

Heights as Functions

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Click [here](#) to download lesson.

To see a video clip of this lesson being implemented in a third grade classroom go to [What could x mean? - Third Grade](#).

Summary	In this class children will work on the functional representation of two unknown heights and on the composition of the shorter height plus the difference between the heights as equal to the second height.
Goals	<ol style="list-style-type: none">1. Work with differences between two compared lengths.2. Work with algebraic representation for measured lengths.3. Work with part whole relationships.4. Work with the representation of additive operations on unknown amounts.
Materials	Overheads, Handouts
Keywords	Contextualized Situations Describing Magnitudes Full Class Discussion Interpretation of Symbols Small Group Work
Foci	Representing and working with the composition between unknown amounts.

Activity Plan:

1. Comparing two unknown heights [Whole Class]

Introduce Joe and Leila (using the overhead on page 1), two children who are not members of the class.

State that:

Leila is 3 inches shorter than Joe.

Discuss with the children:

What do we know about Joe and Leila?

Who is shorter? Who is taller?

What is the difference between their heights?

2. Nicknames [Whole Class]

Show the overhead on page 2 and discuss the meaning of the short symbols (nicknames) to represent amounts or operations on amounts.

3. Representing and comparing two unknown heights as mathematical sentences [Whole Class]

Show the overhead on page 3 and propose to the children that:

Symbol	Stands for
h_j	height of Joe
h_L	height of Leila

Ask the children to suggest a short representation for the difference between the two heights. Propose to adopt JL as the symbol for that difference.

Show the overhead and handout (both page 4) and work with the whole class to answer the first two problems:

$$h_j - h_L = \underline{\hspace{2cm}}$$

$$h_j - \underline{\hspace{2cm}} = JL$$

4. Composition of measures [Group Work]

Distribute the handout (page 4) and ask the children to complete the sentences.

5. Representing operations on unknown measures [Whole Class]

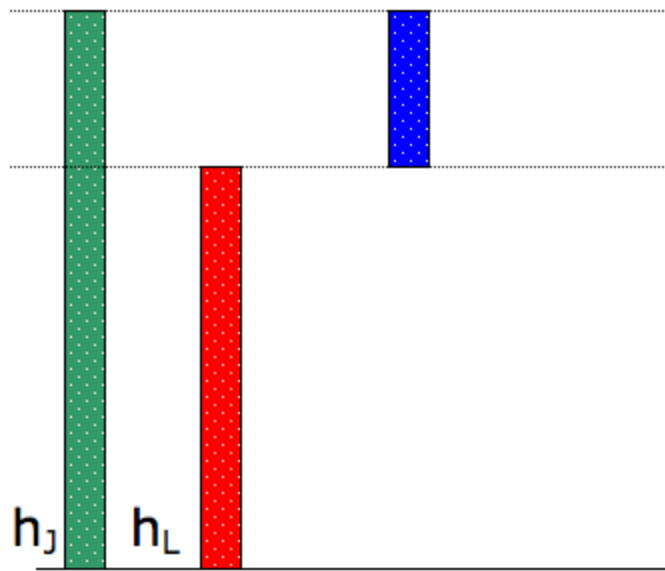
Ask children to show and discuss their work.

6. Introducing the homework [Whole Class]

Briefly explain to the class how to complete the homework (Page 5).

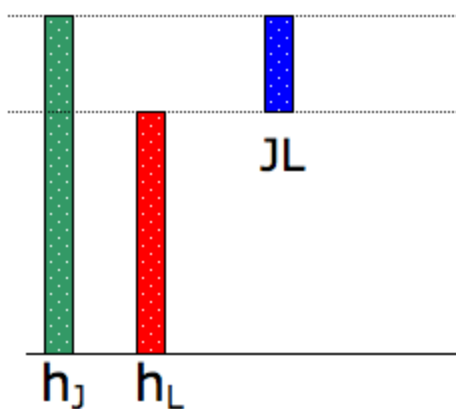
Leila is 3 inches shorter than Joe.

Symbol	What Could The Symbol Mean?
h_{Leila}	
h_{Joe}	
$>$	
$<$	
3 in	
$+$	
$-$	



h_j	height of Joe
h_L	height of Leila
	difference between their heights

Name: _____ Date: _____



h_J	height of Joe
h_L	height of Leila
JL	difference between their heights

Complete the following sentences:

$$h_J - h_L = \underline{\hspace{2cm}}$$

$$h_J - \underline{\hspace{2cm}} = JL$$

$$h_L + JL - JL = \underline{\hspace{2cm}}$$

$$h_J - \underline{\hspace{2cm}} = JL$$

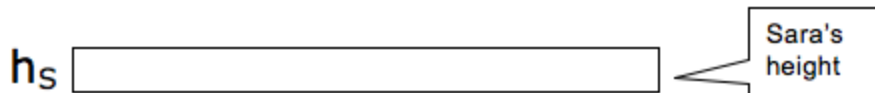
$$h_L + JL - JL = \underline{\hspace{2cm}}$$

Name: _____ Date: _____

Fred is 10 inches taller than Sara.

Show Fred's height and Sara's height as lines with the labels h_S , h_F , and FS .

Show the difference between Sara and Fred's heights.



Complete:

Sara's height + _____ = Fred's height.

Fred's height - _____ = _____

The difference between their heights + Sara's height =

$$h_S + FS = \underline{\hspace{2cm}}$$

$$h_S + 10 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} - FS = h_S$$

$$\underline{\hspace{2cm}} - 10 = h_S$$

$$FS = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$h_S - h_F = \underline{\hspace{2cm}}$$