Math Lab Lesson #5:
Working with Fractions Part II

How can we use fractions to measure?

How can we multiply and divide fractions?

SITUATING THE LESSON:

During the next Saturday Academy, students will:

- Practice operating with rational numbers by solving equations with fractional coefficients, and model "real-world" situations with expressions and equations that contain fractions.
- Justify the "keep-change-flip" algorithm for dividing fractions, and reason about properties of reciprocals.

Summary: In this lesson, students will:

- Complete an extension activity based on last week's Group Activity (measuring with flash cards).
- Preview some of the key ideas that they will learn during next Saturday Academy Lesson 7 about how to operate with fractions (only two videos this week)
- Play the numeracy game "24" as a review of decomposing integers, and then create their own game like "24" based on proportions.

Preparation Before Class: Work through all problems and watch videos in advance. Read through and annotate the Lesson Plan in a way that will be useful to you.

Materials:

- **Math Lab Lesson #5: Classwork** (1 per student and instructor)
- **Math Lab Lesson #5: Group Activity** (1 per student and instructor)
- **2 inch Wood Cube** (10 per instructor)
- **10 foot tape measures** (6 per instructor)
- **"24" Game and Blank "24" Cards** (6 per student)
- **Math Lab Lesson #5: Game Time** (1 per student and instructor)
- **Math Lab Lesson #5: Instructor Answer Key** (instructor only)

1st Hour

1. Lesson Launch (5 min)

A) SATURDAY ACADEMY AND WEEKDAY REVIEW (5 MIN)

- Ask students what they have been learning in Saturday Academy and Weekday. What has been interesting? What have they struggled with? Take a few responses and jot them on the board.
- Ask students to get out their Workbook and find a Classwork (Level 1 or Level 2) problem that they understand. Have them pair up and give them one minute to explain it to their partner, then switch.
- Explain that this week we will start with the Group Activity

2. Group Activity and Presentations (45 min)

- Hand out the Group Activity, and distribute tape measures and 2 inch wooden cubes. Have students work on this activity groups of three or four. Circulate and provide support.
- The purpose of this activity is to extend the "flash card" activity from last week by exploring measurement in three dimensions. **The question "how many cubes would fit in this room?" is another way of asking "How large is this room when measured in cubes?"** In other words, it is another way of conceptualizing the measuring model!
- One way of addressing this question is to calculate the volume of the room in cubic feet and then ask "How many wooden cubes would make up one cubic foot?" Since each cube is 2 inches, one foot would be 6 cubes and a cubic foot would be $6^3 = 216$ cubes. Then it is a straight multiplication problem.
- Have all groups write their solutions on the board and present them. Encourage students to make connections between different solution strategies.
- If students finish earlier then move to the Math Videos.

3. Break (5 min)

2nd Hour

4. Individual Work: Math Lab Videos (30 min)

- Hand out the Classwork and help students access the following videos:
  - Video #1: Taking Parts of a Whole
  - Video #2: Algebra with Fractions!
- Direct students to take notes on the videos on their Classwork. Let them know that they should feel free to pause or rewind the video if anything is unclear, and they should raise their hand if they would like you to help them one-on-one.
- Once a student is done watching a video, they should **complete the Classwork problems that relate to that video.** After they do this (and ask any clarifying questions), they should start the next video.
- As you circulate, make sure that students are focused and on track (i.e. not surfing the web), and provide hints and help as needed.

5. Game Time (25 min)

- Hand out the game "24" and the "Game Time" handout. Circulate as students play.
- After about 10 minutes, hand out the Blank "24" cards and direct students to create their own game like "24" but based on proportions (see "Game Time" handout)