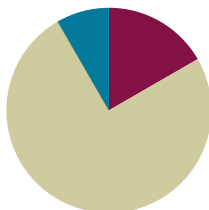


Lesson 22

Objective: Make sense of complex, multi-step problems and persevere in solving them. Share and critique peer solutions.

Suggested Lesson Structure

■ Fluency Practice	(10 minutes)
■ Concept Development	(45 minutes)
■ Student Debrief	(5 minutes)
Total Time	(60 minutes)



Fluency Practice (10 minutes)

- Multiply **5.NBT.5** (4 minutes)
- Change Improper Fractions to Mixed Numbers **5.NF.3** (3 minutes)
- Add Unlike Fractions **5.NF.1** (3 minutes)

Multiply (4 minutes)

Materials: (S) Personal white boards

Note: This drill reviews year-long fluency standards.

T: Solve 34×24 using the standard algorithm.

S: (Write $34 \times 24 = 816$ using the standard algorithm.)

Continue the process for 134×24 , 46×42 , 346×42 , and 768×37 .

Change Mixed Numbers to Improper Fractions (3 minutes)

Materials: (S) Personal white boards

Note: This fluency activity reviews G5–Module 3 concepts.

T: (Write $1 + \frac{1}{3}$.) Say the sum as a mixed number.

S: $1\frac{1}{3}$.

T: (Write $1\frac{1}{3}$.) How many thirds are in 1?



NOTES ON LESSONS 21–25:

Lesson Sequence for M6–Topic E:

- Lessons 21–22 use a protocol to solve problems within teams of four. The number of problems solved will vary between teams.
- Lesson 23 uses a protocol to share and critique student solutions from Lessons 21–22.
- Lesson 24 resumes the problem solving begun in Lessons 21–22.
- Lesson 25 uses the protocol from Lesson 23 to again share and critique student solutions.

S: 3 thirds.

T: (Beneath $1\frac{1}{3}$, write $\frac{3}{3} + \frac{1}{3}$.) What's $\frac{3}{3} + \frac{1}{3}$?

S: 4 thirds.

T: (Write $1\frac{1}{3} = \frac{4}{3}$.)

T: (Write $3 + \frac{1}{3}$.) Write the sum as a mixed number.

S: (Write $3\frac{1}{3}$.)

T: How many thirds are in 1?

S: 3.

T: How many thirds are in 2?

S: 6.

T: How many thirds are in 3?

S: 9.

T: (Write $3\frac{1}{3}$. Beneath it, write $\frac{9}{3} + \frac{1}{3} = \frac{10}{3}$.) Beneath your mixed number, write the addition sentence, filling in the missing numbers.

S: (Beneath $3\frac{1}{3}$, write $\frac{9}{3} + \frac{1}{3} = \frac{10}{3}$.)

Continue the process for the following possible sequence: $3\frac{2}{3}$, $1\frac{3}{4}$, $2\frac{3}{4}$, $4\frac{1}{10}$, $4\frac{7}{10}$, and $3\frac{5}{6}$.

Add Unlike Denominators (3 minutes)

Materials: (S) Personal white boards

Note: This fluency activity reviews content from G5–Module 3.

T: (Write $\frac{2}{3} + \frac{1}{6}$.) Add the fractions. Simplify the sum, if possible.

S: (Add.)

Repeat the process for $\frac{3}{4} + \frac{2}{3}$ and $\frac{3}{8} + \frac{5}{6}$

Concept Development (45 minutes)

Materials: (S) G5–M6–Lesson 21 Problem Set

Students continue work through the Problem Set presented in G5–M6–Lesson 21.

1. Re-establish the intention of G5–M6–Lessons 21–22: to give students the opportunity to solve challenging, multi-step problems.

2. Remind students of the *think, pair, share, and complete* protocol.

After having spent G5–M6–Lesson 21 using the protocol, students may now realize that different teams will need quiet at different times. You may want to establish a system for lowered voices when necessary.

3. Remind teams of how they advance to the next problem.

Re-establish the way for teams to communicate that they have completed a problem and adjust the system from the first day if it was flawed.

4. Remind students that completed solutions will be collected, organized, and analyzed.



**NOTES ON
MULTIPLE MEANS OF
EXPRESSION:**

An engaging extension is to offer teams the opportunity to videotape a solution strategy to one of the problems. The videos could be used as part of the share and critique in G5–M6–Lessons 23 and 25.

Student Debrief (5 Minutes)

Lesson Objective: Make sense of complex, multi-step problems and persevere in solving them. Share and critique peer solutions.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

- If you encountered a difficulty while solving the problem, what strategies did you use to keep going?
- Did you apply what you learned yesterday to today's problems?
- What advice would you give a classmate who was having trouble with a hard problem?
- What did you learn about yourself today as a problem solver that will help you to be a better problem solver tomorrow?

Note: There is no Exit Ticket for this lesson.

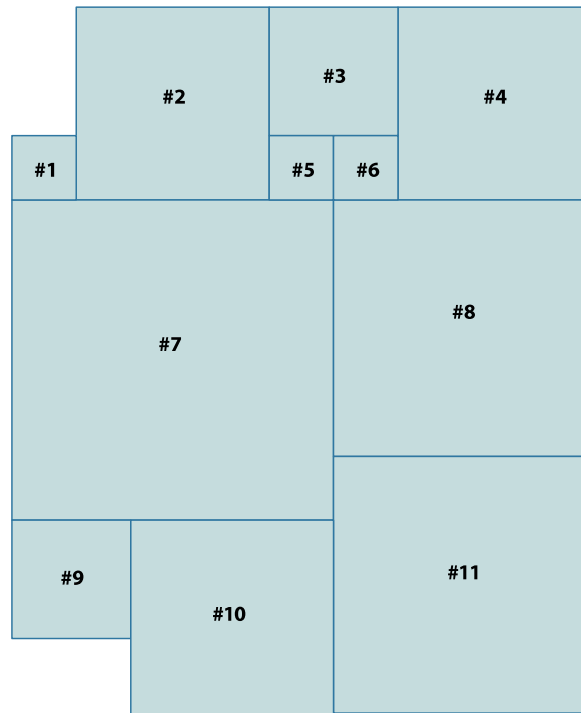
Name _____

Date _____

Solve using any method. Show all your thinking.

1. Study this diagram showing all squares. Fill in the table.

Figure	Area in Square Feet
1	1 ft^2
2	
3	
4	9 ft^2
5	
6	1 ft^2
7	
8	



The following problem is a brainteaser for your enjoyment. It is intended to encourage working together and family problem solving fun. It is not a required element of this homework assignment.

Remove 3 matches to leave 3 triangles.

