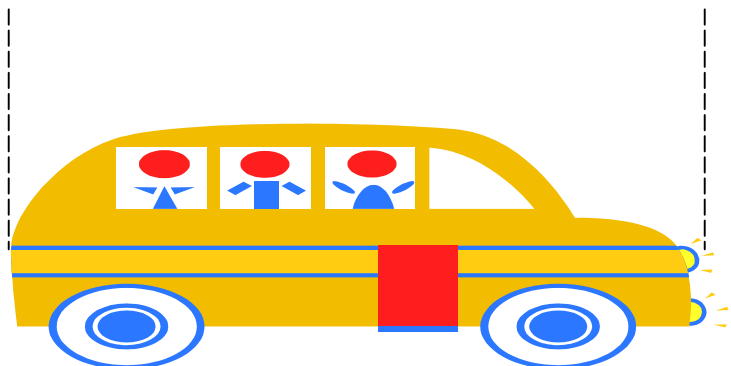
Then, write the number of cubes you needed to measure the picture.



1. This snake is _____ cubes long.



2. This turtle is _____ cubes long.



3. This school bus is _____ cubes long.

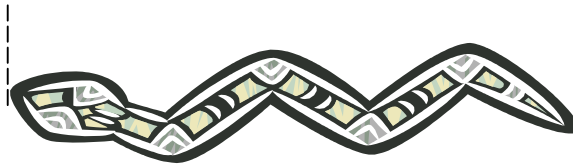
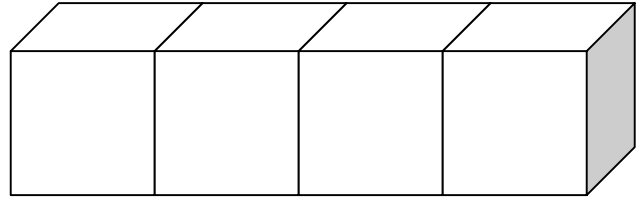
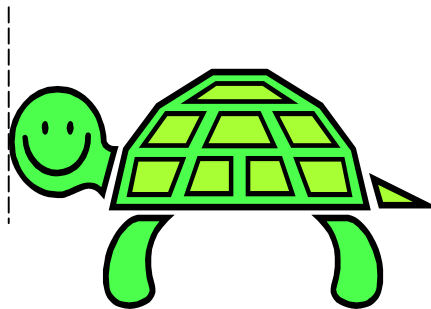
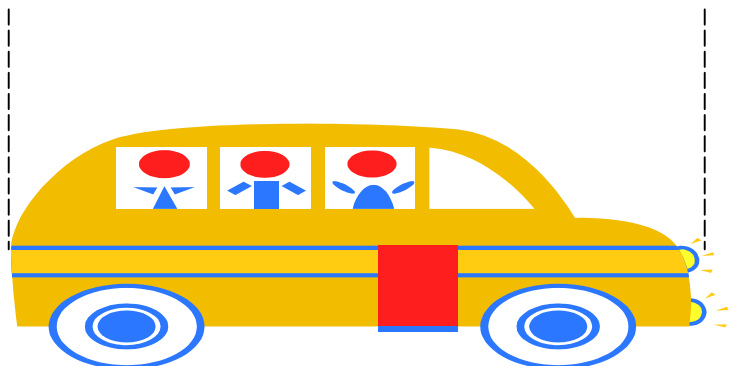
Measuring With Cubes #1 – Answer Key

Name _____ Date _____

First, measure with cubes.

Next, count the cubes.

Then, write the number of cubes you needed to measure the picture.

1. This snake is 4 cubes long.2. This turtle is 3 cubes long.3. This school bus is 5 cubes long.

Measuring With Cubes #2

Name _____

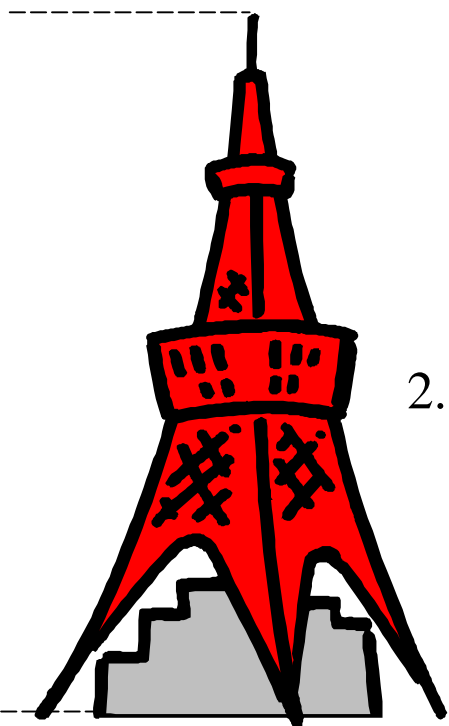
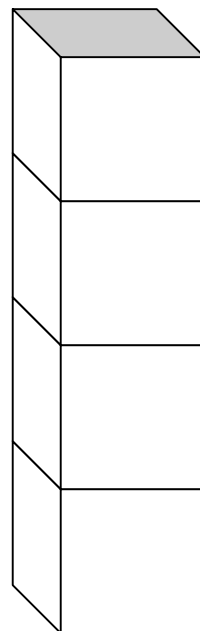
Date _____

First, measure with cubes.

Next, count the cubes.

Then, write the number of cubes you needed to measure the picture.

1. This sea horse is _____ cubes high.



2. This tower is _____ cubes high.

3. This giraffe is _____ cubes high.



Measuring With Cubes #2

Name _____

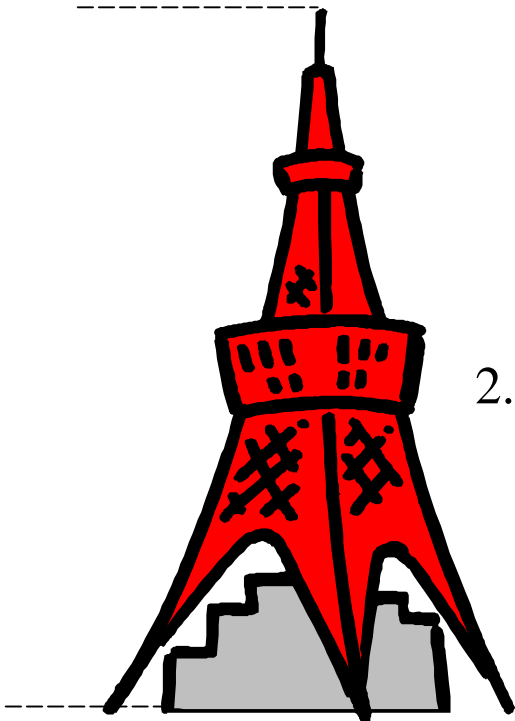
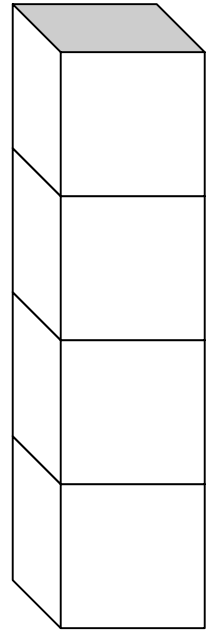
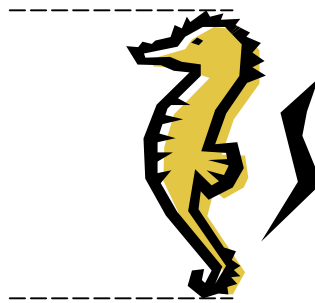
Date _____

First, measure with cubes.

Next, count the cubes.

Then, write the number of cubes you needed to measure the picture.

1. This sea horse is
 _____ 2 _____ cubes high.

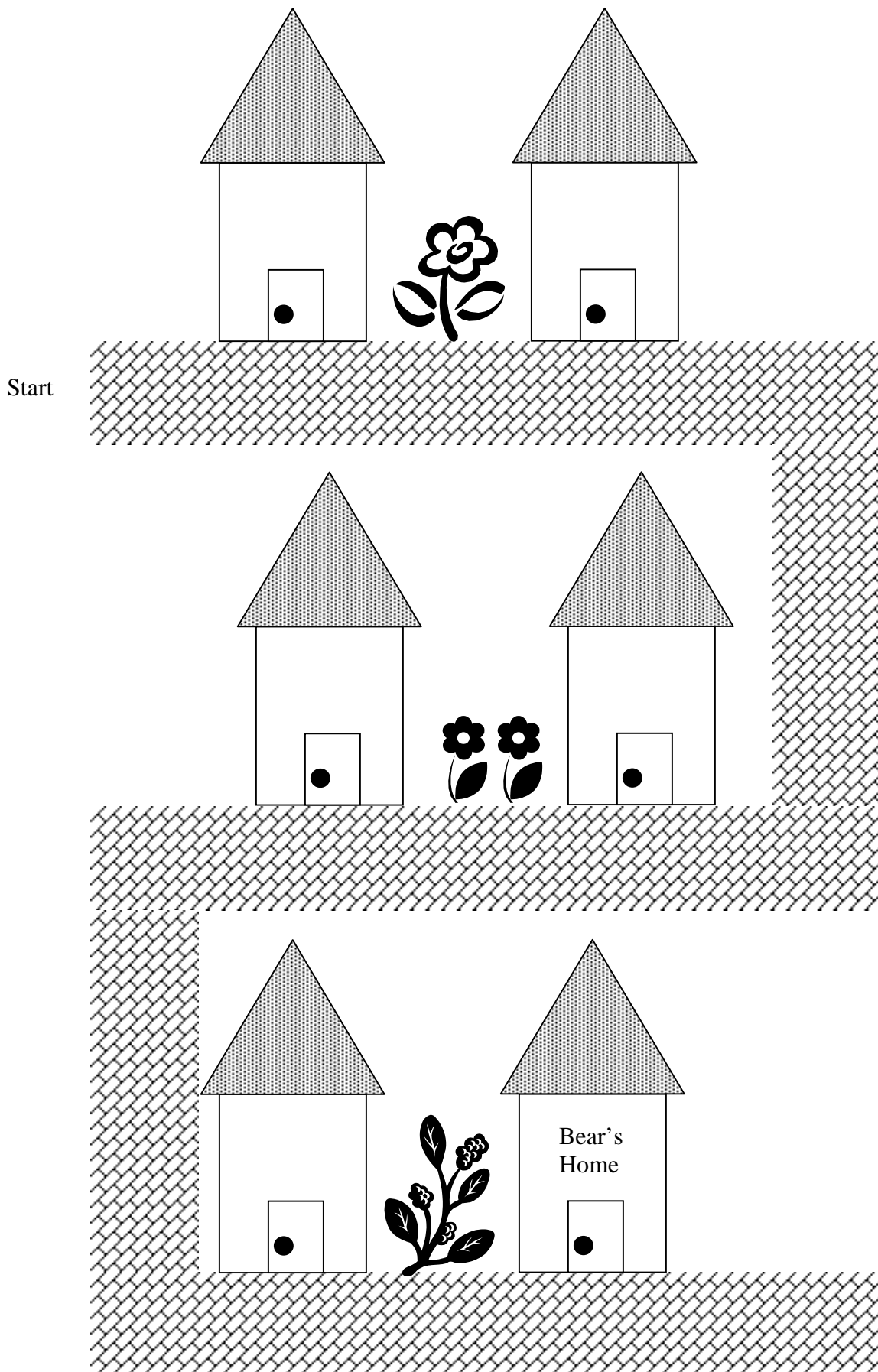


2. This tower is _____ 5 _____ cubes high.

3. This giraffe is _____ 4 _____ cubes high.

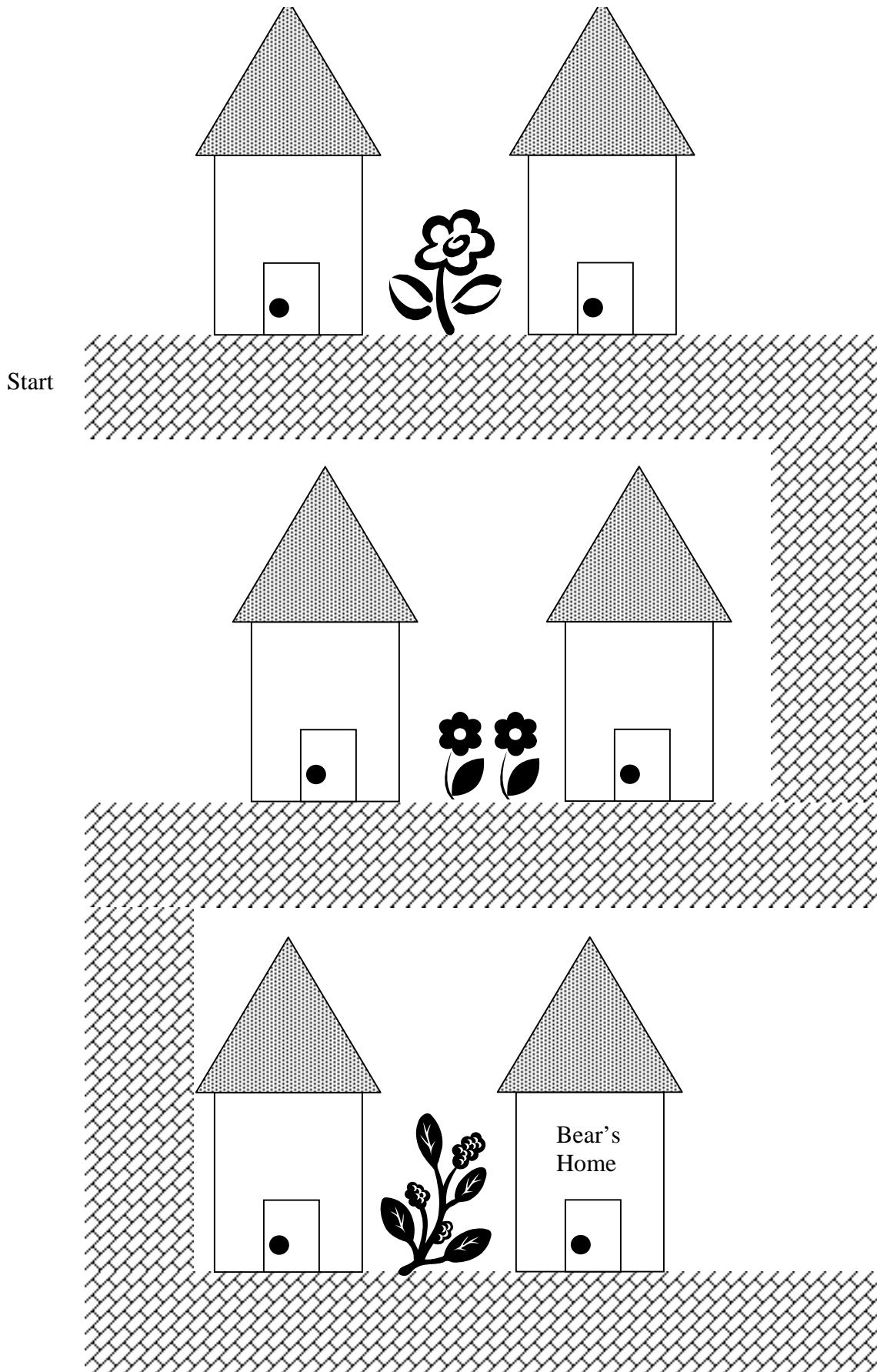


Help The Bear Find His Home



Directions: Students will begin where it says start. Then they place the bears onto the road until they find out how many bears it takes to get to the bear's home.

Help The Bear Find His Home – Answer Sheet



Directions: Students will begin where it says start. Then they place the bears onto the road until they find out how many bears it takes to get to the bear's home. The answer is 18

Centimeters

Name _____ Date _____

A. List 3 things that are as long as a centimeter cube:



1.

2.

3.

B. List 3 things that are as long as a ten-centimeter rod:



1.

2.

3.

C. List 3 things that are as long as 10 ten-centimeter rods:

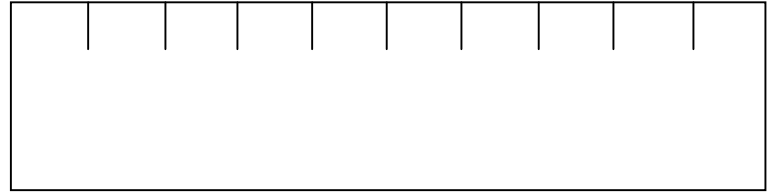
1.

2.

3.

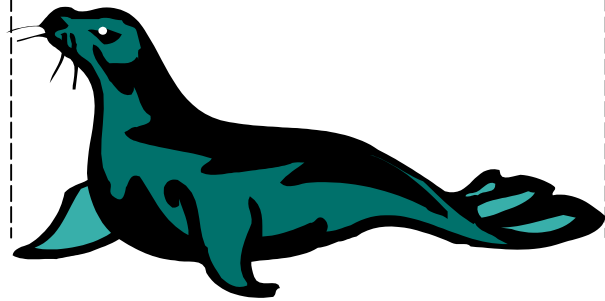
Using A Centimeter Ruler #1

Name _____ Date _____



First, use your ruler to measure in centimeters.

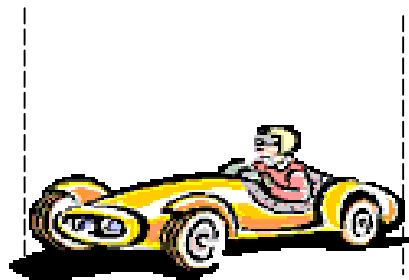
Then, write the number of centimeters that tells how long the picture is.



1. This seal is _____ centimeters long.



2. The scissors are _____ centimeters long.

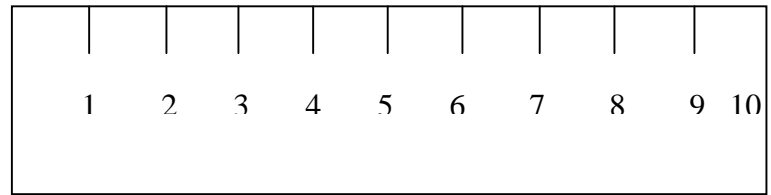


3. This racecar is _____ centimeters long.

Using A Centimeter Ruler #1 – Answer Sheet

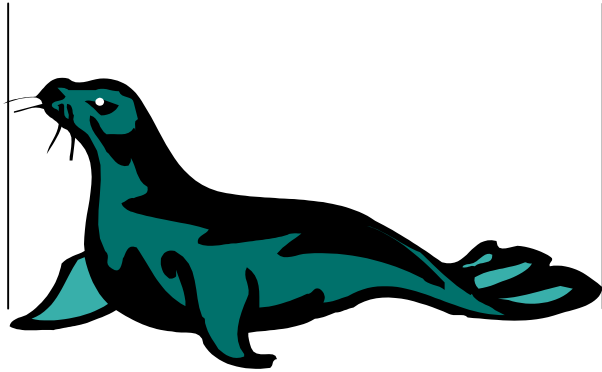
Name _____

Date _____



First, use your ruler to measure in centimeters.

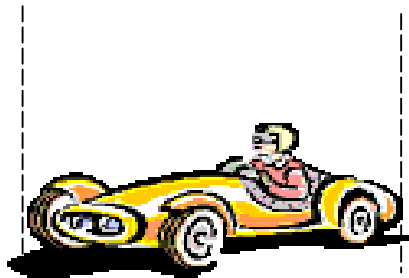
Then, write the number of centimeters that tells how long the picture is.



1. This seal is 8 centimeters long.



2. The scissors are 10 centimeters long.

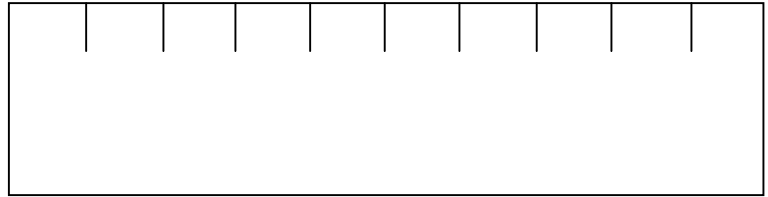


3. This racecar is 5 centimeters long.

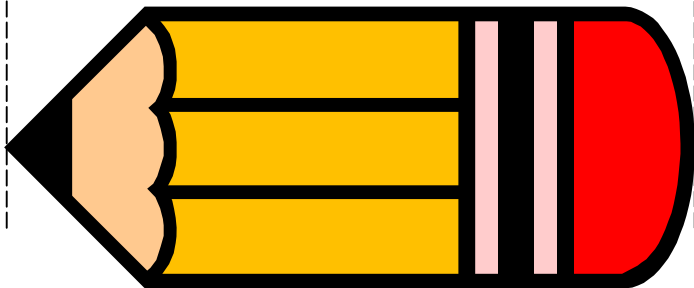
Using A Centimeter Ruler #2

Name _____ Date _____

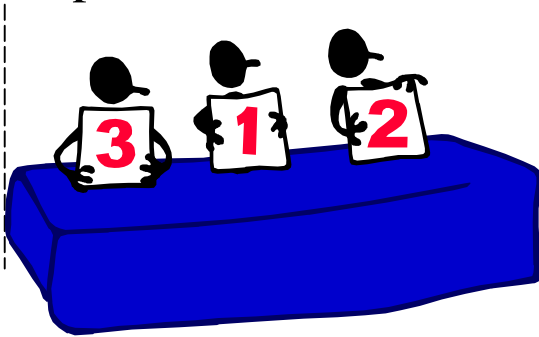
First, use your ruler to
measure in centimeters.



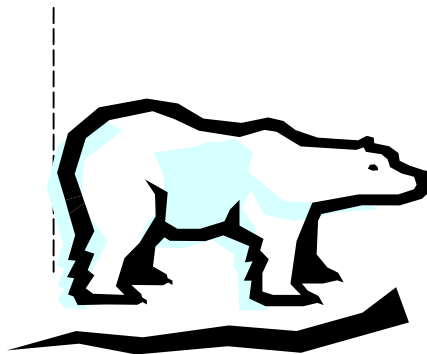
Then, write the number of centimeters that tells how long
the picture is.



1. This pencil is _____ centimeters long.



2. This table is _____ centimeters long.

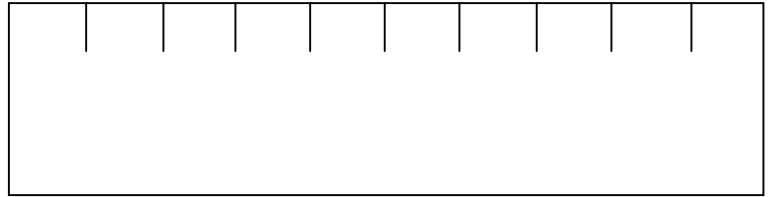


3. This bear is _____ centimeters long.

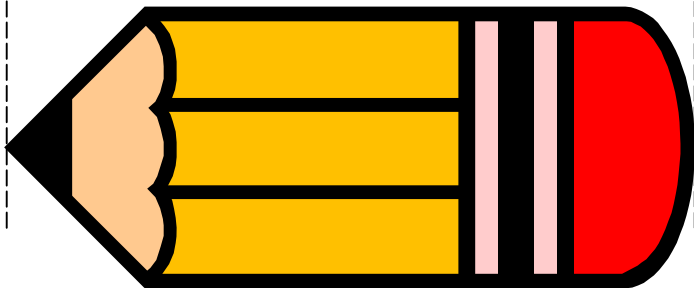
Using A Centimeter Ruler #2 – Answer Sheet

Name _____ Date _____

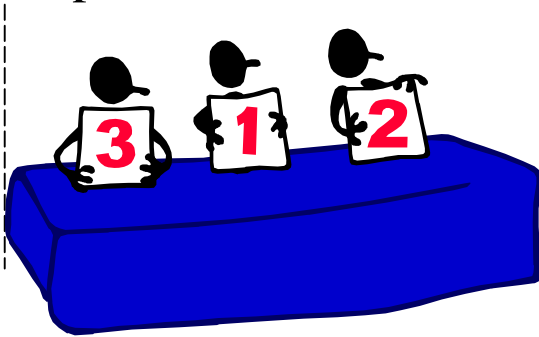
First, use your ruler to measure in centimeters.



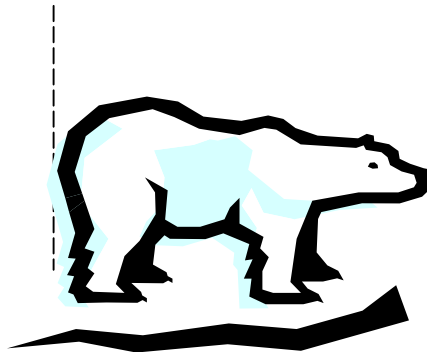
Then, write the number of centimeters that tells how long the picture is.



1. This pencil is 9 centimeters long.



2. This table is 7 centimeters long.



3. This bear is 5 centimeters long.

Name _____

Date _____

Practicing Your Measuring with
Nonstandard Units

Item to Measure	What unit did you use to measure?	Estimate	Actual Number of Units
hand length			
foot length			
wrist			
head			
arm			
leg			

Name _____

Date _____

Practicing Your Measuring with
Standard Units

Item to Measure	Estimate Length in Centimeters	Actual Length in centimeters
hand length		
foot length		
wrist		
head		
arm		
leg		

Name _____ Date _____

Measurement

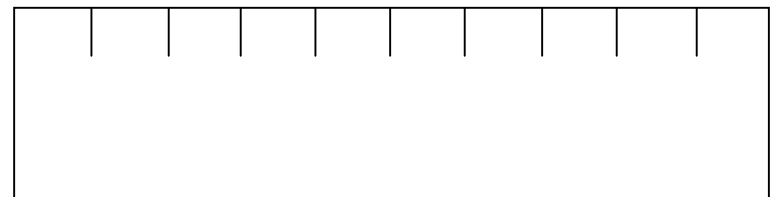
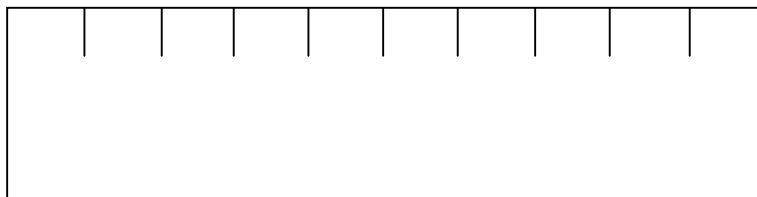
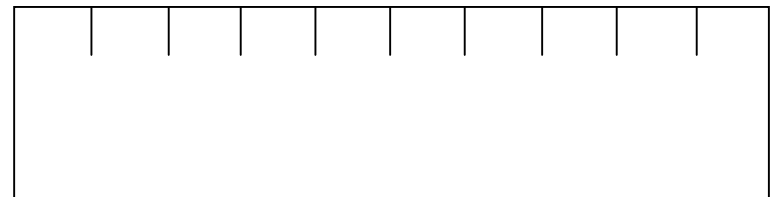
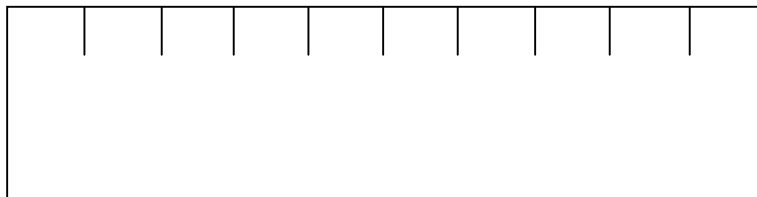
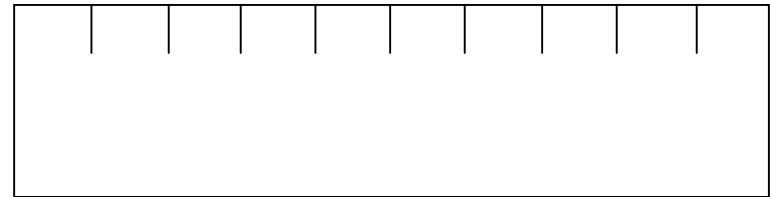
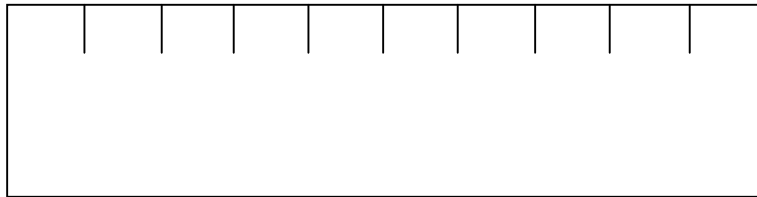
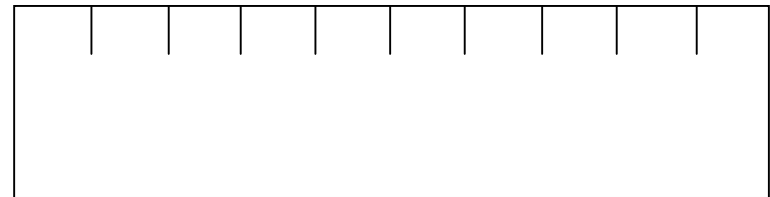
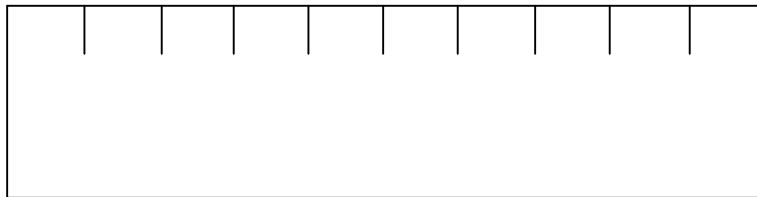
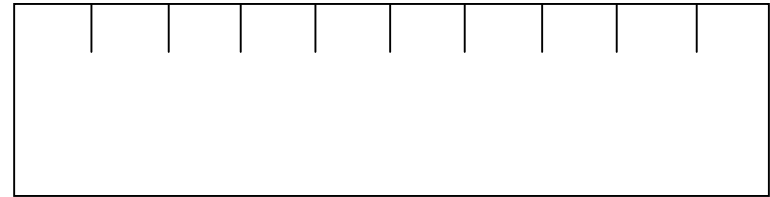
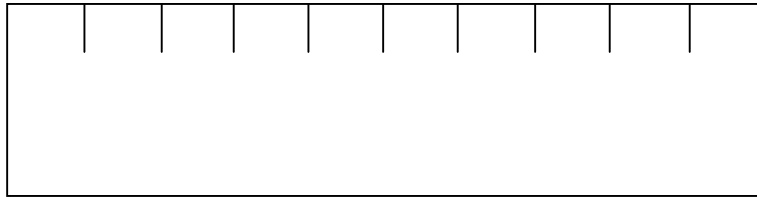
Find something in the classroom that matches the following lengths:

1. 1 centimeter (cm) long

2. 1 decimeter (dm) long

3. 1 meter (m) long

Decimeter Rulers



Name _____

Date _____

Measure the body parts listed below in centimeter:

1) Distance around your head _____

2) Distance around your waist _____

3) Length from knee to ankle _____

4) Distance around your wrist _____

5) Foot length _____

Brief Constructed Response



Part A

Question?

What unit of measurement would you use to measure how long a car is- standard or nonstandard?

Part B

Use what you know about standard and non-standard measurement to explain why your answer is correct.

Brief Constructed Response

Use your ruler to draw a line that is 10 centimeters long.

Part A

Question?

How many centimeters are in a decimeter?

How many decimeters are in 1 meter?

Part B

Use what you know about centimeters to explain why your answers are correct. You may use the metric ruler in your explanation.

MSA Brief Constructed Response “Kid Speak” Mathematics Rubric Grades 1 through 8

Score	
2	<p>My answer shows I completely understood the problem and how to solve it:</p> <ul style="list-style-type: none"> • I used a very good, complete strategy to correctly solve the problem. • I used my best math vocabulary to clearly explain what I did to solve the problem. My explanation was organized and logical. • I applied what I know about math to correctly solve the problem. • I used numbers, words, symbols or pictures (or a combination of them) to show how I solved the problem.
1	<p>My answer shows I understood most of the problem and how to solve it:</p> <ul style="list-style-type: none"> • I used a strategy to find a solution that was partly correct. • I used some math vocabulary and most of my reasons were correct to explain how I solved the problem. My explanation needed to be more complete, well organized or logical. • I partly applied what I know about math to solve the problem. • I tried to use numbers, words, symbols or pictures (or a combination of them) to show how I solved the problem. My explanation may not have been completely correct.
0	<p>My answer shows I didn’t understand the problem and how to solve it:</p> <ul style="list-style-type: none"> • I wasn’t able to use a good strategy to solve the problem. • My strategy wasn’t related to what was asked. • I didn’t apply what I know about math to solve the problem. • I left the answer blank.