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Exploring a Ratio & Proportion Applet

<u>Step 1:</u> Launch the Comparing Number Lines: Ratios & Proportions applet.



Notice the three number lines.

- The first line (green) represents the whole. 50% of the whole 100% is shown by the dotted line.
- The second line (blue) represents the ratio 10 out of 40.
- The third line (orange) represents the ratio 10 of 20.

Step 2: Explore the Applet

Do:	What Happens?
Check and uncheck the <i>Part out of 100</i> and <i>Whole</i> checkboxes	Explain what happens on the green number line. Where is the part located? Where is the whole located?
$\mathbf{\overrightarrow{P} art out}_{of 100} = 50$	
\checkmark Whole = 100	
Check and uncheck the <i>Part</i> ₁ and <i>Whole</i> ₁ checkboxes	Explain what happens on the blue number line. Where is the part located? Where is the whole located?
\overrightarrow{P} Part ₁ = 10 \overrightarrow{P} Whole ₁ = 40	
slide to set Whole 1	
Check and uncheck the <i>Part</i> ₂ and <i>Whole</i> ₂	Explain what happens on the orange number line. Where is the part
checkboxes	located? Where is the whole located?
$\mathbf{\nabla}$ Part ₂ = 10	
Whole ₂ = 20	
slide to set Whole 2	

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Step 2: Explore the Applet (cont)

Do:	What Happens?
Check the hash marks checkbox Hash marks number of intervals = 3 Check the <i>Show intervals</i> checkbox Check the <i>Show intervals</i> checkbox	Explain what happens to the number lines. What do the numbers to the right of the number lines represent?
Move the slider	
Check the <i>proportions</i> checkbox Proportions (see below) Check the ratio checkboxes below Ratio ₁ and Percent Ratio ₂ and Percent Ratio ₁ and Ratio ₂	Notice the ratios. Click on the <i>green dot</i> and move it. What happens to the ratios?
	Click on the <i>blue dot</i> and move it. What happens to the ratios?
	Click on the <i>orange dot</i> and move it. What happens to the ratio?
Check the <i>show decimals</i> checkbox Show decimals (may be rounded)	Explain what happens as you move any of the sliders.
Click and drag the dot on the <i>blue slider</i> below the <i>Whole</i> ₁	What happens to the ratios?
Click and drag the dot on the <i>orange slider</i> below the <i>Whole</i> ₁	What happens to the ratios?

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Step 3: Set up the following proportion: $\frac{3}{5} = \frac{9}{15}$

a) First, *uncheck* the top part and whole. (Next to the green number line.)

- b) Next, click on *blue dot* below the **Whole**₁ and adjust it to **5**. (Note-if you click on the dot on the slider, you can adjust the size with more precision with the right and left arrows.)
- b) Then, adjust the Part₁ to be 3 by clicking on the *blue dot* and dragging until the value is 3
- c) Next, click the *orange dot* below Whole₂ and adjust it to be 15.



- d) Then, click on the checkbox to show the **Part₂** to be lining up with the blue **Part₁**. (The red line shows up when the two ratios are equivalent and make a true proportion.)
- e) The problem can then be shown by the double number line representation below:

3 out of 5 is the same as 9 out of 15.



We know they are equivalent when the number line on the top lines up with the number line below.

- f.) You can also make equal sized intervals on the top and bottom number line to help predict whether the two ratios are proportional.
 - In the example above, I can divide the line in 5 equal parts then use that information to place the 3 and the 9 on the number line.
 - 5 divided in 5 equal parts means each line represents 1, so I go over to the third line and write 3.
 - 15 divided by 5 equal parts means each line represents 3, so I count 3, 6, 9 to go over to the third line and write 9.
 - So, 3 out of 5 is the same proportion as 9 out of 15 since they line up at the same place on the number lines.
- g) To do this on the applet, click in the Hash marks checkbox then drag the slider to the right until you get to 5 intervals.
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h) Check the intervals checkbox to see the amount each interval line increases by.

Comparing Num	ber Line To adju: slider	es – Ratios & Prop st a slider in smaller increments, r circle and use the left and right All values may	click on the arrow keys. be rounded.	 ✓ Visual representations □ Proportions (see below) ✓ Show when equivalent or a ✓ Hash marks number of in 	pproximately equivalent ntervals = 5	_	Show
Part out of 100							(may be rounded)
🗖 Whole							
$ \overrightarrow{P} \operatorname{Part}_1 = 3 \\ \overrightarrow{P} \operatorname{Whole}_1 = 5 $	<u> </u>			Rart		_	1
slide to set Whole 1	Ŏ					5	2
$ Part_2 = 9 Whole_2 = 15 $	0	i	i	Part 2 9	i	15	3
slide to set Whole ₂							

- i) To see the proportions set up, check the *Proportions* checkbox. Proportions (see below) ✓ Ratio₁ and Ratio₂
- Then check the Ratio and Proportion checkbox ii)

Part I. Set these up

Set up the ratio shown. Explain if it is proportional or not.





 $\frac{9}{15}$

=

 $\frac{3}{5}$