

# Linking Bar Diagrams and the Common Core Standards for Mathematical Practice

## Common Core State Standards: Standards for Mathematical Practice

The Standards of Mathematical Practice describe “processes and proficiencies” that maximize students’ deep and lasting conceptual understanding in mathematics. The mathematical practices—like problem solving—are *not* standards taught in isolation. Think of them as the sauces that blend into every content “dish,” adding flavor, interest, and relevance.

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

The Mathematical Practices describe the tools students need to represent problems coherently, justify conclusions, apply the mathematics to practical situations, explain the mathematics accurately to other students, or step back for an overview.

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## Polya’s Four Stage Problem Solving Plan

1. Understand: Identify what is known and what is unknown. *Draw the bar diagram to promote comprehension and demonstrates understanding.*
2. Plan: Decide how you will solve the problem (find the unknown). *Analyze the bar diagram to find a solution plan.*
3. Solve: Execute the plan. *Use the bar diagram to solve.*
4. Evaluate: Assess reasonableness using estimation or substitution. *Substitute the solution for the unknown in the bar diagram.*

See Robyn’s videos on bar diagramming!

[http://www.mhschool.com/math/common/pd\\_video/mathconnects\\_bardiagram\\_p1/index.html](http://www.mhschool.com/math/common/pd_video/mathconnects_bardiagram_p1/index.html)  
[http://www.mhschool.com/math/common/pd\\_video/mathconnects\\_bardiagram\\_p2/index.html](http://www.mhschool.com/math/common/pd_video/mathconnects_bardiagram_p2/index.html)

Directions: Draw a bar diagram to represent each problem. Then use it to solve.

<p>There are 3 birds on a tree branch. Then 2 birds fly over to the same branch. How many birds are on the branch now?</p>	<p>Rani earned \$128 mowing lawns and \$73 babysitting. How much money did Rani earn?</p>
<p>Marc is 70 inches tall. Carrie is 5 feet, 3 inches tall. How much taller is Marc than Carrie?</p>	<p>Jin had \$67 in his pocket after he bought a radio controlled car. He went to the store with \$142. How much did Jin spend on the car?</p>
<p>There are 9 puffy stickers. There are 3 times as many plain stickers as puffy stickers. How many plain stickers are there?</p>	<p>Four children share the cost of a gift equally. The gift costs \$28. How much does each child pay?</p>
<p>Rosa has 336 shells. She keeps 72 of the shells for herself. Rosa shares the remaining evenly shells among 6 friends. How many shells does each friend receive?</p>	<p>A soccer ball and six golf balls weigh a total of 1 kilogram. Each golf ball weighs 70 grams. What is the weight of the soccer ball? (Hint: 1 kg = 1,000 g)</p>
<p>Sara buys a printer for \$120. She buys a computer for 4 times as much as the printer.</p> <ul style="list-style-type: none"><li>• What is the cost of the entire purchase?</li><li>• How much more does the computer cost than the printer?</li></ul>	<p>David had \$40. He spent <math>\frac{1}{5}</math> of the money on a storybook and <math>\frac{3}{10}</math> on a calculator. How much did he spend?</p>