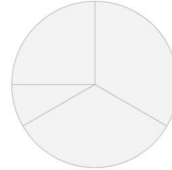
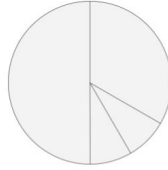


## Connecting Representations Instructional Routine Pre-Planner

### Consider the Representations:

Explore the mathematical structure that the representations highlight. What are key features of the representations? How do they connect to big ideas of the content?



$$\frac{1}{2} + \frac{3}{4} + \frac{2}{8}$$

$$\frac{2}{3} + \frac{1}{4} + \frac{1}{12}$$

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{6}$$

### When considering the representations, ask yourself:

What will students notice and think is important about the different representations?

How will they use those noticings to connect representations?

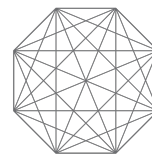
How might they connect representations incorrectly?

### When considering the students, ask yourself:

Which representations will provide access to students?

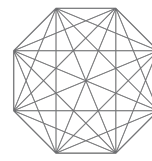
Which representations will be challenging for students?

Which representation will students be connecting, and which one will you leave off for students to generate?





## Connecting Representations Instructional Routine Planner


Launch	
 <b>Connecting Representations</b>  <b>WHAT:</b> Match visuals to expressions by <b>chunking</b> and <b>connecting</b> to math you know  <b>WHY:</b> To “think like mathematicians”, to use mathematical <i>structure</i> to match two different representations.     <b>Connecting Representations</b>  	<p>What will you say to students about <i>what</i> they be doing and <i>why</i>?</p>
Interpret and Connect Representations	
 <b>Think</b>  <ul style="list-style-type: none"> <li>▪ What part of the <i>visual</i> will help me connect to a chunk of the <i>expression</i>?</li> <li>▪ What about the <i>expression</i> will help me connect to the <i>visual</i>?</li> </ul>	<p>Will you unveil all 5 representations or decide to unveil one type of representation first? If you unveil one first, which type?</p>
 <b>Make Connections</b>  <div style="border: 1px solid #ccc; border-radius: 50%; padding: 10px; width: fit-content; margin: 10px auto;"> <p>“I saw... so I connected...”</p> <p>“... connects to ... because...”</p> </div>	<p>Which connections will you share? In what order?</p>
Discuss Representations	
 <b>Share &amp; Study Connections</b>  	<p>Will students self-select the speaker and the pointer/gesturer, or will you pre-select the roles?</p> <p>What questions will you ask to highlight structural underpinnings of the representations?</p> <p>How will you annotate connections?</p>





## Create Representations

<p><b>Create a Representation</b></p> <p> <b>THINK</b></p> <p>Ask yourself...</p> <ul style="list-style-type: none"><li>▪ "What do you notice about this expression?"</li><li>▪ "How can you chunk the <i>expression</i> to create a visual?"</li></ul>	What 'ask yourself questions' will you pose?
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<p><b>Create a Representation</b></p> <p> <b>Pair</b></p> <ul style="list-style-type: none"><li>▪ Share your interpretations of the <i>expression</i></li><li>▪ Together create a matching visual.</li></ul>	Which representation will you plan to share in the full group?
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<p><b>Create a Representation</b></p> <p> <b>Share</b></p> <p>They noticed... so they...</p> <p>When they saw...it made them think</p>	How will you annotate the newly created representation to highlight the connection and underlying structure?
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## Reflect on Thinking

<p> <b>Meta-Reflection</b> </p> <p>A. When interpreting an <i>expression</i> / <i>visual</i>, I learned to pay attention to...</p> <p>B. When connecting representations, I learned to ask myself...</p> <p>C. A new mathematical connection I made</p>	What reflection prompts will you provide?
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