Guiding Questions for Socratic Discussion on the Nature of Mathematics

TOK 12

**Instructions:**

In order to explore the methodology of mathematics in greater depth, we are going to have a 25-minute discussion attempting to answer the question:

***To what extent is mathematics an independent area of knowledge?***

You are each responsible to drive the discussion, adhering to the principals of Socratic discussions. If you find that the conversation stalls, then you may choose to draw from the below guiding questions.

1. Mathematics is, at its foundation, an abstraction of natural phenomenon that uses symbols to represent real things. To what extent does this abstraction limit the strength of its knowledge claims?
2. Mathematics has certain axioms that are unproven assumptions that are the foundation of the logical processes it uses to construct answers. In what ways do these axioms strengthen and weaken mathematics?
3. Mathematical ratios and relationships can be found naturally occurring throughout the universe (i.e. Fibonacci sequence). To what extent is mathematics discovered rather than a man-made creation?
4. When we “box” a solution to a mathematical problem, can we say we have gained new knowledge? If so, why? If not why not?
5. Mathematics has certain concepts that cannot be observed (i.e. imaginary numbers, infinity, etc….). Does this weaken it as an area of knowledge?
6. Is the future of mathematics the future of human civilization? To what extent should the mathematician be seen as a “high priest” of the 21st Century?
7. Does the fact that modern mathematics can only be comprehended by less than .05% of the entire world population limit its relevance as an AOK? How do we know that there have been new developments in mathematics if we cannot understand them?