Grades 2 and Up: Using Tape Diagrams to Solve Word Problems

- **Introduced in Grade 2** but *useful for all grade levels through algebra*, **tape diagrams** use **rectangular shapes** (similar to measuring tapes) to model numbers and the relationships between them.

- **Tape diagrams are** a **visual tool** for **solving word problems.** They **can represent fractions, differences between amounts, and many other concepts**.

- Once you have created a tape diagram, there are usually **several ways to figure out the right answer**. In each of the two example problems, the **notes in blue show one way to find the answer**, but there may be other strategies that work.
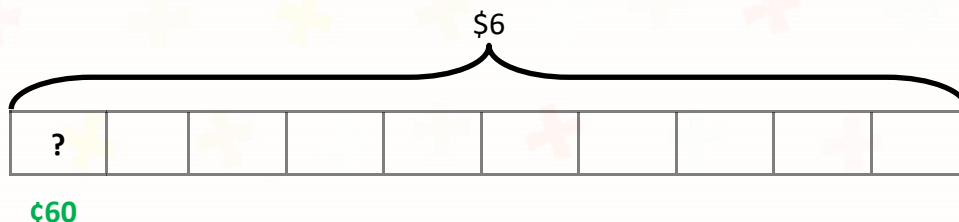
Example Problem #1

Ana spent $6 on 10 stickers. Each sticker cost the same amount of money. How much money did she spend on each sticker?

> **Step 1:** Draw a rectangle that is divided into **10 roughly equal parts** (one part = one sticker).

> **Step 2: Write the total** amount Ana spent **on top**. This shows that the cost of all 10 stickers adds up to $6.

> **Step 3:** Label the unknown part (thing we need to figure out) with a question mark. We want to know how much one sticker costs, so we can **label one of the 10 parts with a question mark.**

> **Step 4: Divide the total money spent by the total number of stickers** to find out how much one sticker costs.

$6

?									

¢60

One Way to Solve the Problem:

- **1/10 of $6 = ?**

- **1/10 X 6/1 = 6/10**

- **6/10 = 60/100**

- **There are 100 pennies in 1 dollar, so...**

- **60/100 of one dollar**

- **Ana spent ¢60 on each sticker.**

Example Problem #2

Ms. Cooper, Ms. Rios, and Mr. Wu are hard-working math teachers. Ms. Cooper works 10 hours every weekend. Ms. Rios works twice as many hours as Ms. Cooper every weekend. Mr. Wu works 3 fewer hours than Ms. Rios every weekend. How many hours do all three teachers together work every weekend?

Step 1: Draw **three rectangles** *of equal size,* **one for each "character"** (in this case, teacher) in the problem. **Label the diagram for Ms. Cooper** to show that her total hours equal **10**.

Step 2: To show that **Ms. Rios works twice as many hours as Ms. Cooper, add another equal-sized piece to Ms. Rios's tape diagram**. 10 + 10 = 20, so **write 20 on top for Ms. Rios's total hours**.

Step 3: **Make Mr. Wu's diagram the same size as Ms. Rios's, but then cross out or shade in a small part** of the diagram to **show he works 3 fewer hours** than her.

Step 4: As in Example 1, **label anything we need to figure out with a question mark**. The big green question mark represents our **final answer.**
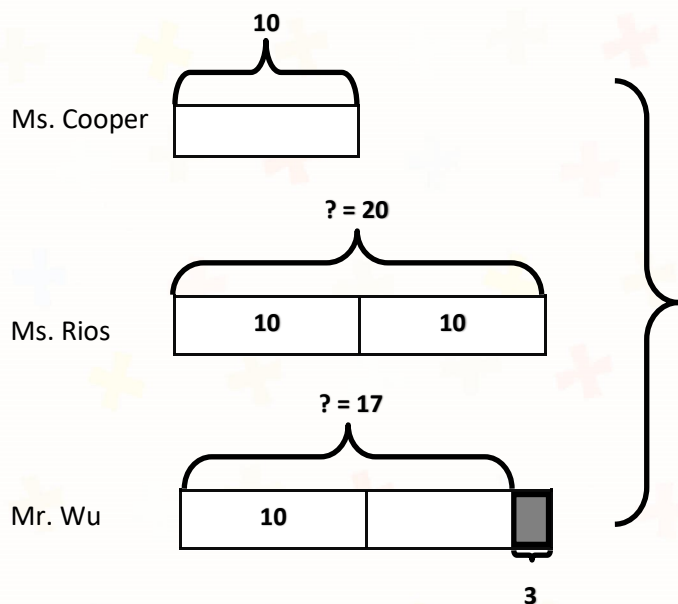
? = 47

One Way to Solve the Problem

- **We already know Ms. Cooper works 10 hours.**
- **To figure out how many hours Ms. Rios works, we can double that number.**
- **10 x 2 = 20, so Ms. Rios works 20 hours.**
- **We know that Mr. Wu works 3 fewer hours than Ms. Rios.**
- **20 - 3 is 17, so Mr. Wu works 17 hours.**
- **To get our final answer, we can add all of the teachers' hours together:**
  10 + 20 + 17 = 47 hours.

For More on This Topic: https://www.engageny.org/resource/word-problems-with-tape-diagrams