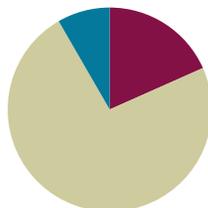# Lesson 25

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

Suggested Lesson Structure

■ Fluency Practice   (11 minutes)
■ Concept Development   (44 minutes)
■ Student Debrief   (5 minutes)
   Total Time   **(60 minutes)**

Fluency Practice (11 minutes)

▪ Multiply **5.NBT.5**   (4 minutes)
▪ Order of Operations **5.OA.1**   (3 minutes)
▪ Subtract Unlike Denominators **5.NF.1**   (4 minutes)

Multiply (4 minutes)

Materials: (S) Personal white board

Note: This fluency activity reviews year-long fluency standards.

> T: (Write 4 tens 9 ones × 4 tens 3 ones = __ × __.) Write the multiplication sentence in standard form.
> S: (Write 49 × 43 = _____.)
> T: Solve 49 × 43 using the standard algorithm.
> S: (Solve 49 × 43 = 2,107 using the standard algorithm.)

Continue the process for the following suggested sequence:

249 × 43, 67 × 32, 867 × 32, and 938 × 27.

Order of Operations (3 minutes)

Materials: (S) Personal white board

Note: This fluency activity prepares students for today's lesson.

> T: (Write 24 ÷ 3 + 1 = _____.) On your personal white board, write the complete number sentence.
> S: (Write 24 ÷ 3 + 1 = 9.)

> **NOTES ON**
> **LESSONS 21–25:**
>
> Lesson Sequence for 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.

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Lesson 25: Make sense of complex, multi-step problems and persevere in solving them. Share and critique peer solutions.

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355

T: (Write 24 ÷ (3 + 1).) On your board, copy the expression.

S: (Write 24 ÷ (3 + 1).)

T: Write the complete number sentence, performing the operation inside the parentheses first.

S: (Beneath 24 ÷ (3 + 1) = _____, write 24 ÷ 4 = 6.)

Continue this process with the following possible sequence: 5 × 4 − 2, 5 × (4 − 2), 36 ÷ 6 − 2, and 36 ÷ (6 − 2).

Subtract Unlike Denominators (4 minutes)

Materials: (S) Personal white board

Note: This fluency activity reviews Module 3 content.

T: (Write $\frac{3}{5} - \frac{1}{2}$.) Subtract the fractions. Simplify the difference, if possible.

S: ($\frac{6}{10} - \frac{5}{10} = \frac{1}{10}$.)

Repeat the process for $\frac{3}{4} - \frac{3}{8}$, $1\frac{5}{8} - \frac{2}{5}$, and $2\frac{1}{4} - \frac{2}{3}$.

Concept Development (44 minutes)

Materials: (S) Student work from Lessons 21, 22, and 24

1. Establish the intention and structure of today's lesson: to construct arguments, share, and critique peer solutions.

Advise students that today, they will revisit their solutions completed in Lessons 21, 22, and 24 and discuss their answers with students who also solved the same problem.

2. Organize new teams of three (or keep those from Lesson 23) based upon an analysis of the solutions and students' strengths, weaknesses, and interrelationships.

3. Review the protocol with students, which may have been edited during the Student Debrief of Lesson 23. (See the UDL box to the right.)

Step 1   Student A presents his solution step-by-step to the others in the group. (Allow two minutes.)

Step 2   Students B and C discuss and make sense of the solution while Student A listens without intervening. (Allow two minutes.)

NOTES ON
MULTIPLE MEANS
OF REPRESENTATION:

To clarify the *share and critique* protocol for students, consider posting the process listed step-by-step.

1.   Student A presents his solution to the group.

2.   Students B and C analyze and discuss the solution as Student A listens.

3.   Students B and C each ask a question or share a thought about the solution. Student A responds to Student B before Student C speaks.

4.   Student A explains to the group what has been learned and what specific changes could be made to improve the solution.

5.   Repeat the process with Students B and C.

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Lesson 25: Make sense of complex, multi-step problems and persevere in solving them. Share and critique peer solutions.

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356

Step 3   Students B and C each ask one question or share one thought directly related to the written solution and explanation. (Allow six minutes or three minutes per question.) Student A responds, and a whole-group dialogue follows.

Suggested stems:

- Can you explain why you chose to _____?
- What did you mean when you wrote (or said) ____?
- I think you omitted _____.
- It might have been easier to understand your solution if you _____.
- I would argue that _____.

Step 4   Student A explains to the group what has been learned from the process and what changes could be made to the solution, if any. (Allow one minute.)

Step 5   Repeat Steps 1–4 for each student on the team.

4. Give students time to either revise their solutions based on their peers' input or support a peer's revision. (7 minutes)

5. File all student solutions in their work portfolios.

> **NOTES ON MULTIPLE MEANS OF EXPRESSION:**
>
> One way to have shy students share solution strategies or critiques is through the use of puppets. Have students use hand puppets as they explain their solutions.
>
> Another strategy is to give these students an opportunity to practice what they will say before speaking in front of their group. This can be done with a trusted friend or teacher or at home. Practicing beforehand can benefit any team member.

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.

- Did your sharing and critiquing experience improve since the last time? How?
- What emotions did you experience during the share and critique process? (Follow up with additional questions based on the responses.) When did you experience nervousness? Annoyance? Surprise? Confusion?
- Did those emotions change as you went through the process? How? Why?
- What is the value of seeing other solutions and arguing about ways of solving problems?
- What did you learn today that will make you a better problem solver in the future?

Note: There is no Exit Ticket for this lesson.

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engage^ny   **357**

Name _____   Date _____

1. Fred and Ethyl had 132 flowers altogether at first. After Fred sold $\frac{1}{4}$ of his flowers and Ethyl sold 48 of her flowers, they had the same number of flowers left. How many flowers did each of them have at first?

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Lesson 25: Make sense of complex, multi-step problems and persevere in solving them. Share and critique peer solutions.

engage^ny   358

The following problems are puzzles for your enjoyment. They are intended to encourage working together and family problem-solving fun. They are not a required element of this homework assignment.

2. Without removing any, move 2 matchsticks to make 4 identical squares. Which matchsticks did you move? Draw the new shape.
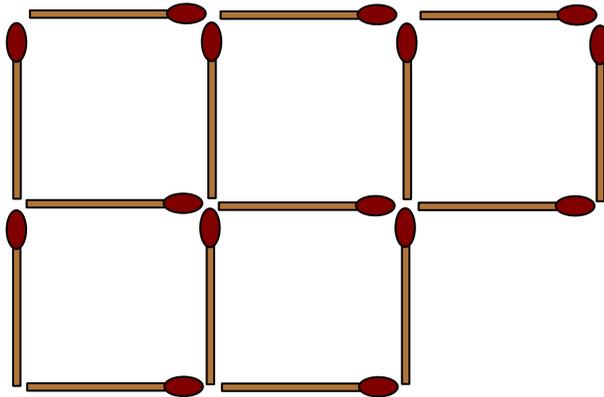
3. Move 3 matchsticks to form exactly (and only) 3 identical squares. Which matchsticks did you move? Draw the new shape.

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Lesson 25: Make sense of complex, multi-step problems and persevere in solving them. Share and critique peer solutions.

engage^ny   **359**