Strand Map: Physical and Conceptual Models and Their Uses

9-12 (11B) The usefulness of a model can be tested by comparing its predictions to actual observations in the real world. But a close match does not necessarily mean that the model is the only "true" model or the only one that would work.

6-8 (11B) Models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or that are too vast to be changed deliberately, or that are potentially dangerous.

6-8 (9E) Some aspects of reasoning have fairly rigid rules for what makes sense; other aspects don't. If people have rules that always hold, and good information about a particular situation, then logic can help them to figure out what is true about it. This kind of reasoning requires care in the use of key words such as if, and, not, or, all, and some. Reasoning by similarities can suggest ideas but can't prove them one way or the other.

6-8 (9E) An analogy has some likenesses to but also some differences from the real thing.

6-8 (11B) Different models can be used to represent the same thing. What kind of a model to use and how complex it should be depends on its purpose. The usefulness of a model may be limited if it is too simple or if it is needlessly complicated. Choosing a useful model is one of the instances in which intuition and creativity come into play in science, mathematics, and engineering.

3-5 (11B) Seeing how a model works after changes are made to it may suggest how the real thing would work if the same were done to it.

3-5 (9E) One way to make sense of something is to think how it is like something more familiar.

3-5 (11B) Geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and stories can be used to represent objects, events, and processes in the real world, although such representations can never be exact in every detail.

K-2 (11B) A model of something is different from the real thing but can be used to learn something about the real thing.

K-2 (11B) One way to describe something is to say how it is like something else.

K-2 (11B) Many of the toys children play with are like real things only in some ways. They are not the same size, are missing many details, or are not able to do all of the same things.