The Long and Short of It: Introducing Measurement in Primary Grades

California State Standards:

Kindergarten MG 1.1 - Compare the length, weight, and capacity of objects by making direct comparisons with reference objects (e.g., note which object is shorter, longer, taller, lighter, heavier, or holds more).

Grade 1 MG 1.1 - Compare the length, weight, and volume of two or more objects by using direct comparison or a nonstandard unit.

Grade 2 MG 1.1 - Measure the length of objects by iterating (repeating) a nonstandard or standard unit.

Common Core Standards:

Kindergarten MD.2 - Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

Grade 1 MD.2 - Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

Grade 2 MD.2 - Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

Note:

As the debate continues over whether young children are developmentally ready to measure and whether we should begin teaching measurement with non-standard or standard measurement in the primary grades, exposure to measurement at an early age through meaningful experiences is key to building a foundation for the understanding of measurement.

Make sure that students are lining their units one after another. There should be no space between linker cubes or paperclips. This is often a mistake that students make when using a non-standard unit to measure.

Objective:

Students will compare lengths of feet, hands, and heads, as well as overall height, using several non-standard units as well as an inch ruler. They will graph the data and use it to answer questions on comparing lengths.

Vocabulary:

taller/shorter, longer/shorter, more/less, inches

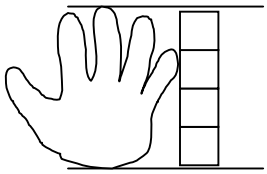
Materials: Markers, construction paper, linker cubes, paper clips, rulers, worksheets
Measurement book (see list at the end of this lesson)
Create a measurement area where students can measure their height against a wall.

Introduction: Today we are going to explore the idea of measurement by comparing the lengths of our hands, feet, and heads, as well as our total height.

Model: Introduce the concept of length and measurement by reading a children's book like *How Big Is a Foot?* by Rolf Myller. Discuss the problem that the king had when he tried to have a bed built for his queen. Explain to the students that to obtain an accurate measurement that we can share with others we must use a similar scale. We will practice this in a moment but first let's begin by comparing children of different sizes. Call three children of varying heights to the front of the room. Ask the students to name the tallest and the shortest. Place them in order from tallest to shortest. Repeat this with three more students. Explain that sometimes when we measure we also make comparison statements like tall and short. To be truly accurate we must measure.

Tell the students that you will be measuring their height while they work on measuring their hands, feet, and head. Demonstrate how you will be measuring the students' heights against the wall. Show how you will record the data on your graph. Tell students they will be recording their own data on a graph.

Pass out construction paper to students. Model how to trace a hand on the paper using markers. Show the students how to measure the length of the hand trace from the tip of the middle finger to the wrist using linker cubes.



4 cubes long

Do the same for the foot and head (heads can be traced by having the student lay down on a rug with her head on a piece of construction paper). The students should save the towers they made when measuring the body parts.

While the students are measuring their body parts with linker cubes you can measure and record students' height.

After the students have measured all body parts and you have measured their heights model how they should record the data on their graphs.

Students should compare towers. Place them in order from least to greatest. Compare the towers to the graph.

Show students how to create bar models to compare lengths.

Ask questions like:

Which body part is the longest?
Which body part is the shortest?
Who has the longest foot? Head? Hand?
Who has the shortest foot? Head? Hand?
How many more linker cubes is your hand compared to your foot? …hand compared to your head? Show me using a bar model.

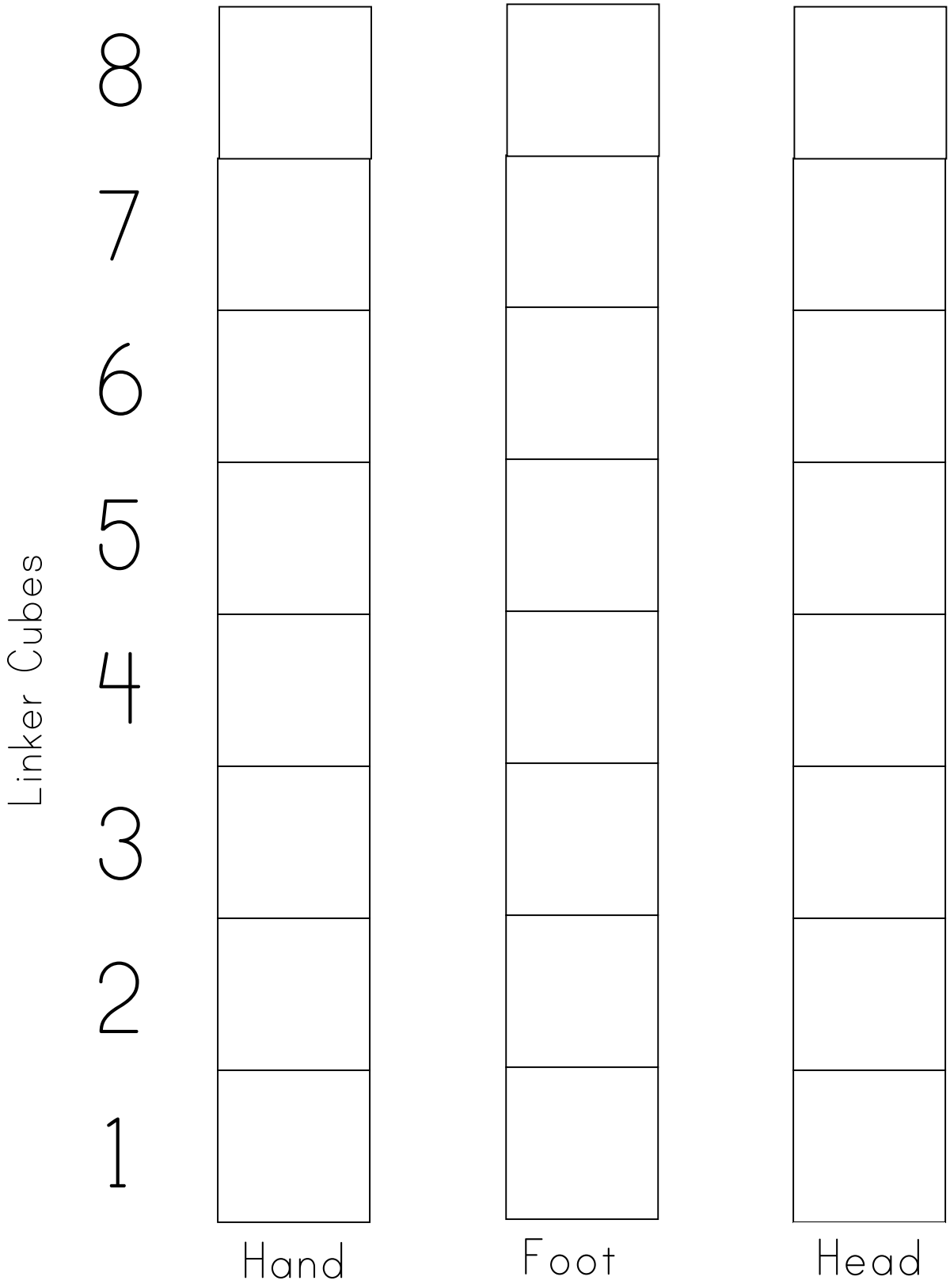
Students can trade graphs and use their partners graph to make linker cube towers.

Do the same activity using paper clips and then a ruler in place of linker cubes.
Compare and contrast the data using linker cubes, paper clips, and a ruler.
Look at the data comparing the heights of all the students.

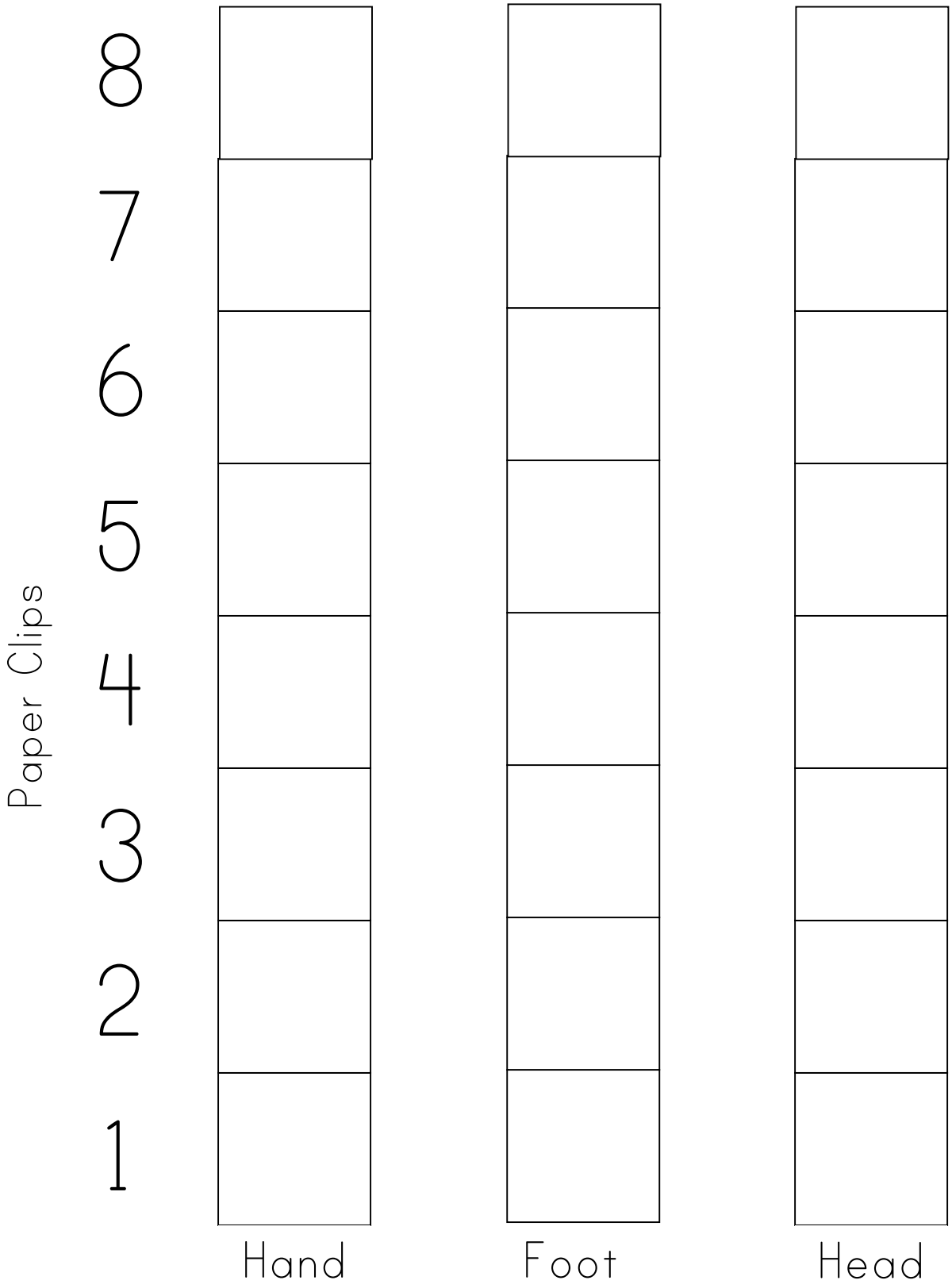
Closing:

Say: What did you notice about the length of you hand when you measured it with linker cubes and then paper clips?
How did a bar model help you to see the difference between the length of your hand and your foot?

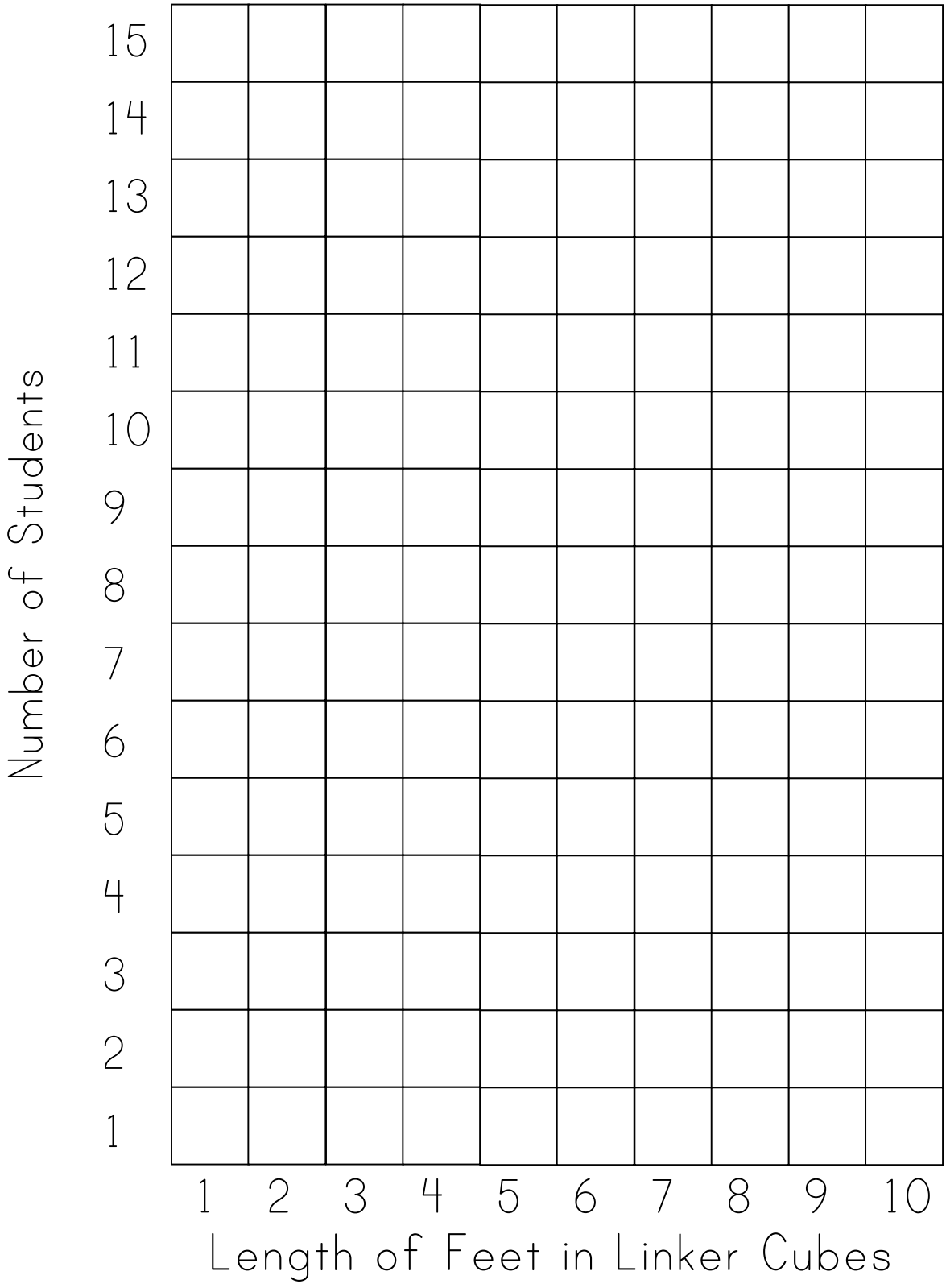
The Length of My Body Parts



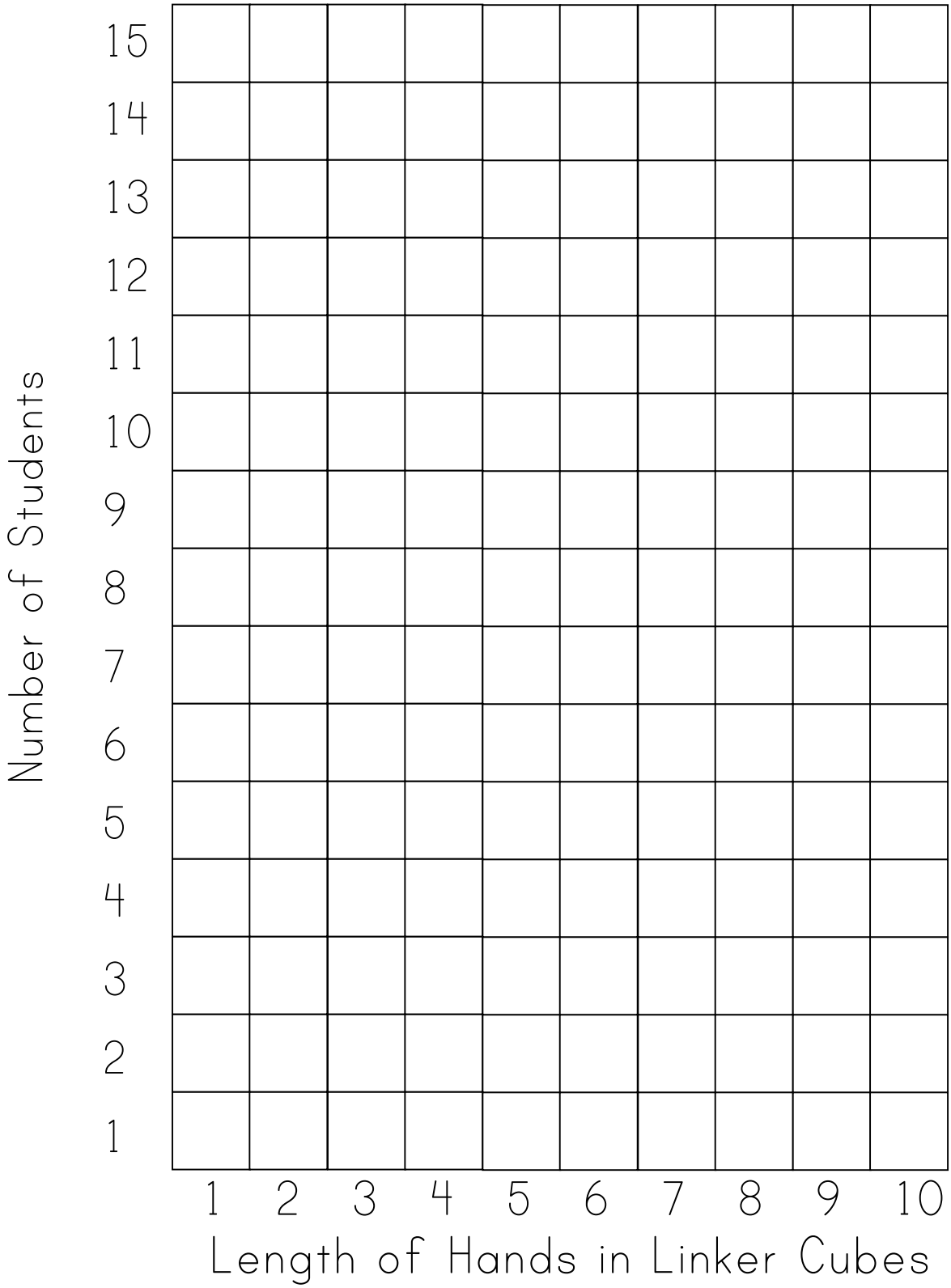
The Length of My Body Parts



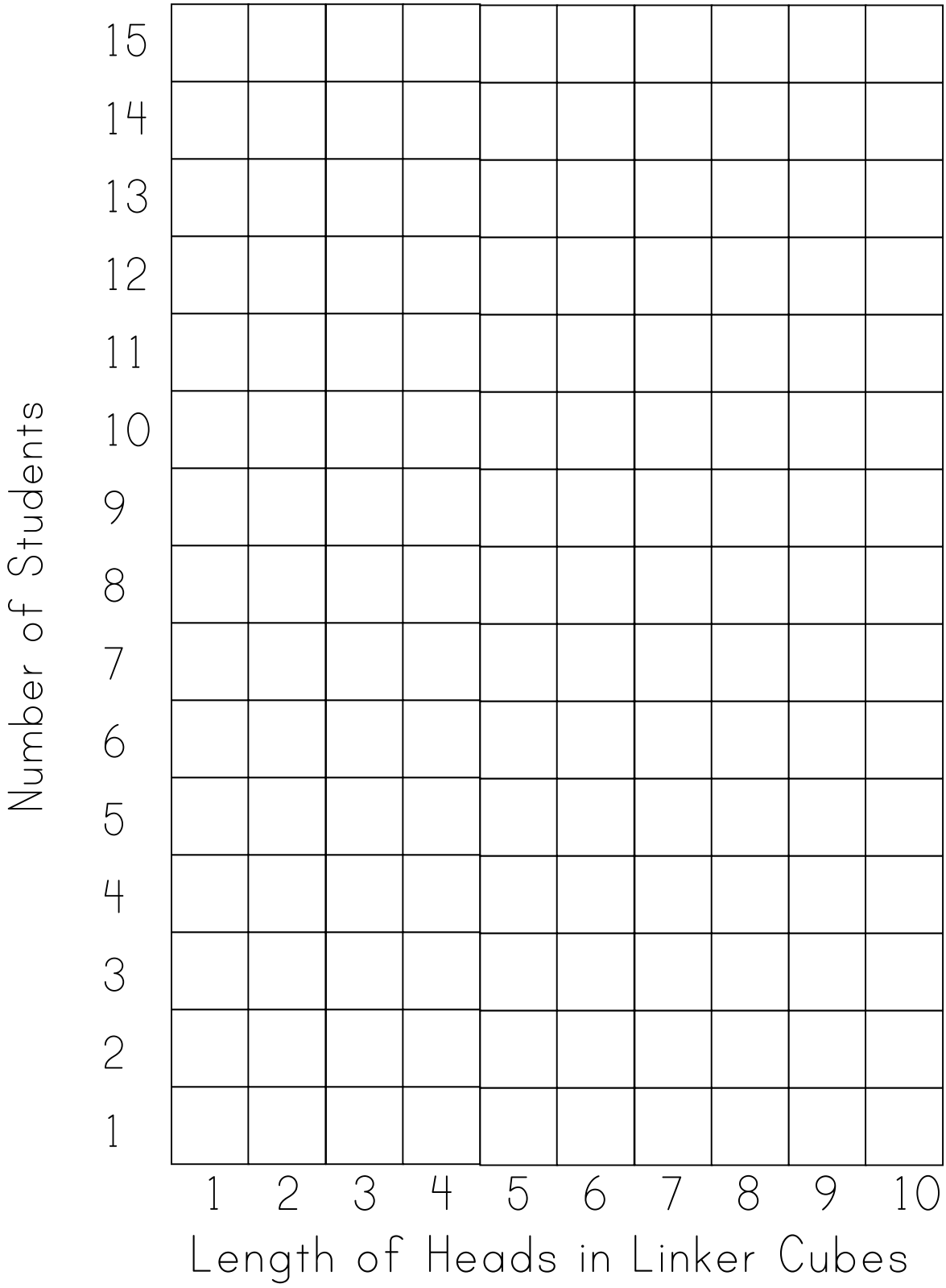
The Lengths of Students' Feet in Our Classroom



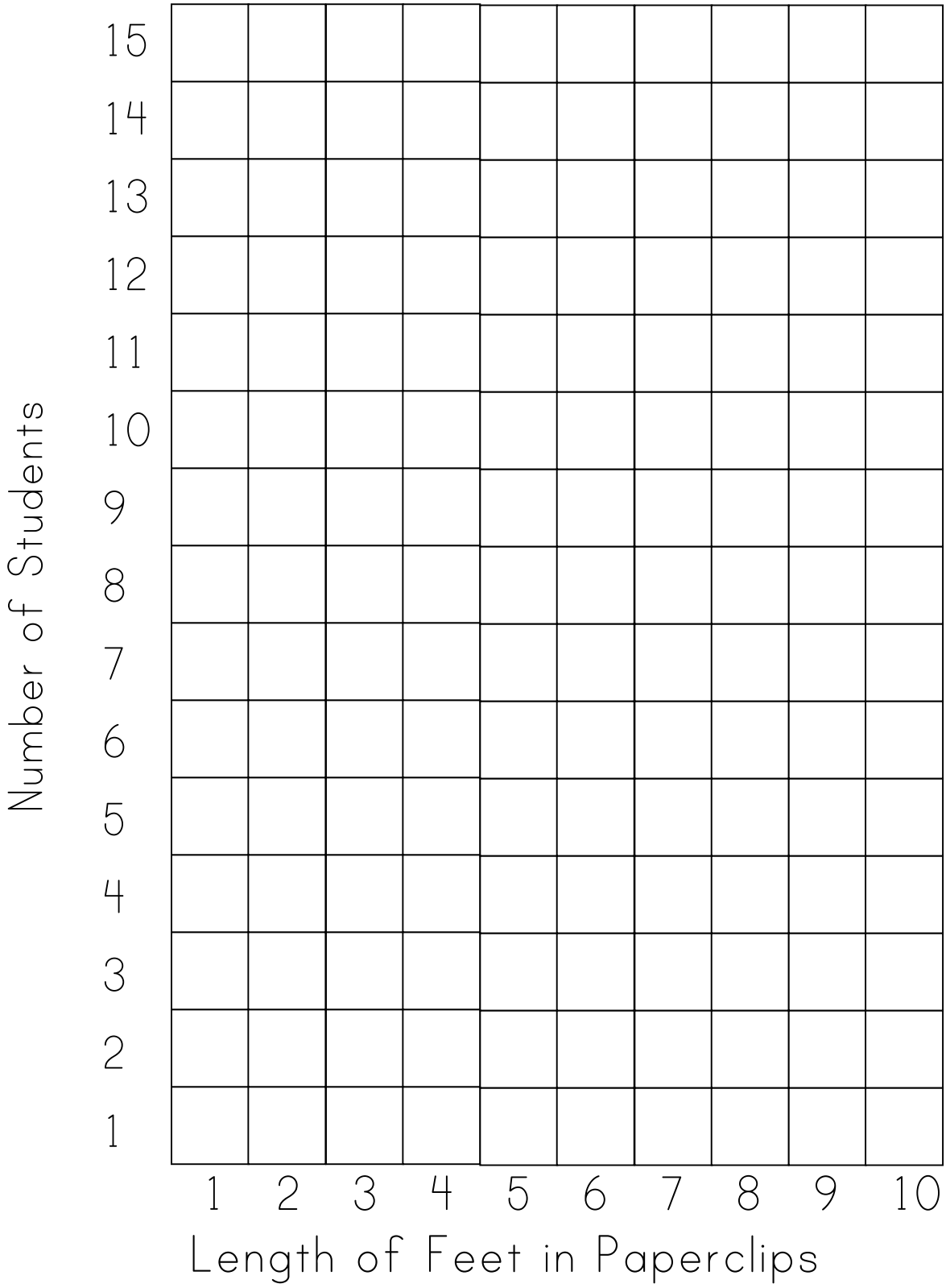
The Length of Student's Hands in Our Classroom



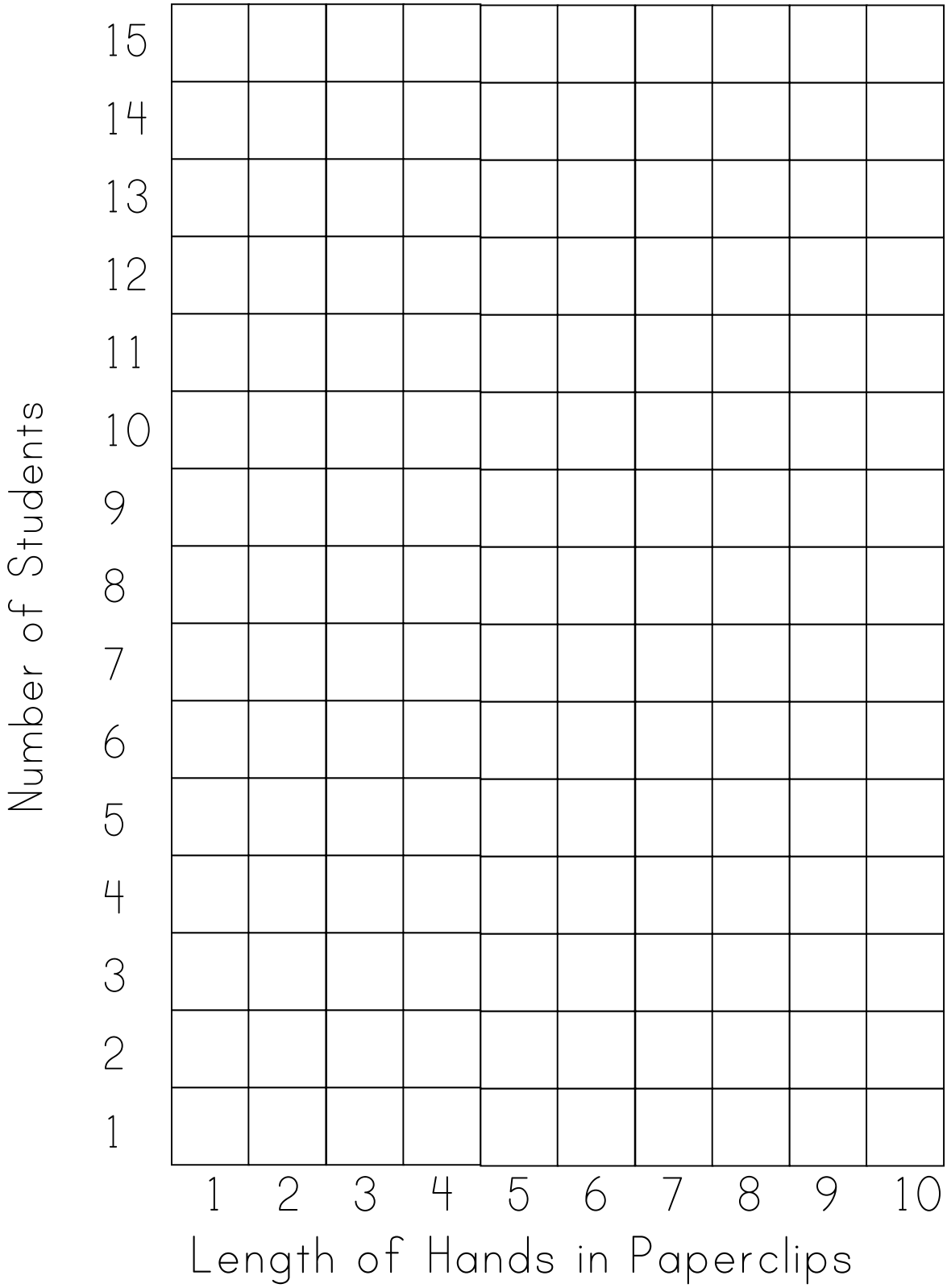
The Lengths of Students' Heads in Our Classroom



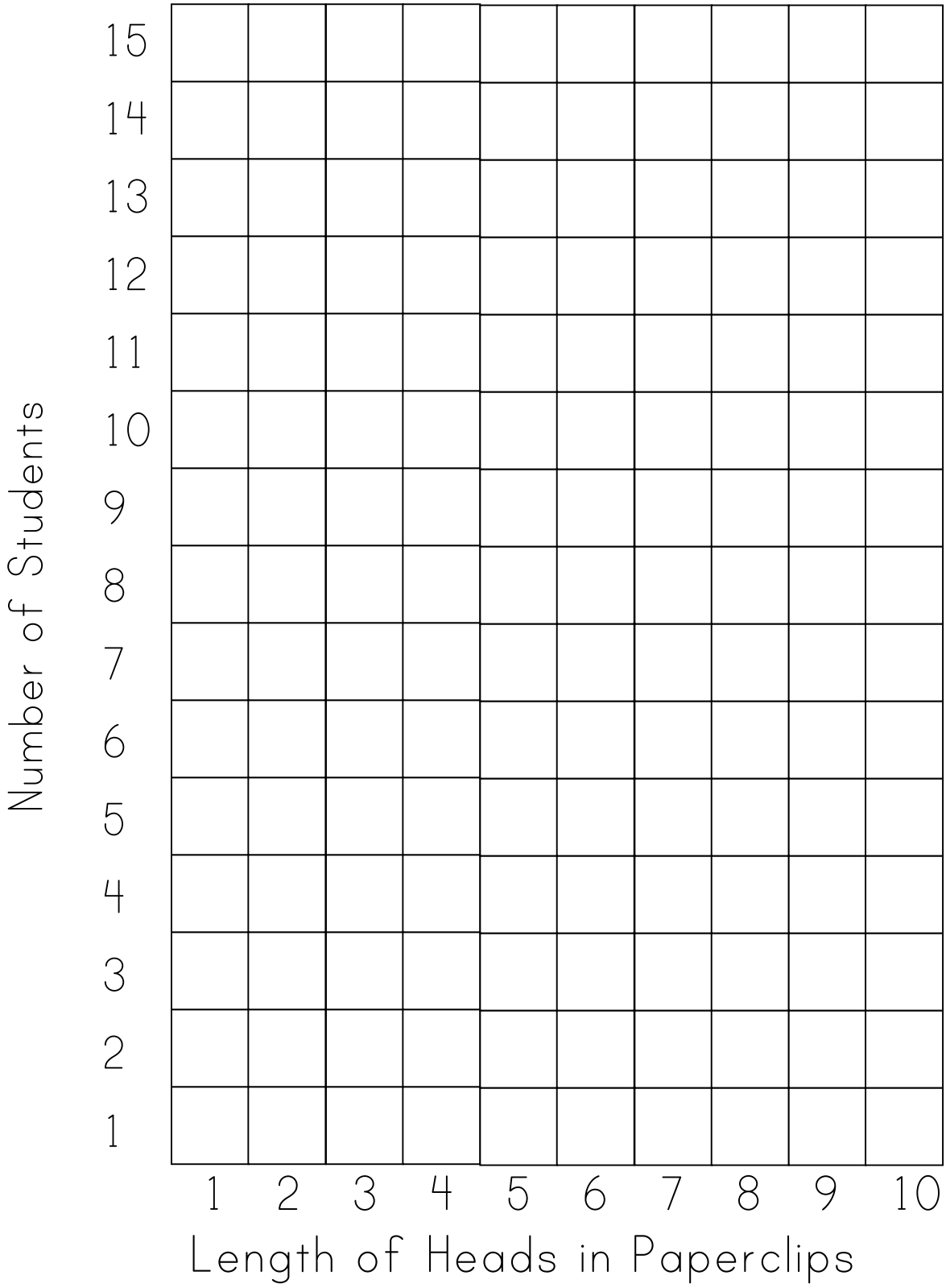
The Lengths of Students' Feet in Our Classroom



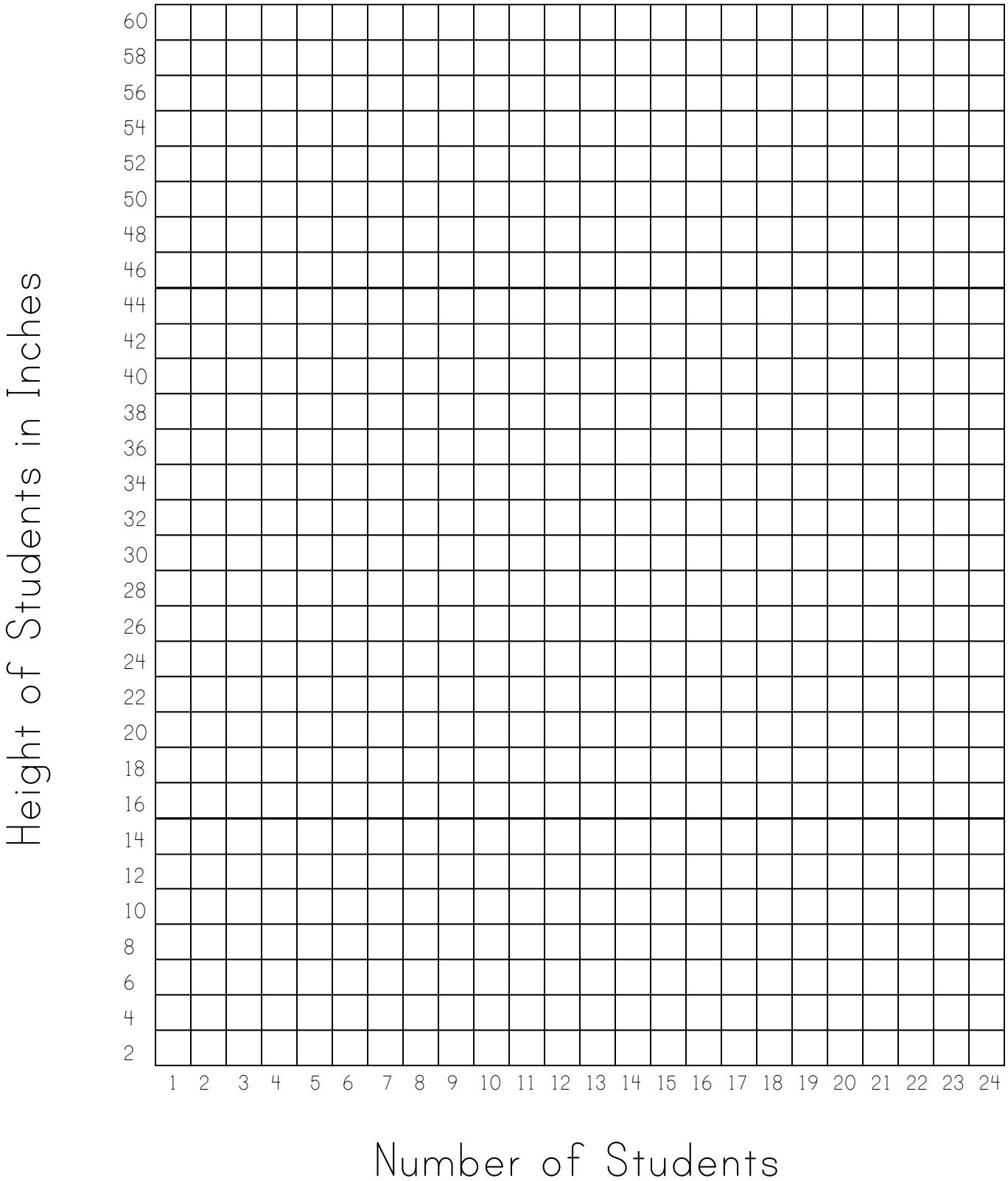
The Lengths of Students' Hands in Our Classroom



The Lengths of Students' Heads in Our Classroom



Height of Students in Our Classroom



Measurement Booklist

Briggs, Raymond. (1997). *Jim and the Beanstalk*. New York: Puffin.
ISBN-10: 0698115775

Hightower, Susan. (1997). *Twelve Snails to One Lizard: A Tale of Mischief and Measurement*. Hong Kong: Simon and Schuster.
ISBN-10: 0689804520

Leedy, Loreen. (2000). *Measuring Penny*. New York: Henry Holt and Company.
ISBN-10: 0805065725

Lionni, Leo. (1960). *Inch by Inch*. China: Harper Collins Publishers.
ISBN: 0-688-13283-9

Myller, Rolf. (1991) *How Big Is a Foot?*. New York: Yearling.
ISBN-10: 0440404959

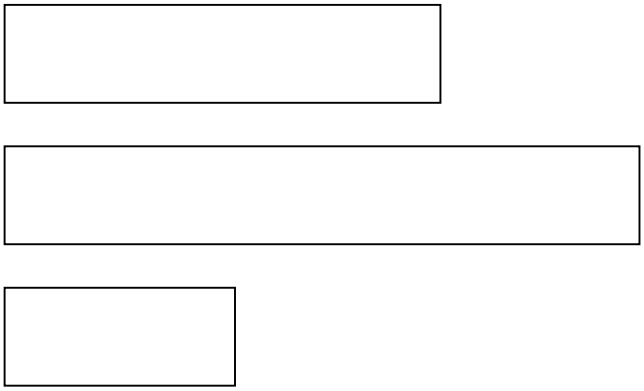
Pinczes, Elinor J. (2001). *Inch Worm and A Half*. Enos, Randall. Boston: Houghton Mifflin Company.
ISBN: 0-395-82849-X (RNF) ISBN: 0-618-31101-7(PAP)

Pluckrose, Henry Arthur. (1995). *Length*. New York: Children's Press' Edition.
ISBN-10: 0516454536

Name _____

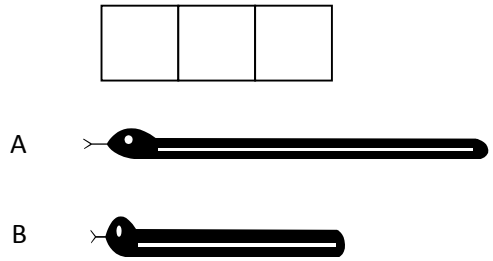
Kindergarten MG 1.1
CC K.MD.2

Circle the rectangle that is the longest.



Grade 1 MG 1.1
CC 1.MD.2

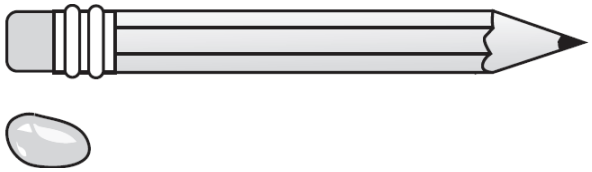
Which worm is about 3 squares long?



Draw a bar model to show your answer.

CST/Grade 2 MG 1.1
CC 2.MD.2

About how many jelly beans long is the pencil?



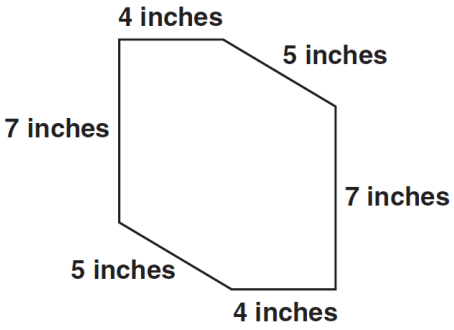
A 3 **B** 7

C 10 **D** 12

Your friend Mary says the answer is A. Explain why she is correct or incorrect.

CST/Grade 3 MG 1.3

What is the perimeter of the figure?



A 18 inches **B** 22 inches

C 24 inches **D** 32 inches

Tim thinks the answer is 16 inches. What mistake could he be making?