

Strong Work in Mathematics

Inquiry

- Reasoning:
 - Develops mathematical conjectures;
 - Tests examples and counter-examples;
 - Tries to explain *why* observed patterns are true and under what conditions they hold
- Problem Solving:
 - Develops a plan, modifies it as needed, simplifies if possible;
 - Identifies sub-problems and relates them back to the main problem;
 - Considers strengths and weaknesses of various strategies and how strategies are related
- Modeling / Mathematizing:
 - Describes situations mathematically (i.e. “mathematizes” rather than applies a teacher-given tool);
 - Considers strengths / weaknesses of model (e.g. “Is weight ÷ track area an appropriate way to describe ‘sinkability’?”);
 - Generalizes models of individual situations to models that work in a variety of situations

Knowledge

- Procedural Competence (strategies): Uses established procedures appropriately and accurately; considers reasonableness of answers
- Conceptual Understanding (big ideas): Understands connections between various mathematical topics (e.g. connections between multiplication and division; linear relations and proportionality)

Mathematical Work Habits (Productive Disposition)

- Considers alternative ideas
- Tolerates ambiguity
- Willing to try own ideas before seeking help

Establishing and Supporting *Mathematical* Community

- Contributes to class discussion re: the development of ideas and solving of problems
- Connects contributions to what others have said or done (This goes with....; I agree with....; I disagree with...; I think I see what ... means by ...; Another way of saying that might be....)
- Respects other people and ideas; i.e. works hard to understand other views (asks questions, paraphrases, etc.)

Communication

- Shows work (uses writing, charts, diagrams, models, etc.)
- Organizes complex ideas
- Uses appropriate mathematical terminology and notation

What Are Characteristics of Strong and Weak Work?

(I1) Mathematical Reasoning

Strong

Weak

(I2) Problem Solving

Strong

Weak

(I3) Mathematical Modeling

Strong

Weak

(K1) Procedural Competence

Strong

Weak

(K2) Conceptual Understanding

Strong

Weak

(WH) Mathematical Work Habits

Strong

Weak

(ESC) Mathematical Community

Strong

Weak

(C) Mathematical Communication

Strong

Weak