



[Video Link](#)



VOCABULARY

The vertical lightning bolts go up and down.

The horizontal lightning bolts go side to side.



TEACHER TIP

The product is the result of the intersection points created by the horizontal and vertical lightning bolts.

Multi-plying Factors

Summary

In Zaplify, all numbers represent magnitudes and the unit of the product derive from the multi-plying of the factors. Factors are represented by the number of lightning bolts and the product is represented by the intersection points. The **covariation** between the factors and how it expresses the product is explored in this activity. For example, in the photo to the left, the product “ten” is established at the intersection of the horizontal and vertical lightning bolts.

Tasks:

- Using Zaplify, ask students to:
 - Make a horizontal line.
 - Make two horizontal lines.
 - While holding two horizontal lines, make a vertical line.
 - Make three vertical lines.
 - What is the product?
 - What are the factors making the product?
- Have students figure out how to create a product of ten using Zaplify.
- Have students create a product of one using Zaplify.

What to Watch For

- It is common for students to initially place ten fingers down to create a product of ten.
- If this strategy persists, ask students, *What is the product when you pressed ten fingers down? How could you make the product ten?*

Questions to Ask

- How did you figure out how to create a product of ten? Did you get this right away? If not, what did you do first? How did you know that was incorrect?*
- Were you surprised that you needed two lines to make a product of one?*
- What does the second line do to the first line? What does it create?*

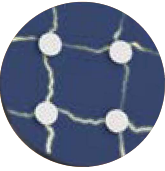
- Where is the point? When did it appear? If I want to make a single point right here (point to a location on the screen that is different from where the previous lines intersected), how should I place my fingers?*
- Does the order of the lines matter? Why or why not?* Make explicit that the number of lines represent the factors, which are the black numerals on the screen, and the number of orange intersection points represent the product, which is the orange number at the top of the screen. The ideas represented by the lines and the intersection point in this case are important ideas for thinking multiplicatively.

Extending Student Learning

- Encourage students to try making 12, try making 15, try making 1.
- As pairs successfully create a product of one, direct their attention to the relationship between the factors and the product, by asking, *You made one with two fingers here. Can you make a single point right here?* Point to a location on the screen that is different from where the previous lines intersected. Some students will always place their fingers in the same order, always creating horizontal (or vertical lines) first. Invite children to explore how the order of the orientation of the lines influences the product.

Assessment

If you press your fingers like the ones in the picture, draw what you would see in Zaplify. Include as many details as possible and write the multiplication sentence that would go with this situation.



TEACHER TIP

Students may think that a point can be created only at a specific location. The goal is for students to figure out that a point can be created at any location as long as they create an intersection at that point.



TEACHER TIP

We want students to notice that in order to create an intersection point, they need two types of lines (vertical and horizontal). The number of intersection points is the product.