	Number Line	Strip	Pie	Grid
General	Conceptual, No Final Values	Procedural, Math Shown	Procedural, Math Shown	Hybrid, Some Math Visual
Compare **>** **<**	Lengths	Area	Area	Area, ¾ and 2/3 create a visually interesting case
Addition **+**	0 of second line aligned with endpoint of first line	Common Denominators created by using other denominator. Identical denominators remain the same.	Same as strip except numbers greater than one have whole parts move as wholes first, then fractional parts move.	Creates common denominators through visually cross hatch. Identical denominators remain the same.
Subtraction **-**	Second line endpoint aligns with first line endpoint.	Parts from second overlap and remove parts from the first.	Wholes cancel first, fractional parts cancel second.	Parts from second overlap and remove parts from the first.
Multiplication **x**	Treats the first fraction as a unit and then takes second fraction of that unit. Multiplication is viewed as scaling.	Creates fractional parts based on the multiplier denominator and then accumulates multiplier numerator of these parts. See longer explanation*.	Same as Strip.	Treats one fraction as the base and then the second as a cross-section of that base. Suggested entry progression: ½ x 3, ½ x 2, ½ x 1, ½ x ½
Benchmark **🡐|🡒**	Length comparison to benchmark number (default ½)	Area comparison to benchmark number.	Same as Strip.	Magically creates least common denominator of two fractions and benchmark before comparison.

- Explanation of Multiplication representation for Strip and Pie.
  For the case of ¼ x 2/3 there are two natural choices:

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	Number Line	Strip	Pie	Grid
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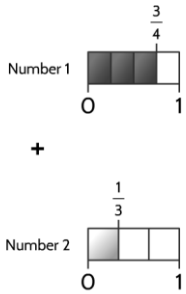
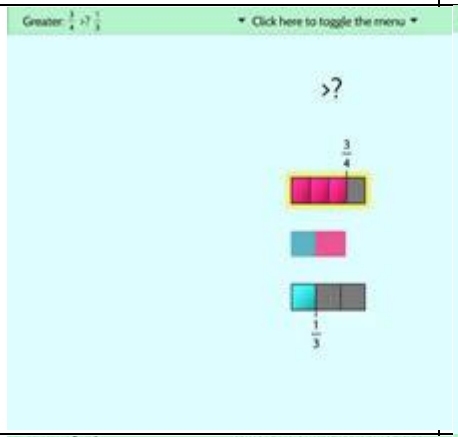
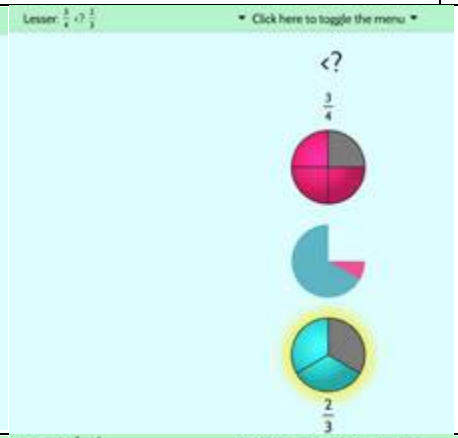
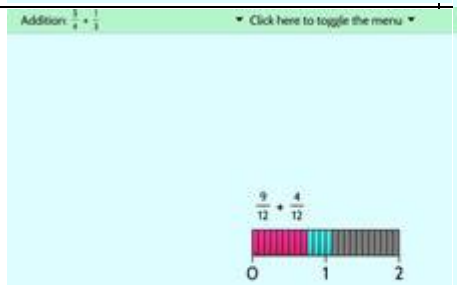
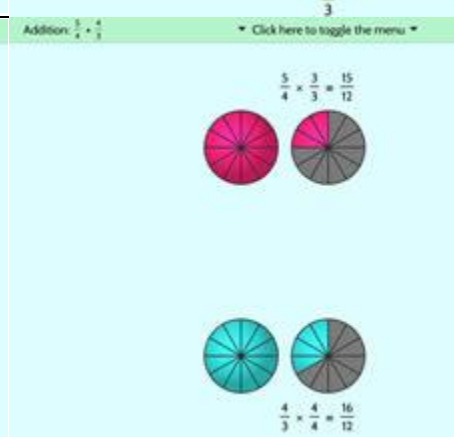
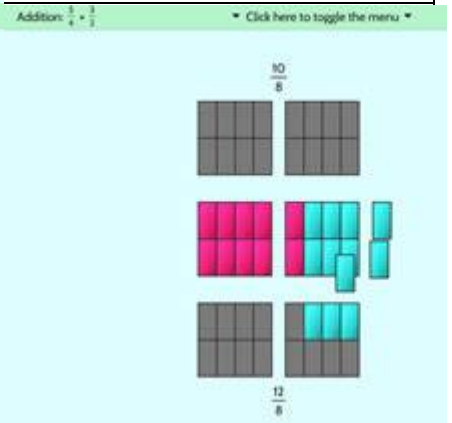
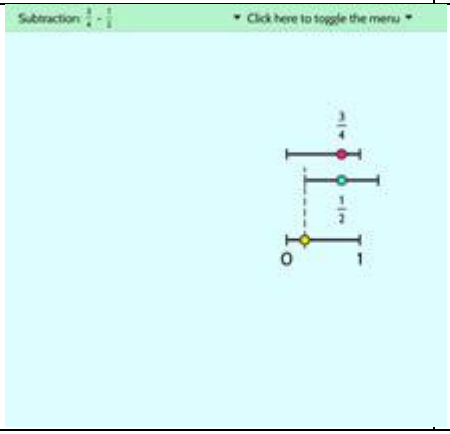
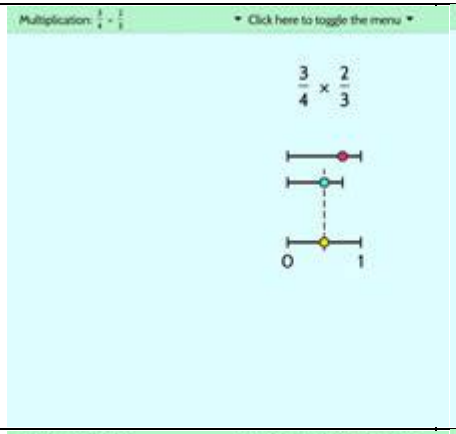
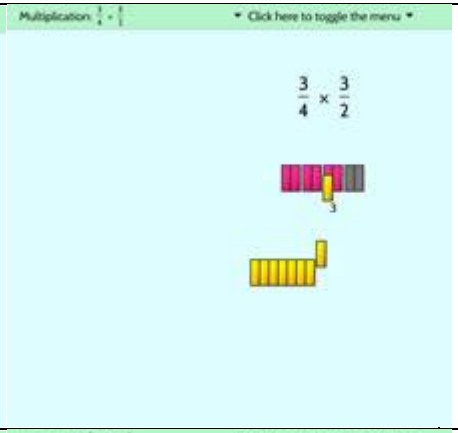
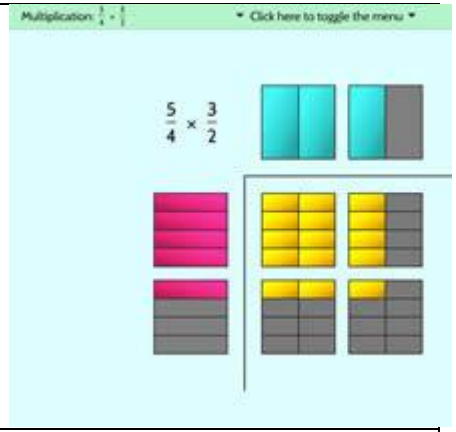
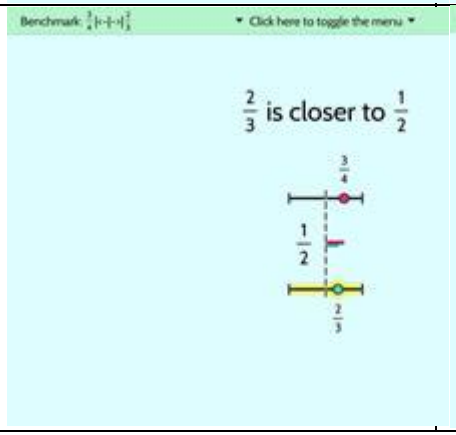
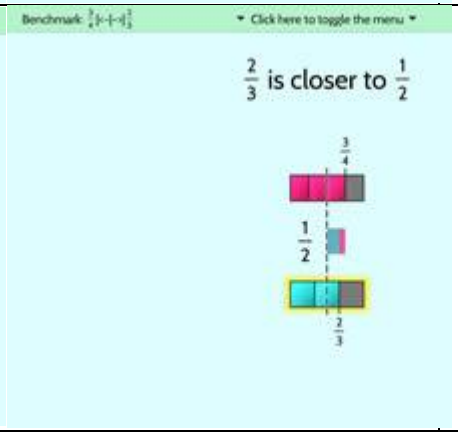
Compare **>** **<**				
Addition **+**				
Subtraction **-**				

Multiplication x			
Benchmark ←|→			

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Compare **>** **<**				
Addition **+**				
Subtraction **-**				
Multiplication **x**				
Benchmark **←|→**				

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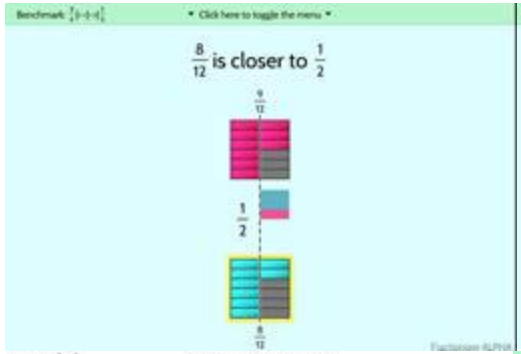
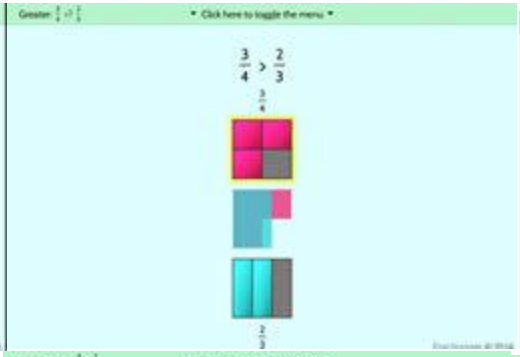
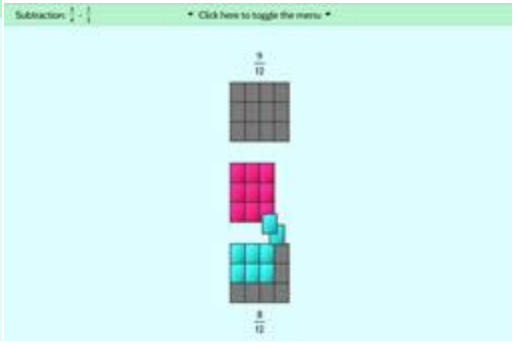
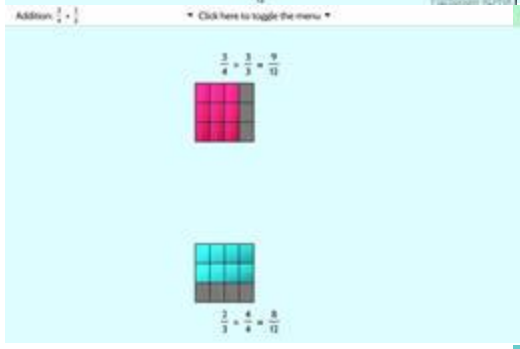
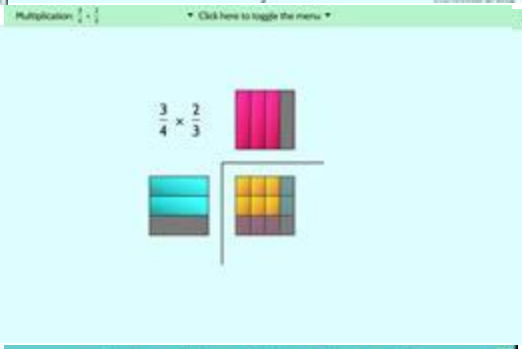
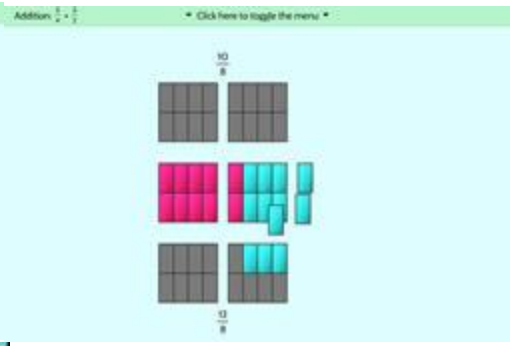

Benchmark
Click here to toggle the menu
$\frac{8}{12}$ is closer to $\frac{1}{2}$
$\frac{9}{12}$
$\frac{1}{2}$
$\frac{8}{12}$

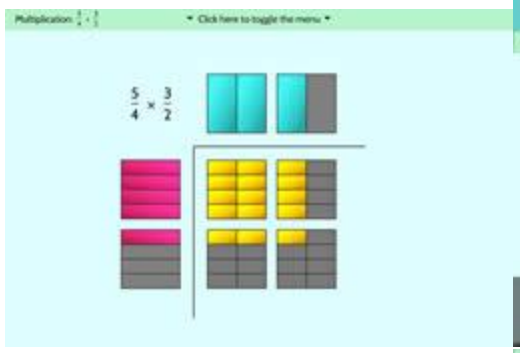

Greater
Click here to toggle the menu
$\frac{3}{4} > \frac{2}{3}$
$\frac{3}{4}$
$\frac{2}{3}$

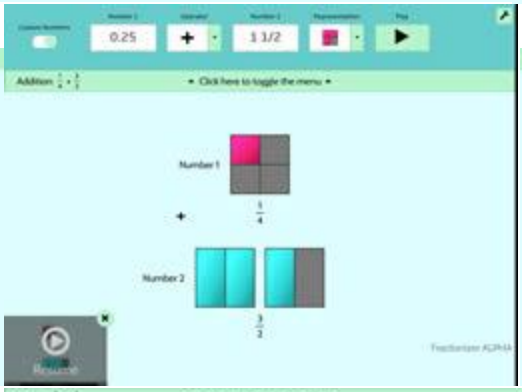

Subtraction
Click here to toggle the menu
$\frac{9}{12}$
$\frac{8}{12}$

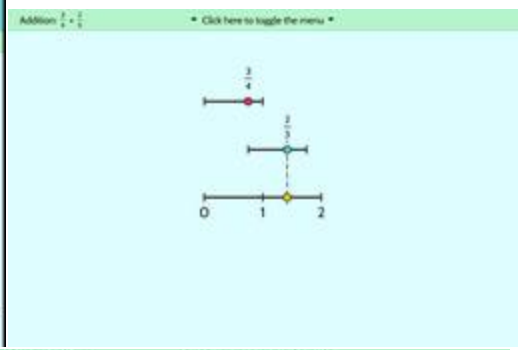

Addition
Click here to toggle the menu
$\frac{3}{4} + \frac{2}{3} = \frac{9}{12}$
$\frac{2}{3} + \frac{4}{4} = \frac{8}{12}$

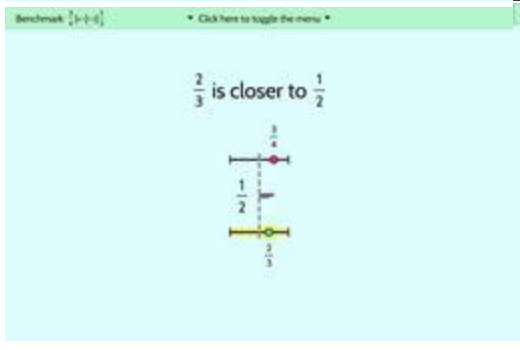

Multiplication
Click here to toggle the menu
$\frac{3}{4} \times \frac{2}{3}$

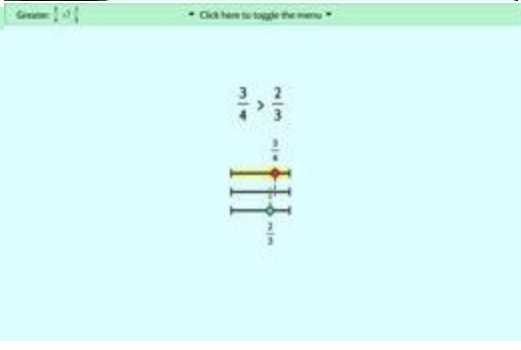

Addition
Click here to toggle the menu
$\frac{10}{8}$
$\frac{12}{8}$

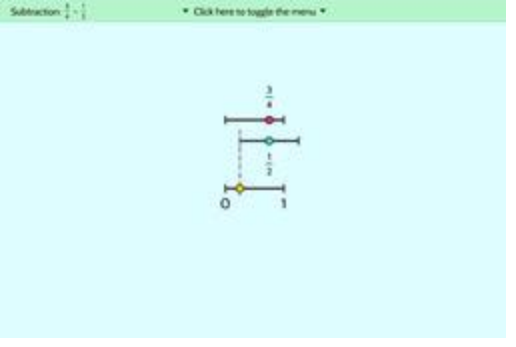

Multiplication
Click here to toggle the menu
$\frac{5}{4} \times \frac{3}{2}$


0.25
1 1/2
Addition
Click here to toggle the menu
Number 1
Number 2
$\frac{1}{4}$
$\frac{3}{2}$


Addition
Click here to toggle the menu
$\frac{3}{4}$
$\frac{2}{3}$
0
1
2


Benchmark
Click here to toggle the menu
$\frac{2}{3}$ is closer to $\frac{1}{2}$
$\frac{3}{4}$
$\frac{1}{2}$
$\frac{2}{3}$


Greater
Click here to toggle the menu
$\frac{3}{4} > \frac{2}{3}$
$\frac{3}{4}$
$\frac{2}{3}$


Subtraction
Click here to toggle the menu
$\frac{3}{4}$
$\frac{1}{2}$
0
1

Subtraction $\frac{3}{4} - \frac{2}{3}$ ▾ Click here to toggle the menu ▾

Multiplication $\frac{3}{4} \cdot \frac{2}{3}$ ▾ Click here to toggle the menu ▾

$\frac{3}{4} \times \frac{2}{3}$

Benchmark $\frac{3}{4}$ [-] $\frac{2}{3}$ ▾ Click here to toggle the menu ▾

$\frac{2}{3}$ is closer to $\frac{1}{2}$

Lesser $\frac{3}{4}$ ◇ $\frac{2}{3}$ ▾ Click here to toggle the menu ▾

<?

Subtraction $\frac{3}{4} - \frac{2}{3}$ ▾ Click here to toggle the menu ▾

Addition $\frac{3}{4} + \frac{2}{3}$ ▾ Click here to toggle the menu ▾

$\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$

$\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$

Subtraction $\frac{3}{4} - \frac{1}{4}$ ▾ Click here to toggle the menu ▾

Multiplication $\frac{3}{4} \cdot \frac{2}{3}$ ▾ Click here to toggle the menu ▾

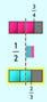
$\frac{3}{4} \times \frac{2}{3}$

Addition $\frac{1}{2} + \frac{1}{4}$ ▾ Click here to toggle the menu ▾

$\frac{1}{2} + \frac{1}{4} = \frac{6}{12}$

Benchmark $\frac{3}{4}$ [-] $\frac{2}{3}$ ▾ Click here to toggle the menu ▾

$\frac{2}{3}$ is closer to $\frac{1}{2}$



Greater $\frac{1}{2}$ ◇ $\frac{1}{4}$ ▾ Click here to toggle the menu ▾

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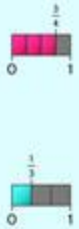
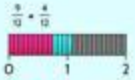
Addition $\frac{3}{4} + \frac{1}{3}$ ▾ Click here to toggle the menu ▾

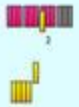


Addition $\frac{3}{4} + \frac{1}{3}$ ▾ Click here to toggle the menu ▾



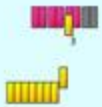
Multiplication $\frac{3}{4} \cdot \frac{2}{3}$ ▾ Click here to toggle the menu ▾

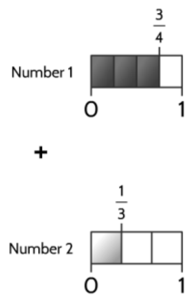
$$\frac{3}{4} \times \frac{2}{3}$$

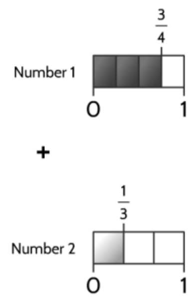


Multiplication $\frac{3}{4} \cdot \frac{3}{2}$ ▾ Click here to toggle the menu ▾

$$\frac{3}{4} \times \frac{3}{2}$$




3/4
Number 1
0
1
+
1/3
Number 2
0
1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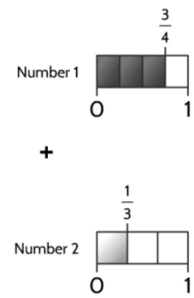
3/4
Number 1
0
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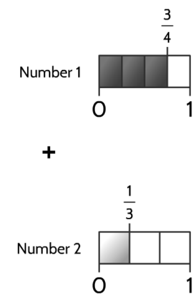
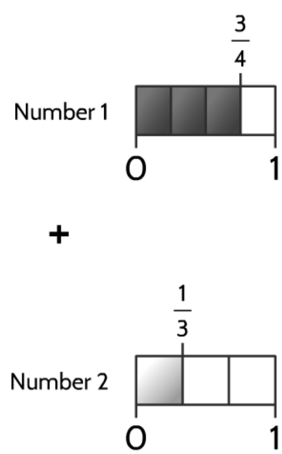
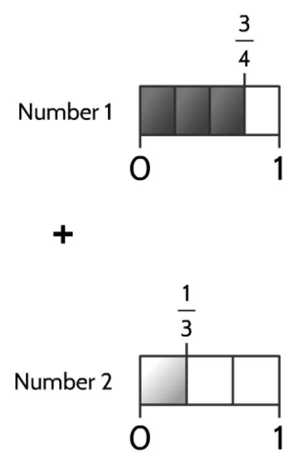
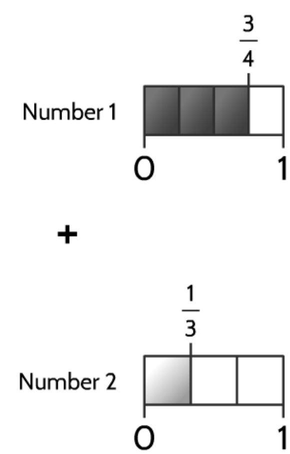

3/4
Number 1
0
1
+
1/3
Number 2
0
1


3/4
Number 1
0
1
+
1/3
Number 2
0
1


3/4
Number 1
0
1
+
1/3
Number 2
0
1


3/4
Number 1
0
1
+
1/3
Number 2
0
1