

## Problem Solving

The student selects and carries out a strategy to find a solution, and checks results for reasonableness.



- Translates the problem into mathematical terms
- Chooses or creates a strategy
- Uses a strategy to solve the problem
- Checks solution to make sure it make sense in the problem

### Some Strategies for Problem Solving

Draw a picture or diagram.

Look for patterns.

Use trial and error.

Make a table.

Work with special cases, then generalize.

Try simpler numbers.

Work backwards from the solution.

# Problem Solving

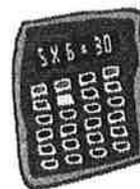
**5 I came up with and used a strategy that really fits and makes it easy to solve this problem.**

- I know what to do to set up and solve this problem.
- I knew what math operations to use.
- I followed through with my strategy from beginning to end.
- The way I worked the problem makes sense and is easy to follow.
- I may have shown more than one way to solve the problem.
- I checked to make sure my solution make sense in the original problem.

**3 I came up with and used a strategy, but it doesn't seem to fit the problem as well as it should.**

- I think I know what the problem is about, but I might have a hard time explaining it.
- I arrived at a solution even though I had problems with my strategy at some point.
- My strategy seemed to work at the beginning but did not work well for the whole problem.
- I checked my solution and it seems to fit the problem.

**1 I didn't have a plan that worked.**



- I tried several things but didn't get anywhere.
- I didn't know which strategy to use.
- I didn't know how to begin.
- I didn't check to see if my solution makes sense.
- I'm not sure what the problem asks me to do.
- I'm not sure I have enough information to solve the problem.

# PROBLEM SOLVING STEPS

**Define the Problem:** (Write in own words what you are suppose to do in this activity)

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**Gather Information:** (Where did you get your information, what are some of the things you know about this problem?)

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**Set Goals:** (What are you trying to accomplish, ultimate thing you are trying to accomplish?)

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**List possible solutions:** (What are your ideas, no matter how wild, to solve the problem, list at least 2-4 minimum)

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**Select the best solution:** (from your list above, which seems to be the most possible to do and work?)

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**Apply the best solution:** (What did you do and what happened when you tried doing your best solution?)

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**Evaluate:** (What changes were necessary to make your solution work or did it work exactly as planned and shown in original sketches?)

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NAMES \_\_\_\_\_

DATE \_\_\_\_\_

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## Formative Feedback for Problem Solving

### Problem Solving Strategy

**First. Understand the problem.** Read and reread the problem. Highlight the key words.

- ✓ What does the problem ask you to find? (This is the unknown.)
- ✓ What data does the problem give you?
- ✓ What are the requirements or conditions?
- ⇒ Hint: Draw a figure or picture. Make a table or model.
- ⇒ Hint: Introduce helpful symbols.

**Second. Make a plan.** Have you solved other problems like this one before?

- ✓ What steps will you take to get from the data to the unknown?
- ✓ Does your plan use all of the important data?
- ⇒ Stuck? Tactic: Is there a similar problem which is simpler?
- ⇒ Stuck? Tactic: Could you solve part of the problem?
- ⇒ Stuck? Tactic: Could you restate the problem?
- ⇒ Stuck? Tactic: Would other data help you find the unknown?
- ⇒ Stuck? Tactics: Work backwards. Look for a pattern. Guess and check.

**Third. Carry out your plan.**

- ✓ Check each step.
- ✓ Can you see clearly that the step is correct?

**Fourth. Look back.** Reread the problem.

- ✓ Did you answer the question that was asked?
- ✓ Was more than one question asked?
- ✓ Is your answer reasonable?
- ✓ Can you check the result? Can you think of an easier way to solve the problem?

Adapted with permission from Princeton University Press: G. Polya, "How to Solve It", 2<sup>nd</sup> ed., Princeton University Press, 1957, ISBN 0-691-08097-6. For details check: <http://www.pupress.princeton.edu/titles/669.html>