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)

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|  | 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.

Materials: (S) Personal white boards

Note: This drill reviews year-long fluency standards.

T: Solve 34 × 24 using the standard algorithm.

S: (Write 34 × 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?

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 $\frac{}{3}$ + $\frac{1}{3}$ = $\frac{}{3}.$) 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)

|  |  |
| --- | --- |
|  | 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.

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.

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 ft2 |
| 2 |  |
| 3 |  |
| 4 | 9 ft2 |
| 5 |  |
| 6 | 1 ft2 |
| 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.

