

Matching Lengths of Arms and Legs

Overview and Objectives

In this lesson, students have an opportunity to apply what they have learned in Lesson 3 about the importance of using beginning and ending points when matching. They build on this idea by exploring the use of a common starting line when comparing on a representational bar graph. Appreciating the need for a common starting line helps strengthen students' concept of making fair comparisons. In addition, students take the first step toward predicting by making a guess about the lengths of their arms and legs. Throughout the unit, students will gain more experience with using a common starting line and making predictions.

- Students guess which team member has the longest arm and longest leg.
- Students match the lengths of their arms and their legs and graph their results in serial order from shortest to longest.
- Students discuss why it is important to use a common starting line when making comparisons.
- Students compare the information on the arm and leg graphs with the information on the height graph from Lesson 3.

Background

When students match the lengths of their arms in this lesson, they will place the adding machine tape from the wrist to the end of the shoulder, as in Figure 4-1. When students match the lengths of their legs, they will place the tape from the outside of the ankle to the outside of the hip, as in Figure 4-2.

When students construct a graph in this lesson, they will begin to recognize the importance of a common starting line. You may want to explain that in a race, people need to begin, as well as end, at the same place. If everyone started from different places, they would be running different lengths, and the race would not be fair. Similarly, by placing the arm and leg tapes at a common starting line, the students will be able to make fair comparisons.

In **this** lesson, students also gain experience making guesses, the first step in learning to make predictions. You may want to mention to students that scientists often make predictions; for example, a meteorologist makes predictions about the coming weather.

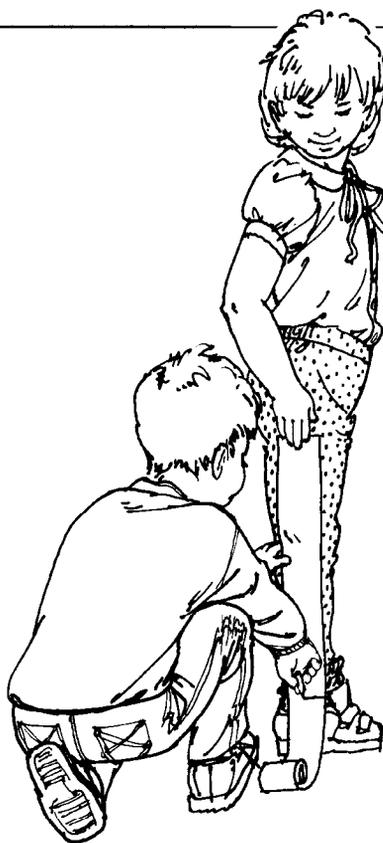
Figure 4-1

Matching arms



Figure 4-2

Matching legs



Materials*For each student*

- 1 science journal
- 1 **Record Sheet 4-A: Matching Our Arms and Our Legs**

For every two students

- 1 roll of yellow adding machine tape
- 1 roll of pink adding machine tape
- 1 pair of scissors
- 1 marker
- 1 bottle of glue
- 1 resealable plastic bag, 23 x 30 cm (9 x **12 in**)

For every four students

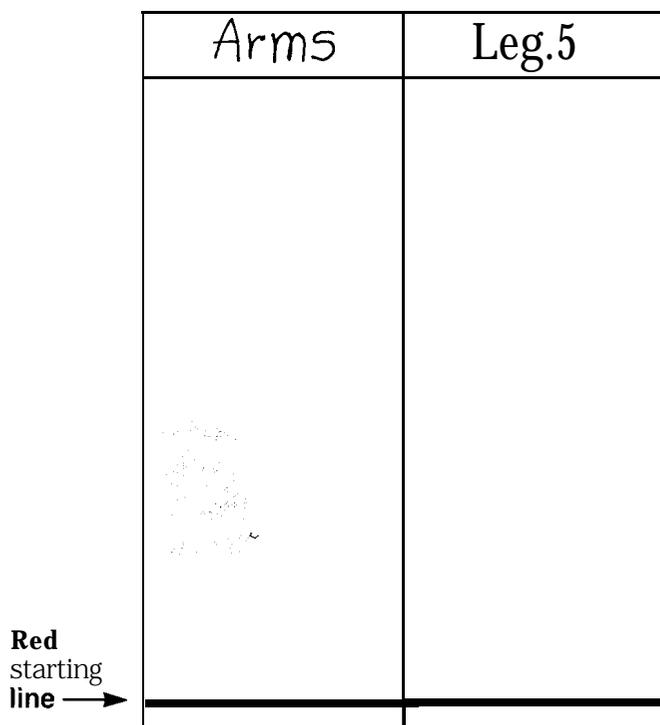
- 1 “Our Heights” graph (from Lesson 3)
- 1 sheet of newsprint

For the class

- 1** red marker

Preparation

1. Arrange the materials in the distribution center. Students will use the pink adding machine tape to match arms and the yellow to match legs. This will help them arrange and read the information on the graphs more easily.
Note: This is the only lesson in which the color of adding machine tape is important. In subsequent lessons, students can choose to use either pink or yellow tape for matching.
2. Prepare a piece of newsprint for each team, as illustrated in Figure 4-3. Be sure to use a red marker to make the starting line. Label the graph “Arms/Legs.”

Figure 4-3*Sample graph*

3. Group students in the teams from Lesson 3. Within each team, match partners.
4. Copy **Record Sheet 4-A: Matching Our Arms and Our Legs**, on pgs. 40–41, for each student.

Procedure

Have students prepare a science notebook (loose-leaf notebooks or folders with notebook paper inside work well) that they will use throughout the unit. Explain that the notebook will be a record of their thoughts, ideas, and drawings. Then ask students to think about some reasons for writing down the date above each day's entry.

2. Show the class the “Arms/Legs” graph. Ask students questions such as the following:
 - Why would someone need to know the length of your arms or legs?
 - If you were buying clothes, would you need to know the length of your arms and legs? Why?
3. Share with students that today they will gather information about the lengths of their arms and legs. They will record it on a graph, as they did in Lesson 3.

Note: **You can** decide which arm and leg the teams will match (right or left), or you can let each team decide. It may help avoid confusion if **you** establish the beginning and ending points on the arm (wrist and shoulder) and leg (ankle and hip) before the students move to **the** next step.
4. Distribute **Record Sheet 4-A: Matching Our Arms and Our Legs** to each student.
5. Describe the process students **will** follow.
 - With your partner, collect the materials from the distribution center.
 - Everyone on the team should match the same arm (right or left).
 - Without actually placing your arms side by side, simply observe your arm and compare its length with the lengths of the arms of your team members.
 - Make an individual guess about which team member has the longest arm. Record your guess on Record Sheet 4-A.
 - Match the pink tape to the length of your partner's arm. Match the tape from your partner's wrist to his or her shoulder. Cut or tear the tape and write your partner's name on it.
6. Ask students to switch roles so that both partners have had an arm matched with the tape. Then invite students to do the following:
 - Everyone on the team should match the same leg (right or left).
 - Without actually placing your legs side by side, simply observe your leg and compare its length with the lengths of the legs of your team members.
 - **Now** make an individual guess about which team member has the longest leg. Record your guess on Record Sheet 4-A.
 - Using the yellow adding machine tape, match your partner's leg from ankle to hip. Cut or tear the tape and write your partner's name on it.
7. Pass out an “Arms/Legs” graph to each team. Explain the process for constructing the graph.
 - Using **the** red line as the common starting line, arrange your team's arm tapes from shortest to longest on the section of the graph labeled “Arms.”

- Using the red line as the common starting line, arrange your team's leg tapes from shortest to longest on the section of the graph labeled "Legs."
 - After your team has checked the tapes to see that they are in the right order, glue them to the graph.
 - After comparing lengths of arms and legs, write the name of the team member with the longest arm on your record sheet. Do the same for the team member with the longest leg.
8. Circulate to assess how the students are comparing and arranging the tapes. You may want to record any observations in a log to aid in the assessment process throughout the unit.

Final Activities

1. Give the teams a few minutes to observe and discuss their graphs.
2. Have each team share its graph with the class.
3. Ask students to compare their "Arms/Legs" graphs with the "Our Heights" graphs from Lesson 3 and **find** ways that they are alike and different. Students have said, "We used adding machine tape in both graphs," "All of our tapes are sitting on the red line," and "People glued the height tapes all over."
4. Ask students to discuss the following questions:
 - How did you use the red starting line on the graph?
 - Is it important to have a common starting line? If yes, why?
 - How is this graph like your height graph? How is it different?
 - What information can you read from the graph?
5. Have students return their materials to the distribution center.

Extensions

(MATHEMATICS) (ART)

Ask parents or an alterations shop to donate a few clothing patterns that are no longer used. Explain to students how the patterns were used to make clothes. Have students use newspaper, craft paper, or construction paper to make clothing for their body cutouts.

(MATHEMATICS)

2. Have your students match the arms and legs of other first-graders and older and younger students. Students can then compare these tapes with the tapes on the graphs made in this lesson.

Record Sheet 4-A

Name: _____

Date: _____

Matching Our Arms and Our Legs

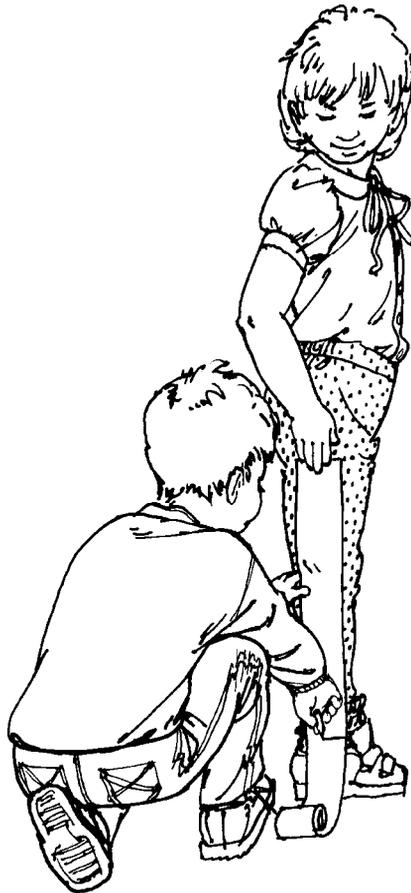


I think -- _____ has the longest arm.

Now match with the tape.

I found out that----- has the longest arm.

Record Sheet 4-A

Name: _____
_____Date: _____
_____**Matching Our Arms and Our Legs (continued)**

I think ----- has the longest leg.

Now match with the tape.

I found out that --- _____ has the longest leg.
