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. The sets, for example G, H, and I below, are written on the whiteboard.

The teacher then reads a prompt orally, one at a time, and the community of mathematicians wrestles with the prompt. Typically we have one learner go forth to the whiteboard to explain their thinking aloud. Debate often ensues as the community evaluates the quality of the thinking and evaluates with whether they agree or disagree with the justification given by peers as they share their thinking.

G: {3, 6, 9, 12, 15, . . .}
H: {4, 8, 12, 16, 20, . . .}
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 ∩ 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 ∩ 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 her 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.