

Problem Solving Protocol: Grade 10

The following cycle will help you when you come across a situation or a problem that you have not seen before. The **FOUR KEY STEPS** are essential, but the specifics listed below each big step are just suggestions. You do not need to do every one of these steps. Just pick and choose the ones that work for each situation – or invent your own!

1. Understand the Problem

- Read and **decode**
- Identify and highlight important information
- Decide what information is not useful
- Try to rewrite the problem in your own words
- Rewrite the question in your own words for clarity
- Rewrite the problem with mathematical notation
- Find a definition for words that you don't know
- Make a table comparing the information you know, and what you don't know
- Make a picture or diagram to help you understand the problem
- Check to see if you have enough information to solve the problem

2. Make a Plan

- Make an orderly list
- Make a table
- Draw a picture
- Look for patterns
- List all of the things you know
- Create and solve a simpler version of your problem - consider a special case
- Eliminate impossible or absurd answers
- Use a variable to represent an unknown
- Work backwards
- Use a formula
- Make a model
- Be fearless - willing to take risks!
- Make a connection to something you have learned before
- Identify resources that you can use
- **Estimate** an answer

4. Check Your Answers and Reflect

- Does your answer make sense when you put it back in the context of the original question? Does it work? How does your answer compare to your original estimate?
- Are you confident that you have come to a correct solution?
- Was your strategy efficient?
- Can you think of a different way to solve the problem?
- Was there something that you realized along the way?
- Can you use your method to solve other problems? Can you make a generalization?
- Did you spot any patterns?

3. Try Your Strategy

- Guess and check
- Extend your table or your list
- Refine and analyze your picture
- Attend to precision – check each step as you work
- Make a convincing argument
- Persist with the plan you have chosen
- Discard your plan and choose another (this is how mathematics is done, even by professionals!)
- **Show your work** – keep good records of what you've done