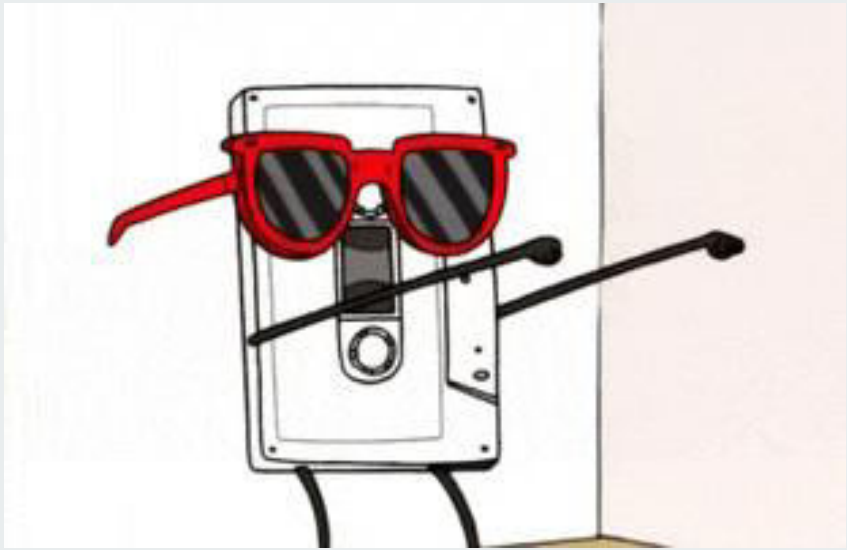
Tape Diagrams and Equations

Lesson # 1

Addressing	**6.EE.B.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.



Let’s see how tape diagrams and equations can show relationships between amounts.

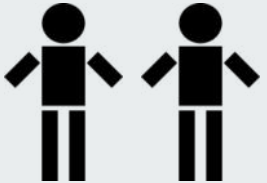
Today's Goals

- ❏ I can tell whether or not an equation could represent a tape diagram.
- ❏ I can use a tape diagram to represent a situation.

Students, write your response!

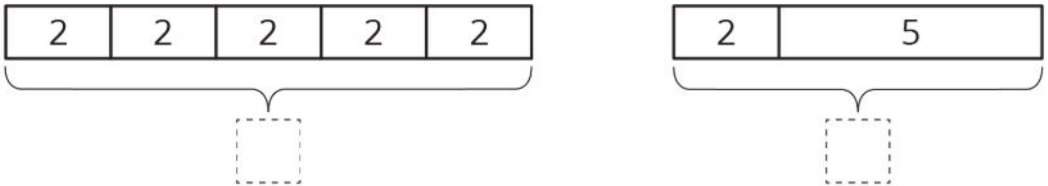
Which Diagram is Which?

Warm Up 1.1



Work quietly (2 min)

Here are two diagrams. One represents $2 + 5 = 7$. The other represents $5 \cdot 2 = 10$. Which is which? Label the length of each diagram.



Draw a diagram that represents each equation.

1. $4 + 3 = 7$

2. $4 \cdot 3 = 12$

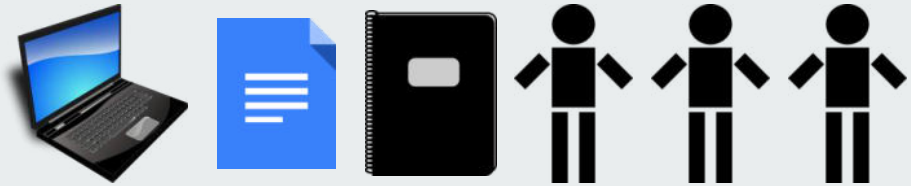
Let's Talk About It

- Where do you see the 5 in the first diagram?
- How did you find the length of the first diagram?
- Explain how you knew what the diagrams for $4+3=7$ and $4 \cdot 3 = 12$ should look like. How are they alike? How are they different?
- How did you represent $4 \cdot 3$? How are they alike? How are they different?

Match Equations and Tape Diagrams

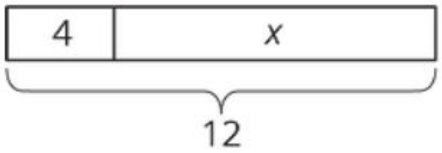
Activity 1.2

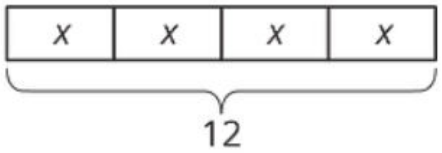
- MLR2: Collect and Display
- Think Pair Share



Work quietly (2 min)
Share your work with your partner (3 min)

Here are two tape diagrams. Match each equation to one of the tape diagrams.





1. $4 + x = 12$
2. $12 \div 4 = x$
3. $4 \cdot x = 12$
4. $12 = 4 + x$
5. $12 - x = 4$
6. $12 = 4 \cdot x$
7. $12 - 4 = x$
8. $x = 12 - 4$
9. $x + x + x + x = 12$

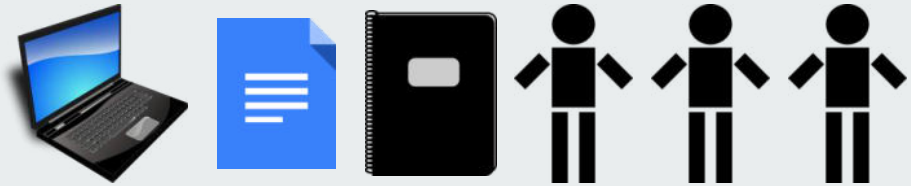
Let's Talk About It

- How can you tell if a diagram represents addition or multiplication?
- Once you were sure about one equation, how did you find others that matched the same diagram?
- Regarding any two equations that represent the same diagram: What is the same about the equations? What is different?

Draw Diagrams for Equations

Activity 1.3

- MLR7: Compare and Connect
- Anticipate, Monitor, Select, Sequence, Connect



Work quietly (5 min)

For each equation, draw a diagram and find the value of the unknown that makes the equation true.

1. $18 = 3 + x$
2. $18 = 3 \cdot y$

Are you ready for more?

You are walking down a road, seeking treasure. The road branches off into three paths. A guard stands in each path. You know that only one of the guards is telling the truth, and the other two are lying. Here is what they say:

- Guard 1: The treasure lies down this path.
- Guard 2: No treasure lies down this path; seek elsewhere.
- Guard 3: The first guard is lying.

Which path leads to the treasure?

Lesson Synthesis

Why are tape diagrams useful to visualize a relationship?

Students, write your response!

Lesson Synthesis

Where in the tape diagram do we see the equal sign that is in the equation it represents?

Students, write your response!

Lesson Synthesis

Why can a diagram be represented by more than one equation?

Students, write your response!

Lesson Synthesis

Describe some ways to represent the relationship $23 + x = 132$.

Students, write your response!

Lesson Synthesis

Describe some ways to represent the relationship $5x = 30$.

Students, write your response!

Today's Goals

- ❏ I can tell whether or not an equation could represent a tape diagram.
- ❏ I can use a tape diagram to represent a situation.

Finish the Diagrams

Cool Down 1.4

Cool Down

Finish the first diagram so that it represents $5 \cdot x = 15$, and the second diagram so that it represents $5 + y = 15$.