Mathematics: The Language of STEM
Boot Camp Fractions!

CONTENT AND TASK DECISIONS

Grade Level(s): 3rd

Description of the Task:
During this lesson, the students will be creating a boot camp. In the boot camp, a fraction of the camp will be running and the rest of the camp will be up to seven strength-building activities. Your students will build the camp and then will create a fraction number line that represents the running and strength-building activities.

Indiana Mathematics Content Standards:
3. NS.3: Understand a fraction as a quantity formed by 1 part when a whole is partitioned in to equal parts.
3.NS.4: Represent a fraction on a number line by defining the interval from 0-1 as the whole.

Indiana Mathematics Process Standards: PS.1: Make sense of problems & persevere in solving them
PS.4: Model with mathematics

Mathematics Content Goals: The students will understand fractions as a whole. They will be able to plot the fractional parts on a number line.

Language Objectives: With a partner, students will create a boot camp diagram or model and then represent the parts of the camp on a fraction number line.

Materials:
Each group will need:
- Ruler
- Paper
- Pencil and markers
- Items to build a model of the boot camp

THE LESSON

Before: Teacher and students will discuss prior knowledge of boot camp obstacles. What activities could build strength and running stamina? How could you design a boot camp to maximize space and include a variety of obstacles?

- **Activate prior knowledge:**
  What do you need in order to make a fraction?

Sentence Frames: A fraction has _____
The bottom (top) of the fraction represents _____
I could use a fraction to show _____

Be sure the problem is understood: We really want to be in better shape, so let us create a boot camp that will be fun so we will want to work hard to be healthier! It is time to create a boot camp and show the fractional parts on a line. Let us get in shape!

Establish clear expectations:

- Work with your partner to decide up to seven different obstacles you will have in your boot camp.
- The running portion will need to be included in the final course, as well. (Remember: there will be just one part running).
- Create a fraction line to show the running part of the course and the fractional part for the obstacles.

During:

- **Let go:** Before you begin to design the boot camp, discuss the different obstacles that could be added to the course to help build strength. There can be up to seven them. There must be one part of the camp that is a running activity. Draw the entire boot camp on paper and the one part of the course that will be running. Then draw the fractions on a line to show the two parts (running and obstacles).

- **Listen actively:** As the students are working, the teacher will circulate and listen for misunderstandings or confusion. The confusion could still be about the boot camp obstacles or the fact that one part must be running. Also, listen for fractional misconceptions. What denominator did they use?

- **Provide appropriate support:**
  Can you explain to me what you have done so far? What is your next step?
  Explain how you know the fractional part for the running portion of the camp.
  Why do you have _____ as the denominator (numerator)?

- **Provide worthwhile extensions**:
  What happens if you include five obstacles? Change the number of obstacles and then explain why the fraction would change.

After:

- **Promote a mathematical community of learners:**
  Each partnership will share their boot camp with the class in math congress. Each group will share their fraction number lines and explain how they know they are accurate.

- **Listen actively without evaluation**
  How would the fractions change with a different number of obstacles?
  How did you work together to create the boot camp?
  What was the most difficult part of this lesson?
  How did you create the fraction number line? What was your thinking?
  What are some strategies you used when creating your boot camp.

- **Make connections**
  Why can your camp be a whole (1) with five obstacles and one running part while my camp is a whole (1) with seven obstacles? What happens to the fraction when you change the number of activities in the boot camp?

- **Summarize main ideas:** After the groups present and talk through their thinking, the students should be able to verbalize or show how to make the different fractions between 0-1 on a number line.

ASSESSMENT

Observe:
Look for evidence that the students made connections between the fractions and the parts in the boot camp.

Ask:
Would the fractional parts change if the amount of obstacles changed? How do you know?
How would you show that on a fraction line?
How might you convince your parents that the fraction line you created for your camp is accurate?
Why is it one even with different numbers of obstacles?