

Comparing Heights I

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Summary	Students compare the heights of two children, measure, compare, and represent one's own height in relation to a peer's height, and focus on the differences between heights.
Goals	1. Work with differences between two measured lengths.
Materials	Overheads, Handouts
Keywords	Data Collection Describing Magnitudes Full Class Discussion Hands-On Activity Small Group Work
Notes	The focus of this lesson is reifying differences, as well as representing unknown amounts. One of the challenges children face when they compare measures is to consider the differences between two measured quantities as a dimension on its own. In this class we attempt to help children overcome this challenge.

Introduction:

In this lesson we will help children to conceive of the difference between two heights as an object with a dimension of its own.

Activity Plan:

1. Measuring heights [Whole Class]

Ask two children to stand at the front of the class. Have the two children stand back to back, and ask them to compare their heights.

Ask the class:

Are they the same height? Who is taller? Who is shorter?

Ask a few children to come to the front of the class and:

Show with your hands how much <shorter child> would have to grow to become the same size as <taller child>?

Show with your hands the difference between their heights.

2. Diagramming two heights [Group Work]

Distribute the handout on Page 1 and show the corresponding overhead (also Page 1) and ask the class to work in pairs and to represent the two children's heights on paper in some way.

3. Adopting lines to represent heights [Whole Class]

Select the work of a few children to show to the whole class. Discuss and determine with the children where, in their drawings, they represented each height and where they represented the difference between them.

Then introduce vertical lines to represent the heights of the two children (using the overhead on Page 2) and ask volunteers to determine:

Whose name should go under the taller line?

Whose name should go under the shorter line?

Show in the drawing how much <shorter child> would have to grow to be the same size as <taller child>.

Show where is the difference between the children's heights?

After the students have discussed their work, introduce the line segment representation for the difference between them, moving the overhead on Page 3 over Page 2 overhead if using transparencies. If not using transparencies, the instructor can draw, on Page 2, the new line segment representation for the difference between the heights.

4. Measuring their own heights [Group Work]

Have the children work in pairs to measure one another's heights and record the data on Page 4 handout.

Then each child should represent the pairs' heights on paper, find the difference between the heights, and write some mathematical sentences about the heights, also using Page 4.

5. Comparing heights [Whole Class]

Discuss the children's work. Compare representations, ways of indicating the difference. Highlight various ways of naming the difference (for example, "extra", "How many inches to grow", etc.)

Ask children if the heights could be represented horizontally (using the overhead on Page 5).

Would this picture mean the same thing? Why or why not?

State that child A (name of one of the children in class) is taller than child B (the partner child A worked with) and ask the children to name the horizontal lines and to show the difference between them.

6. Introducing comparisons between two discrete amounts [Whole Class]

If there is time left, ask the children to discuss whether or not the two lines could represent the amounts of money two children might have. Ask them to generate other dimensions that could be represented by the two lines.

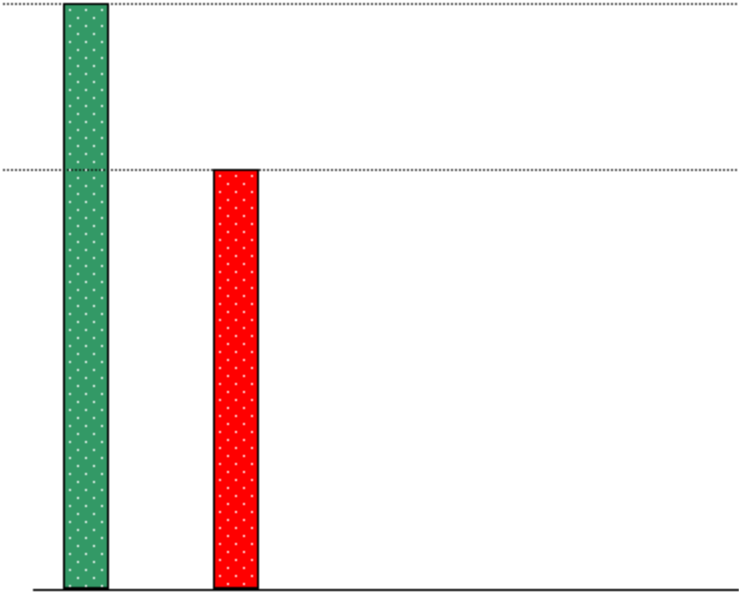
7. Present homework for students [Whole Class]

Display the homework (Page 6) explain what it is about and what you expect the students to do.

Overhead and Handout: Diagramming Heights in Schematic Form (Page 1)

Name: _____ Date: _____

Show the heights of the two children in front of the class and the difference between their heights:



**Overhead: The Difference between the two heights as
a Line Segment (Page 3)**



Overhead and Handout: Measuring and Diagramming Two Heights (Page 4)

Name: _____ Date: _____

Partner's Name: _____

- Work with a partner.
- Measure your partner's height. Have your partner measure your height.
- Then fill in the table:

Name	Height in inches
(You)	
(Your partner)	

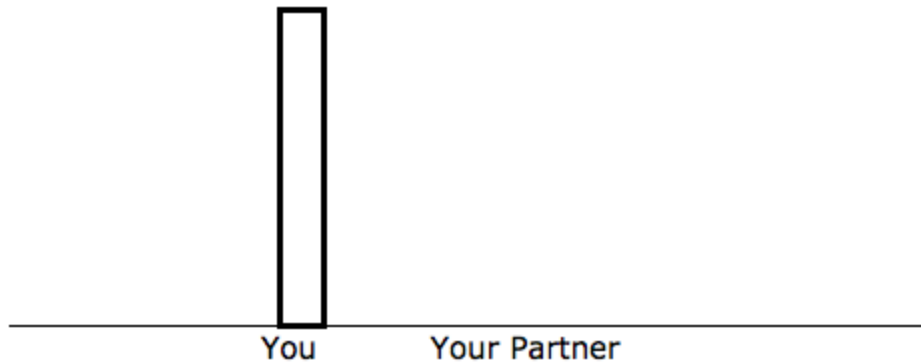
Who is taller? _____ Who is shorter? _____

What is the difference between the two heights? -

Below is a drawing of your height.

Draw a picture of **your partner's height**

Show the **difference** between your height and your partner's height.



Overhead: Heights and Differences as Horizontal Lines
(Page 5)



Overhead and Homework: Comparing Two Heights (Page 6)

Name: _____ Date: _____

Compare your height to the height of someone in your family.

Who is taller? _____

Who is shorter? _____

Show your height on this paper.

Show the height of **the other person**

Show **how much** the shorter person will have to grow to be **the same size** as the taller person.

Show the **difference** between your height and the other person's height.

You

The Other Person