

# Break It Apart

## MULTIPLICATION Strategies

K20 Center, Lyndsie Pearce
Published by *Oklahoma Young Scholars/Javits*

*This work is licensed under a Creative Commons CC BY-SA 4.0 License*

| | | | |
|---|---|---|---|
| **Grade Level** | 4th Grade | **Time Frame** | 3-4 class period(s) |
| **Subject** | Mathematics | **Duration** | 240 minutes |
| **Course** | Elementary Mathematics | | |

## Essential Question

How can you use multiplication strategies to solve a story problem?

## Summary

During this lesson, students will use their prior knowledge of multiplication and the distributive property to solve a 2-digit by 2-digit multiplication problem.

## Snapshot

**Engage**

Students activate prior knowledge with group discussion and are introduced to the problem.

**Explore**

"Harvest Strategy": Students create a poster for their solution.

**Explain**

Students solve story problems with their preferred method.

**Extend**

"Who Has the Largest?": Students play a card game to practice multiplication.

**Evaluate**

Students complete an Exit Ticket to evaluate their understanding.

## Standards

*Oklahoma Academic Standards for Mathematics (Grade 4)*

**4.N.1.2:** Use an understanding of place value to multiply or divide a number by 10, 100 and 1,000.
**4.N.1.5:** Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction, and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of appropriate technology, and the context of the problem to assess the reasonableness of results.

## Attachments

- Break-It-Apart-Story-Problem.docx
- Break-It-Apart-Story-Problem.pdf
- Break-It-Apart.docx
- Break-It-Apart.pdf

## Materials

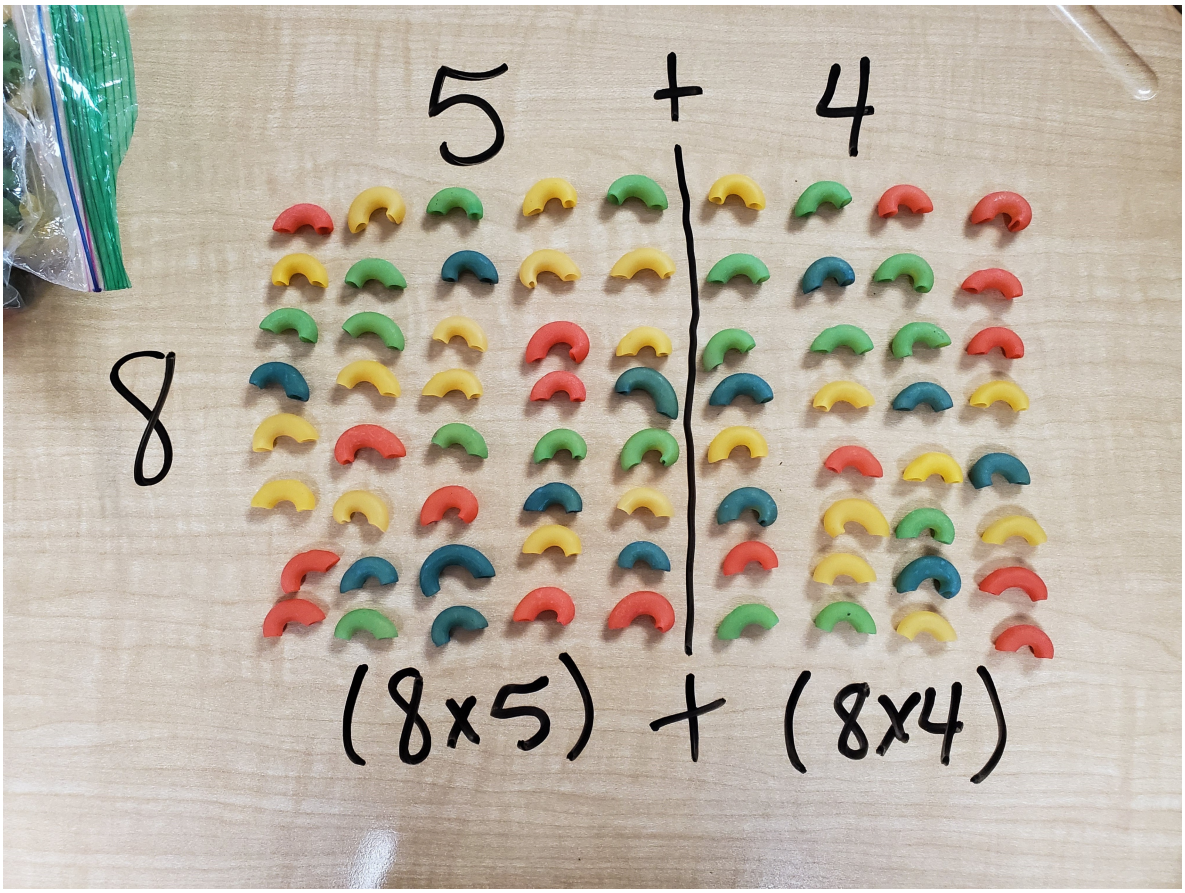
- Story problem handout
- Large sheets of bulletin board paper (one per group)
- Sticky notes (one per student)
- Deck of playing cards with face cards and 10s removed
- Craft sticks (optional)
- Exit ticket

# Engage

Begin by discussing the distributive property to activate students' prior knowledge of multiplication. Ask students, "What does the distributive property look like?" Students may answer the questions through whole group discussion, written/illustrated responses, or by modeling.

**Teacher's Note: Modeling Multiplication Problems**

Students should have been taught how to model a multiplication problem and the distributive property before this lesson. Have the students model a basic math fact before presenting the problem for the day. Doing so will allow students to remember or realize that they can solve problems by breaking them apart.




*Modeling multiplication.*

Tell students, "I need your help today solving a story problem." Share the following problem with students. You may either use an interactive whiteboard or the attached paper copy (one per group).

**Teacher's Note: Grouping Students**

You can decide how to group students or let the students pick their partners. For this lesson, it will be a good idea to limit groups to no more than four students.

Tom builds 36 birdhouses. He used 17 craft sticks to build each birdhouse. How many craft sticks did he use in all?

# Explore

Introduce a Strategy Harvest instructional strategy. Within their groups, have students discuss how they would solve the problem. After the students have had time to discuss, ask each group to share out how they would solve the problem and what led them to their decision. Ask students to create a poster illustration showing how they would solve the story problem. Allow students to decide how and what they use to create their poster. Walk around to each group and discuss their plan with them.

### Teaching Note: Scaffolding With Manipulatives

Before they design their poster, provide manipulatives (such as Base 10 blocks, macaroni, Napier's Bones, or craft sticks) to students who are still struggling with multiplication. Bundle or group manipulatives to simulate the story problem, e.g., craft sticks would be bundled into 36 groups of 17 sticks each.

When students have completed their posters, hang them around the room. Use a Gallery Walk strategy to allow students to travel to each poster and then answer the following questions:

1. What do you notice about the posters?
2. What methods are used to solve the problem?
3. Are all of the methods the same?

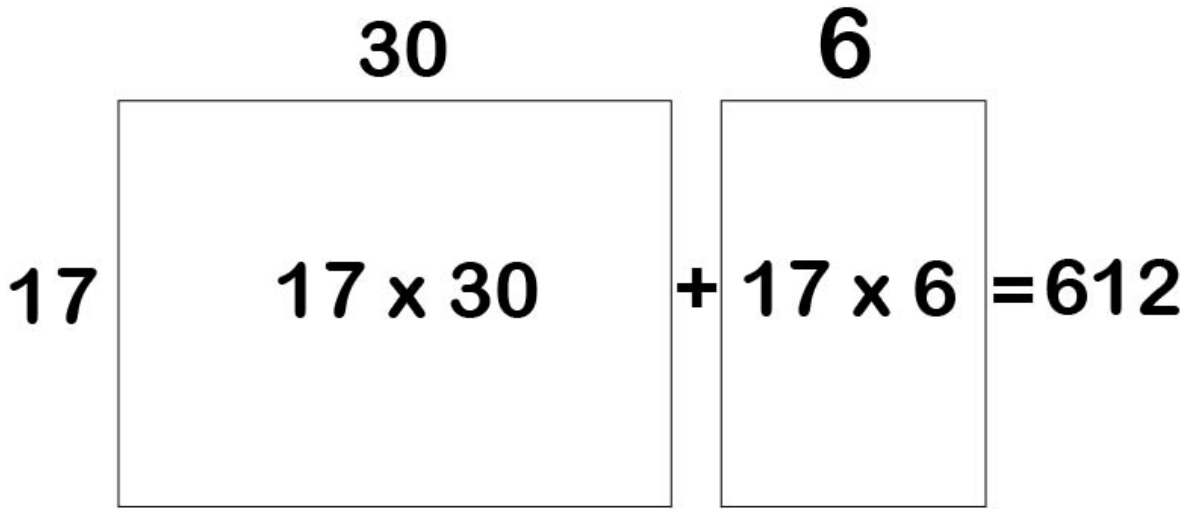
After everyone has traveled to all the posters, students will return to their seats. Have each group explain the method they used to solve the problem.

Give each student a sticky note. Ask students to choose a method they would use to solve the problem and write why they chose that method on their sticky note. Students then place their sticky note on the poster that represents their preferred method.

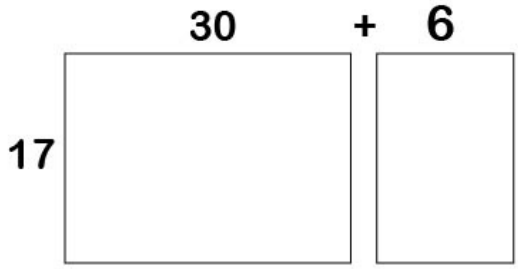
The following are examples of methods for solving the problem:

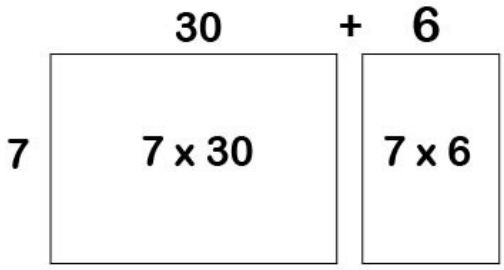
$$\begin{array}{r} 4 \\ 36 \\ \times\ 17 \\ \hline 252 \\ +360 \\ \hline 612 \end{array}$$

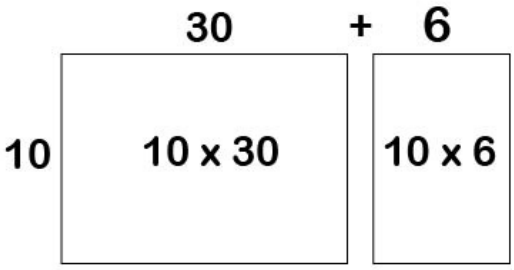
*Standard method*




*Partial product method*



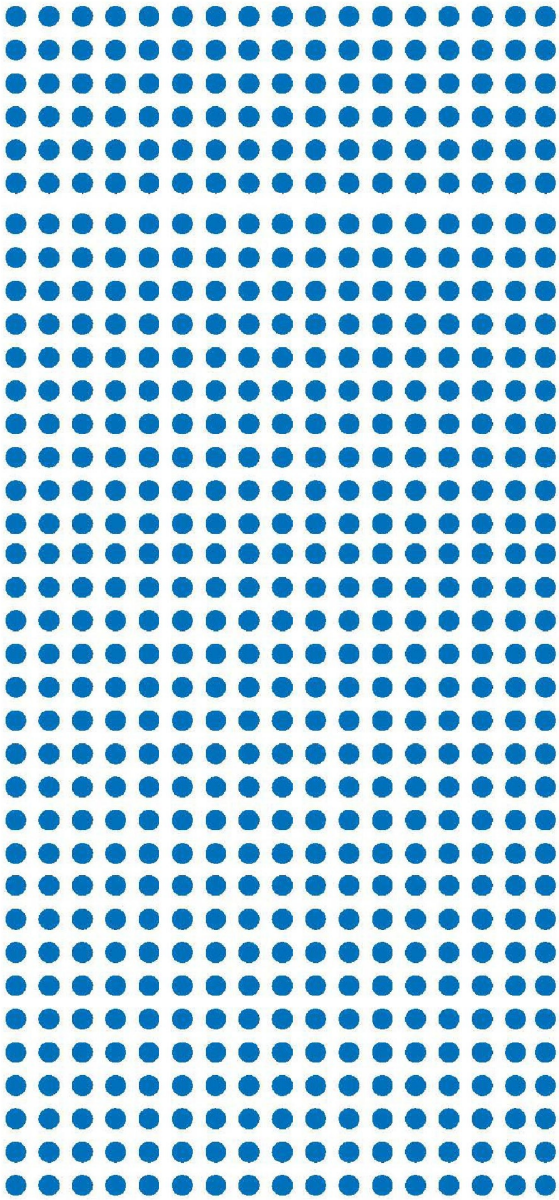

$$\begin{array}{r} 42 \\ +210 \\ \hline 252 \end{array} \qquad \begin{array}{r} 60 \\ +300 \\ \hline 360 \end{array}$$

$$\begin{array}{r} 252 \\ +360 \\ \hline 612 \end{array}$$

*Distributive property method*

17

36



$$\begin{array}{r} 17 \\ \times\ 36 \\ \hline 612 \end{array}$$

*Array method*

# Explain

Leave the posters from the Gallery Walk hanging up and over the next day or so, go over each group's poster. Demonstrate each method for solving the multiplication problem.

**Teacher's Note: Practicing Each Method**

Give students plenty of time to practice each method. Methods you will see students develop are the distributive property, drawing arrays, partial product, and the standard method.

After each method has been reviewed, let the students choose a method to use when solving a multiplication problem.

Present each of the problems below. Have students solve each problem on their whiteboards or paper, using a strategy that they prefer. While students are solving the problems, walk around and ask students why they chose their method they are using to solve the problem. Take time to work each or the problems and discuss them as a class.

1. A pet store sold 74 puppies in one week. If the cost of each of the puppies was 65 dollars, how much money did they collect that week?
2. Kelli had 56 shelves of DVDs. If each shelf held 38 movies, how many total movies did she have?
3. Kelsey was making necklaces for her friends. She had 85 friends who wanted a necklace and each necklace required 25 beads. How many beads would she need altogether?

**Guiding Questions:**

Students should now be able to verbalize their solutions. Ask students, "Can you tell me how you chose this method?" and "Can you walk me through your steps to finding your answer?"

# Extend

### Teachers' Note: Card Game Prep

For the Extend activity, you will need a deck of playing cards for each pair of students in your class. Remove the face cards and the 10s from each deck. Make sure students know that an ace represents the number 1.

Teach students to play a card game called, "Who Has the Largest?"

During this activity, students will work with a partner. Each pair of students will get a deck of cards with the face cards and 10s removed. Have the students shuffle their cards and lay them face down.

Each student should draw four cards and arrange them to make a two-digit by two-digit multiplication problem. The goal of the game is to use your cards to design a problem with the highest possible product. Have students solve their own multiplication problem on their scratch paper using their preferred strategy.

After they have solved a problem, students trade papers and check each other's work. The player with the largest product scores a point. Students keep playing until one person scores ten points or when time runs out.

### Guiding Questions:

As students play the game, ask them to consider the following questions to guide their decisions about designing problems: "What is the greatest digit you could use?", "What kinds of multiples make bigger products?", and "How can you arrange your numbers to make the biggest product?"

### Teacher's Note: Game Variation

For a variation on the game and for further practice, you may change the rules so that the goal is to create a problem with the smallest product. The player who does so wins the point.

# Evaluate

Use an Exit Ticket strategy to evaluate students' learning.

Each student receives a blank sheet of paper that will serve as their Exit Ticket. You may also use the Exit Ticket template provided. Using a deck of cards from the "Who Has the Largest?" game, draw four playing cards and present them to the class. Have students write the numbers on their paper to create a multiplication problem and solve it using their preferred strategy. After solving the problem, they will explain in writing on their Exit Ticket why the method they used is the best way to solve a multiplication problem.

**Early Finishers:**

Students who finish quickly could write a story problem to go with their multiplication problem.

Use the information from the student's Exit Tickets to organize small groups or one-on-one meetings for students who are still confused or are not confident in the multiplication process.

## Resources


- K20 Center. (n.d.). Bell ringers and exit tickets. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505d6f2
- K20 Center. (n.d.). Gallery walk / carousel. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505a54d
- K20 Center. (n.d.). Strategy harvest. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5062662