

Proportional Reasoning - Ratios

Grade Six HLC

Use visual representations to compare ratios, and solve problems including those involving unit rates and percentages

September



Grade Six Learning Progressions



June

Students must use visual representations to build understanding along this trajectory and interact with a variety of rates and ratios.
 Be VERY cautious of introducing algorithms before conceptual understanding is SOLID

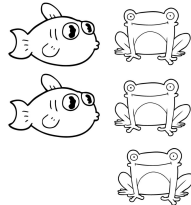
Critical Strategies: Look for and identify multiplicative relationships in tables and diagrams.

Visually represent and interpret a ratio between two quantities (two quantities could connect part to part or part to whole)

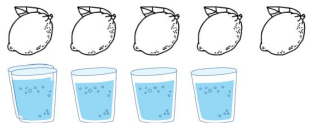
Find equivalent ratios
(Initially ratio tables are created through skip counting, then students recognize multiplicative relationships)

Use multiplicative reasoning, unit rates and/or equivalency to compare ratios and solve more complex problems.

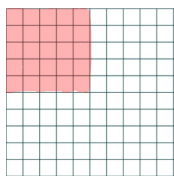
2 fish : 3 frogs



Mix A - Lemonade

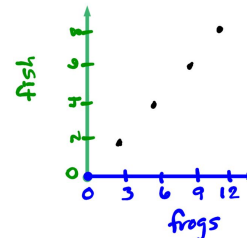
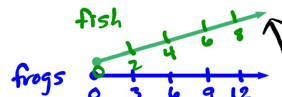
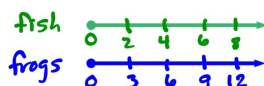
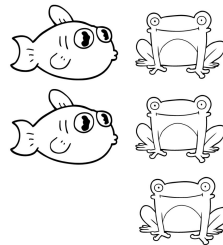


100 grid
25% of 100



Visual rep with iteration

Fish	Frogs
0	0
2	3
4	6
6	9
8	12



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Ratio Table

Mix A: 5 cups of lemon to 4 cups of water
 Mix B: 3 cups of lemon to 2 cups of water

Mix B is more lemony - it has more lemon to 1 part water or more water to 15 parts lemon.

MIX A		mix B	
lemon	water	lemon	water
5	4	3	2
$\div 2 \rightarrow 2.5$	2	1.5	1
$\div 2 \rightarrow 1.25$	1	15	10
10	8		
15	12		

Handwritten notes: Red arrows show scaling factors: x2 from (5,4) to (10,8) and x3 from (10,8) to (15,12). For Mix B, 2 ÷ 2 = 1 and 2 × 10 = 20 (though 10 is written).

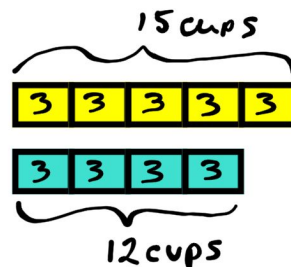
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Find equivalent ratios **(cont.)**
(Initially ratio tables are created through skip counting, then students recognize multiplicative relationships)

Multiplicative reasoning and scaling

$$\frac{6 \text{ fish}}{9 \text{ frogs}} = \frac{2 \text{ fish}}{3 \text{ frogs}} = \frac{8 \text{ fish}}{12 \text{ frogs}}$$

If there are 15 cups of lemon, how much water is needed?



Identify unit rates in multiple contexts

6 pounds of rice costs \$3. How much will it cost for 7 pounds of rice?

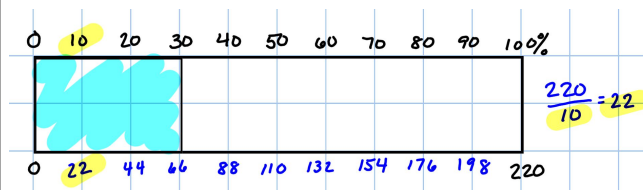
Rice (lbs.)	6	3	1	7
Cost (\$)	3	1.50	.50	3.50

(Handwritten annotations: green arrows with '÷2' from 6 to 3, '÷3' from 3 to 1, and 'x7' from 1 to 7; the '1' and '.50' are circled in red.)

Use multiplicative reasoning, unit rates and/or equivalency to compare ratios and solve more complex problems. **(cont.)**

Percent Bar

66 is what percent of 220?



Double Number Line

40% of 65

