



# How? Justify.

*How did I arrive at my solution? How do I know it's correct?*

USE DIAGRAMS, OBJECTS, ETC., TO CONSTRUCT YOUR ARGUMENT FOR SOLVING		
UNDERST AND	<b>Definition</b>	Students use a diagram, object, or other visual aid as a support when explaining <i>why</i> their solution pathway works.
	<b>When to Teach This Strategy</b>	<ul style="list-style-type: none"> <li>• When introducing students to defending their solution pathways</li> <li>• When students struggle with abstract mathematical concepts, and visuals help them <i>see</i> the math</li> <li>• When students have arrived at a solution and need to explain their solution pathway to others</li> </ul>
PREPARE	<b>Why We Teach It</b>	Mathematically proficient students need this strategy to <ul style="list-style-type: none"> <li>• make sense of their work and <i>see why</i> the solution pathway does or does not work, and</li> <li>• communicate their mathematical thinking to others.</li> <li>• Additionally, this strategy supports students in asking questions of themselves or their peers to clarify or improve their argument for solving.</li> </ul>
	<b>Secrets to Success</b>	For students to be successful with this strategy they must be able to <ul style="list-style-type: none"> <li>• explain their work,</li> <li>• reason abstractly and concretely,</li> <li>• regularly practice defending their strategies for solving, and</li> <li>• regularly practice listening to peers defend their strategies and asking them clarifying questions.</li> </ul>
TEACH	<b>How We Teach It</b>	Modeling a think-aloud during the “I Do” focus lesson:  Explain to students that they are going to learn how to use a strategy called Use Diagrams, Objects, Etc., to Construct Your Argument for Solving. “In math it is important not only to find a solution, but to be able to explain how we solved the problem to ourselves and to others.  “This strategy is important because it helps you attend to accuracy and precision in your work. It also gives you a tool to help confirm that the work is correct or to recognize errors and correct them. Additionally, it provides a visual representation of the solution pathway.  “Using the strategy Use Diagrams, Objects, Etc., to Construct Your Argument for Solving looks like this:”  During the “I Do” focus lesson present a previously solved problem. Model how to use a diagram, an object, and a picture to support your defense of the solution pathway. As you explain the strategy for solving, be certain to explain <i>why</i> you know the strategy for solving works and <i>how</i> the visual model supports you. Be sure to also model a problem that has been solved incorrectly and <i>how</i> the visual aid supports you in seeing the error(s).  After modeling this strategy, we provide students with chances to practice by having them solve a problem, then use a diagram, object, or picture to support them in defending their solution pathway.  “You will know you are using this strategy when you can model your solution pathway using a diagram, object, or picture. Additionally, you can explain how you arrived at a solution and why your strategy works, your work makes sense, and your work is regularly free of mistakes.”
		<b>Suggested Language</b> <ul style="list-style-type: none"> <li>• <i>How do I know my strategy makes sense?</i></li> <li>• <i>How can I explain my strategy to someone else?</i></li> <li>• <i>Would someone else understand how I arrived at my solution?</i></li> </ul>
SUPPORT	<b>Instructional Pivots</b>	<ul style="list-style-type: none"> <li>• Give regular opportunities to explain their thinking to students who struggle with explaining their strategy for solving. (Mental math is an excellent way to do this.)</li> <li>• Give students who struggle regular opportunities to look at problems that have been solved in various ways (using symbols, diagrams, objects, and so on). Then, have them explain the solution pathway and ask questions to clarify their understanding.</li> <li>• Give students an organizer that provides space for them to fill in the               <ul style="list-style-type: none"> <li>• <i>what</i> (what needs to be solved),</li> <li>• <i>why</i> (why my strategy works), and</li> <li>• <i>how</i> (my strategy for solving).</li> </ul> </li> </ul>
	<b>Partner Strategies</b>	These strategies may provide support before, during, and after teaching this strategy: <ul style="list-style-type: none"> <li>• Defend Your Strategy for Solving the Problem</li> <li>• Distinguish Correct Logic from Incorrect Logic</li> </ul>