

Name: \_\_\_\_\_

***Mathematics: The Language of STEM***

**Exploring Equivalent Fractions: Day 1**

**CONTENT AND TASK DECISIONS**

**Grade Level(s): 5**

**Description of the Task:**

Students will use snap cubes to build rectangular prisms in order to discover different ways of representing the same fraction.

**Indiana Mathematics Content Standards:**

- 5.C.4: Add and subtract fractions with unlike denominators, including mixed numbers.
- 5.AT.2: Solve real world problems involving addition and subtraction of fractions.

**Indiana Mathematics Process Standards:**

- PS1
- PS2
- PS3
- PS4
- PS5
- PS6

**Mathematics Content Goals:**

Students will directly model how to form equivalent fractions.

**Language Objectives:**

Students will engage effectively in a range of collaborative discussions about equivalent fractions, while posing and responding to specific questions based on the remarks of others.

**Materials:**

Snap Cubes

Fraction Puzzles Worksheet

**THE LESSON**

**Before:**

**Student Actions**

- Students will work in pairs to build a rectangle that is one third of one color and two-thirds of another color using more than three cubes.
- Students will contribute to the discussion by posing questions to their peers and sharing ideas.

**Teacher Actions**

- Show the students a rectangle made of one yellow cube and two blue cubes. Ask, "What fraction of the rectangle is yellow?"
- Ask, "How can you use snap cubes to build a rectangle that is one third of one color and two-thirds of another color using more than three cubes?"
- Circulate among groups to provide assistance and make observations.

- Call on students to share and explain their thinking.

**During:**

**Student Actions**

- Students will work in pairs to create snap cubes rectangles that represent the following puzzles. They must find as many solutions as possible and draw each solution on grid paper.

**Teacher Actions**

- Circulate among groups to provide assistance, pose further questions, and make observations.

**After:**

**Student Actions**

- Students will contribute to the discussion by posing questions to their peers and sharing ideas.
- Student exit ticket: What patterns did you notice when creating solutions to these puzzles?
- Note: Students will need to keep their grid paper for the next day's lesson.

**Teacher Actions**

- Lead the class in a discussion. Call on several groups to share their solutions to one of the puzzles, using the following prompts:
  - How did you go about solving this problem?
- Which solution best illustrates the puzzle? Why?

**ASSESSMENT**

(student exit ticket): What patterns did you notice when creating solutions to these puzzles?

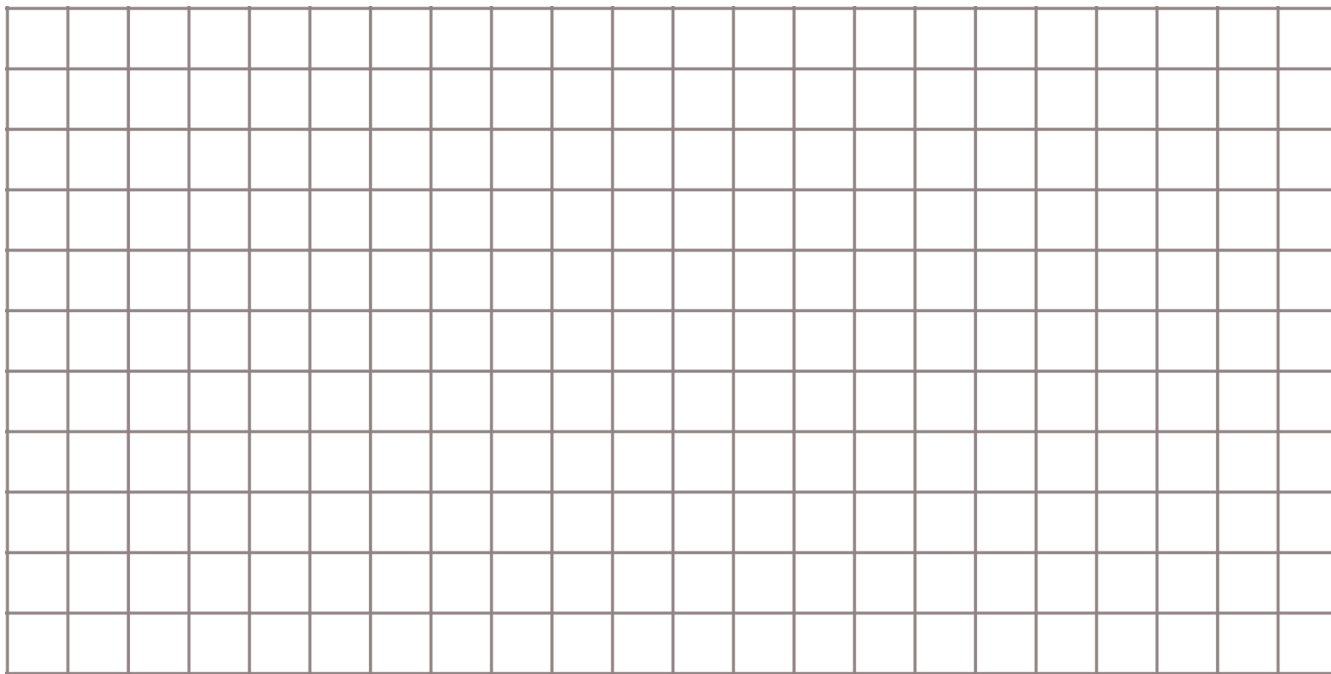
**Observe:**

- Observe students making the connection between two fractions that have different numerators and denominators but have the same value.
- Observe students engaging effectively in a range of collaborative discussions about equivalent fractions, while posing and responding to specific questions based on the remarks of others.

## Fraction Puzzles

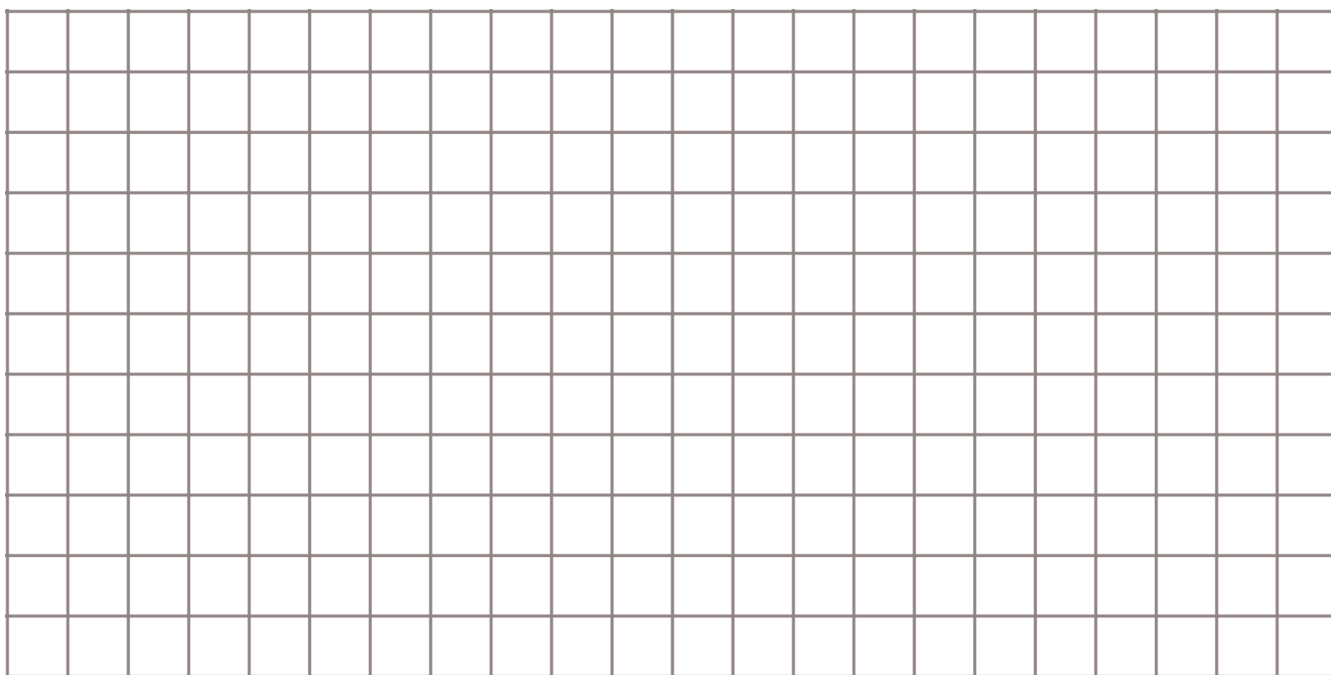
### Fraction Puzzle #1

This rectangle is  $\frac{1}{2}$  blue and  $\frac{1}{4}$  yellow. The rest of the rectangle is black. Use your cubes to build as possibilities that you can think of. Draw them in the grid paper below.



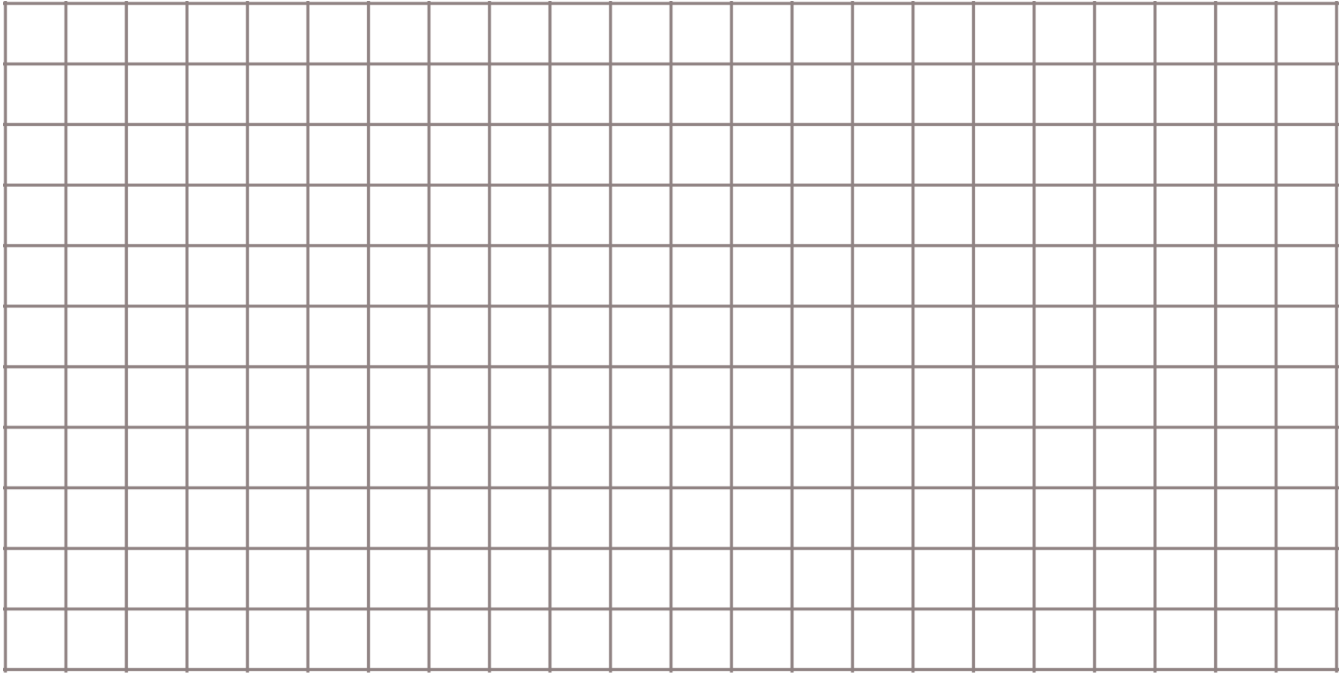
### Fraction Puzzle #2

This rectangle has 12 cubes. Three are blue,  $\frac{1}{4}$  are black, and  $\frac{1}{6}$  are yellow. Use your cubes to build as many as possible. Draw them in the grid paper below.



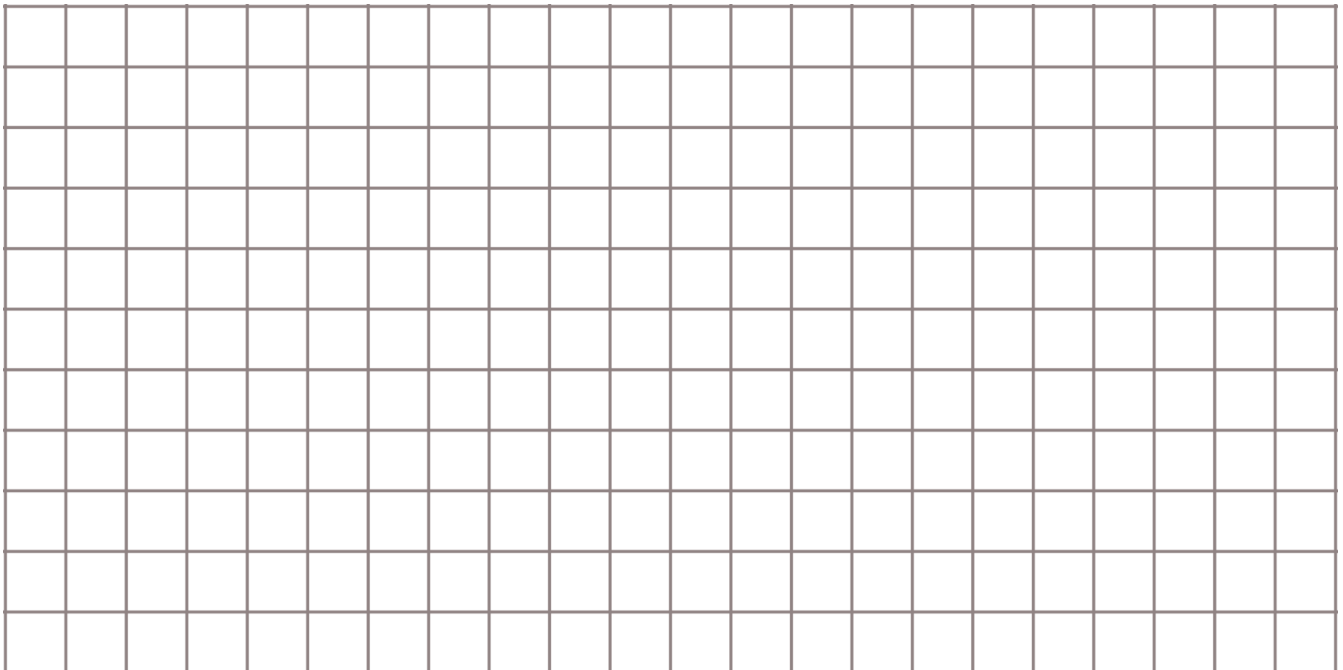
### Fraction Puzzle #3

This rectangle is  $\frac{3}{8}$  blue and  $\frac{1}{4}$  yellow. The rest of the rectangle is black. Use your cubes to build as many as possible. Draw them in the grid paper below.



### Fraction Puzzle #4

This rectangle is  $\frac{3}{5}$  blue. The rest is black and yellow but not in equal amounts. Use your cubes to build as many as possible. Draw them in the grid paper below.



***Mathematics: The Language of STEM***  
Exploring Equivalent Fractions: Day 2

**CONTENT AND TASK DECISIONS**

**Grade Level(s): 5**

**Description of the Task:**

- Students will present their multiplication patterns from yesterday's activity in a table.
- Students will use manipulatives of their choice to solve the problem and present their findings to the class.

**Indiana Mathematics Content Standards:**

- 5.C.4: Add and subtract fractions with unlike denominators, including mixed numbers.
- 5.AT.2: Solve real world problems involving addition and subtraction of fractions.

**Indiana Mathematics Process Standards:**

- PS1
- PS2
- PS3
- PS4
- PS5
- PS6

**Mathematics Content Goals:**

Students will use multiplication strategies to form equivalent fractions and apply their strategies to solve an addition problem involving fractions.

**Language Objectives:**

Students will engage effectively in a range of collaborative discussions about equivalent fractions, while posing and responding to specific questions based on the remarks of others.

**Materials:**

Snap Cubes

Fraction Puzzles Worksheet

**THE LESSON**

**Before:**

**Student Actions**

- Students will work in the same pairs from yesterday to create a table showing the number of cubes for each color in fraction puzzle #1. See example below:

Blue cubes	2	4	8
Yellow cubes	1	2	4
Black cubes	1	2	4
Total cubes	4	8	16

- Use the table to show the three equivalent fractions represented by the number of blue cubes.

$$2/4 = 4/8 = 8/16 = \dots\dots\dots$$

### Teacher Actions

- Ask students to look over their grid paper from yesterday.
- Ask “What did you notice about the rectangles you built yesterday?”
- “When building a fraction what did the bottom number represent?”
- “What did the top number represent?”
- Teacher will use the first rectangle from yesterday (2 blue, 1 yellow, 1 black cubes) to show students how to fill in the table.
- Allow time for students to continue filling in the table for the remaining rectangles from yesterday’s lesson.
- Teacher will circulate the room, checking to make sure groups are completing the table correctly
- “What do we know about all of these rectangles?”
- “What patterns do you see?”

### During:

#### Student Actions

- Students will work in the same pairs to use manipulatives to solve and model the following problem:
  - Sandy and Lisa are sharing a pizza at a sleepover. Sandy ate  $\frac{1}{2}$  of the pizza and Lisa ate  $\frac{1}{3}$  of the pizza. How much pizza did they eat all together? How much is left?

### Teacher Actions

- Circulate among groups to provide assistance, pose further questions, and make observations.
- Provide enrichment for students who grasp the concept quickly. (Draw a model and show your thinking using a number sentence) (Can you do that problem in another way?)

### After:

#### Student Actions

- Students will contribute to the discussion by posing questions to their peers and sharing ideas.
- Students will complete their exit ticket independently.

### Teacher Actions

- Lead the class in a discussion. Call on several groups to share their models and solutions on the document camera. (Consider ordering presenters by level of understanding-least to most.)
  - How did you go about solving this problem?
  - Why couldn’t you add the fractions the way they were written?
  - Who ate more pizza?
  - Justify your answer.

## **ASSESSMENT**

(student exit ticket): Add  $\frac{2}{5} + \frac{1}{4}$  on a notecard. Explain the strategy you used to solve the problem.

### **Observe:**

- Observe students forming multiplication patterns to form equivalent fractions.
- Observe students using equivalency concepts to add unlike fractions.
- Observe students engaging effectively in a range of collaborative discussions about equivalent fractions, while posing and responding to specific questions based on the remarks of others.