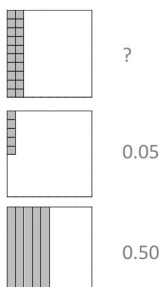


## Connecting Representations Instructional Routine Pre-Planner

### 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?



### 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?

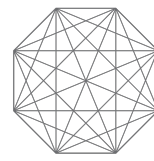
How might they connect representations incorrectly?

### When considering the students, ask yourself:













Which representations will provide access to students?

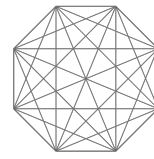
Which representations will be challenging for students?

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





## Connecting Representations Instructional Routine Planner


Launch	
<p> <b>Connecting Representations</b></p> <p><b>WHAT:</b> Match visuals to numbers by <b>chunking</b> and <b>connecting</b> to math you know</p> <p><b>WHY:</b> To “think like mathematicians”, to use mathematical <i>structure</i> to match two different representations.</p> <p style="text-align: center;"></p> <hr/> <p> <b>Connecting Representations</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">       </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 5px;"> <div style="background-color: #ffc107; padding: 2px 5px; font-size: 8px;">Think</div> <div style="background-color: #ffc107; padding: 2px 5px; font-size: 8px;">Make connections</div> <div style="background-color: #ffc107; padding: 2px 5px; font-size: 8px;">Share &amp; study connections</div> <div style="background-color: #ffc107; padding: 2px 5px; font-size: 8px;">Create representation</div> <div style="background-color: #ffc107; padding: 2px 5px; font-size: 8px;">Reflect on learning</div> </div>	<p>What will you say to students about <i>what</i> they be doing and <i>why</i>?</p>
Interpret and Connect Representations	
<div style="background-color: #ffc107; padding: 5px; display: flex; align-items: center; justify-content: space-between;">  <span>Think</span>  </div> <ul style="list-style-type: none"> <li>▪ What part of the <i>visual</i> will help me connect to a chunk of the <i>numbers</i>?</li> <li>▪ What about the <i>numbers</i> will help me connect to a <i>visual</i>?</li> </ul> <p style="text-align: center;"></p>	<p>Will you unveil all 5 representations or decide to unveil one type of representation first? If you unveil one first, which type?</p>
<div style="background-color: #ffc107; padding: 5px; display: flex; align-items: center; justify-content: space-between;">  <span>Make Connections</span>  </div> <div style="border: 1px solid #ccc; border-radius: 50%; padding: 20px; margin: 10px 0; width: fit-content;"> <p>“I noticed... so I knew...”</p> <p>“I saw....so I looked for...”</p> </div> <p style="text-align: center;"></p>	<p>Which connections will you share? In what order?</p>
Discuss Representations	
<div style="background-color: #ffc107; padding: 5px; display: flex; align-items: center; justify-content: space-between;">  <span>Share &amp; Study Connections</span> </div> <div style="display: flex; align-items: center; margin-top: 10px;">  <div style="margin-left: 10px;"> <p>We noticed... so we ...</p> <p>We knew... so we...</p> </div> </div> <div style="display: flex; align-items: center; margin-top: 10px;">  <div style="margin-left: 10px;"> <p>They noticed... so they ...</p> <p>They knew... so they...</p> </div> </div>	<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 visual?"</li><li>▪ "What do the chunks of the <i>visual</i> tell you about the matching number?"</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>visual</i></li><li>▪ Together create a matching <i>number</i>.</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 <i>problem visuals/numbers</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 is ...</p>	What reflection prompts will you provide?
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