

thought exercise

NUMBER STUDY

In our Number Study Thought Exercise, learners analyze elements within a given set or sets in order to find connections, articulate properties or draw conclusions about those elements. This

Thought Exercise occurs in a whole group format, with the community of mathematicians engaging in discourse together, discussing and justifying ideas. Typically we have one learner choose a prompt to explore and they explain their thinking aloud; the learner does this while standing in front of the mathematics community. Debate often ensues as the community evaluates the quality of the thinking and wrestles with whether they agree or disagree with the justification.

$$G: \{3, 6, 9, 12, 15, \dots\}$$

$$H: \{4, 8, 12, 16, 20, \dots\}$$

$$I: \{51, 92, 124, 228, 465\}$$

- DETERMINE ALTERNATE DESCRIPTORS FOR ALL SETS BASED ON THE COMMON PROPERTIES OF THE ELEMENTS
- DETERMINE THE INTERSECTION OF:
 - SETS G AND H
 - SETS G AND I
 - SETS G , H AND I
- GIVE AN ALTERNATE DESCRIPTOR FOR $G \cap H$
- GIVE FIVE NUMBERS BETWEEN 300 AND 400 WHICH ARE NOT PRESENT IN SET G OR SET H

Context of Instructional Design

This Thought Exercise was created for Green Band, a group of 4th and 5th graders in their second year of studying with us. The particular prompts highlighted here were strategically designed to push learners to learn and adopt proper explanations and notations of set theory. As Green Band worked through this Thought Exercise, the learners made connections and discovered new ideas about finite and infinite sets as well as the relationships between sets of multiples.

For example, when finding the alternate descriptor for $G \cap H$, a learner first began by creating a set containing only the value 12 since this was visibly seen in both sets from the prompt. A fellow mathematician prompted them to consider the infinite nature of the sets and set in motion a conversation about where multiple threes and multiple fours intersect: at multiple twelves.