

Common Core State Standards, Mathematics Practices
Questions for Planning & Observation

Make sense of problem and persevere in solving.

Do students:

- Unpack the problem?
 - What is the story?
 - What are the given quantities?
 - What needs to be found out?
- Use strategies to enter the problem?
 - Previous similar or simpler problems.
 - Knows representations/models that work.
 - Language needed to understand problem.
- Recognize relationships in the problem? Relationships needed to find a solution?
 - Solve a part of problem needed to solve second part?
 - Relationship between quantities?
 - Look for regularities, trends?
- Know what the answer tells you? What form should the answer be? What units are called for?
- Do strategies and results make sense?
 - Can students explain why they are trying a particular strategy?
 - If not making progress, can students change course and try a different strategy?
 - Use another strategy to verify and explain solution?
- What mathematics should be evident in all solutions? How will students see the same mathematics in each representation and solution?

Reason abstractly and quantitatively.

Do students:

Mathematize the problem?

- What are the given quantities?
- How do they relate to each other?

Represent the problem symbolically?

- Can students explain what symbols mean and how relate to quantities, other symbols, representations, models?
- Explain the context of problem?

What properties and reasoning will support solutions? How can the problem be decomposed and recombined?

What are the units needed while solving and reporting answer?

Construct viable arguments and critique the reasoning of others.

Do students:

Make conjectures?

- Explore the problem to support or disprove their conjecture?
- Refine or change their conjecture?

Construct their justification? Use objects? Drawings? Diagrams? Examples and counter examples? Cases?

Have opportunities to explain their conclusions and communicate their reasoning with others? What language is needed?

Have opportunities to ask useful questions to seek clarity? Follow the arguments of others looking for flaws and explaining them?

Model with mathematics.

Do students:

- Apply the mathematics to the problems?
- Make and recognize assumptions and approximations?
- Understand they may need to make revisions?
- Identify important quantities and the relationships between them?
- Interpret the mathematics in the context of the problem?
- Reflect on the results?
 - Make sense of solutions?
 - Evaluate model to see if can be improved?

Use appropriate tools strategically.

Do students:

- Choose tools to fit the problem and know how to use them?
- Recognize usefulness and limitations of tool?
- Use technological tools to explore and deepen understanding?

Attend to precision.

Do students:

- Communicate precisely to others?
 - Do they use clear definitions?
 - State the meaning of the symbols they use?
- Calculate accurately and precisely?
- Examine their claims and check reasoning?

Look for and make use of structure.

Do students:

- Recognize the structure of problem?
 - Patterns (e.g., commutative property)
 - Definitions (e.g., rectangles have 4 sides)
 - Utilize properties
 - Decompose & recombine numbers and expressions?
- Are students able to shift perspective?

Look for and express regularity in repeated reasoning.

Do students:

- Notice if calculations repeat themselves?
- Look for general methods? Shortcuts?
- Maintain oversight of process & attend to details?
- Evaluate the reasonableness of the results?

North Bay Mathematics Project
Ben Ford, SSU, Faculty Advisor
Doreen Heath Lance, Director