Translations Tour: Lesson 0 Vector
Student Activity 📱💻📲

Name _____

Class _____

In this activity, you will investigate the defining properties of the transformation known as a translation from a vector standpoint. You will also learn how to easily and quickly maneuver within all the Translations activities using shortcut keys or the tab key.

Open the document: *Translations.tns.*

PLAY   INVESTIGATE   EXPLORE   DISCOVER

Move to page 1.2. (ctrl ▶)

On the handheld, press ctrl ▶ and ctrl ◀ to navigate through the pages of the lesson.
(On the iPad®, select the page thumbnail in the page sorter panel.)

1. What do the 4 parts of the screen have in common?
   Make two conjectures.
   A **conjecture** is an opinion or conclusion based upon what is observed. Quickly discuss with your group.
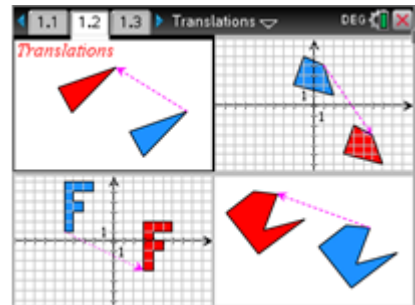
Move to page 1.3. (ctrl ▶) Look at the figure below of an overview of the main translations page and shortcut keys. *Especially notice what the shortcut keys T, +, and – represent.*

Navigating to and Selecting Screen Options or Objects

Handheld Tech Tip:
To choose an option or object, use any of the following 3 methods:

- Use the touchpad to move the pointer over the option or object and press the center of the touchpad (⌖) to select (**click**) it.

- Use [tab] to move to the next option or object on the screen and use [⇧shift] [tab] to go to the previous option or object.

- Use a **shortcut key** (ex: [A] for vertex A, [T] to Translate, etc.). Letters [A], [B], [C] are located at the bottom of the handheld.

Use the method that works best for you: **click**, **tab** or **shortcut key**.

iPad Tech Tip:
To choose a command or object, tap the icon or the object.

2. Press [menu] to open the menu.

   (On the iPad®, tap on the wrench icon [🔧] to open the menu.)
   Press [2] (2: Translation Mode), [2] (2: Vector).

3. On the handheld, press the tab key ([tab]) multiple times and notice each of the icons and points as they are highlighted. To go in the opposite direction, press [⇧shift] [tab]. Investigate.

4. Shortcut keys provide a fast way to perform actions and/or select objects on the screen on the handheld. A list of all shortcuts can be found in the Shortcut Keys Help menu (click on [?] or press [ctrl] [trig]). **Look at this list now.** Use as needed. Press [enter] or [esc] to close the Shortcut Keys Help menu.

5. To translate $\triangle ABC$ about the **vector** $\overrightarrow{WV}$, press the Translate key (click on [▲] or press [T]).

   A **vector** is a directed line segment which has both length and direction.

   Zoom [⊕][⊖] in ([+]) or out ([−]) as needed. Observe what happens on the screen.

   Blue $\triangle ABC$ is called the pre-image and red $\triangle A'B'C'$ is called the image.
   $\triangle A'B'C'$ is read "triangle A prime, B prime, C prime."

6. To move and grab a vertex, press the letter key that corresponds to the vertex such as A ([A]), and use the directional arrows (▲ ▼ ◀ ▶) on the touchpad to move vertex A. Grab and move point A to play, explore and discover ideas and investigate patterns.

    Note: You can also use the **tab** key or **click** on the vertex that is needed.
    (On the iPad®, tap the desired point and move it.)

    What appears to be the relationship between $\triangle ABC$ and $\triangle A'B'C'$? Discuss with your groups.

    Grab and move vertex B ([B]). Grab and move vertex C ([C]). Observe the triangles.

    Discuss with your partner or group: what appears to be true about the pre-image and its image?
    Write your conjecture about the two triangles below.
    A *conjecture* is an opinion or conclusion based upon what is observed.

7. Grab point W ([W]) and move it to coincide with vertex A. What point coincides with V?
    Grab point W ([W]) and move it to coincide with vertex B. What point coincides with V?
    Grab point W ([W]) and move it to coincide with vertex C. What point coincides with V?

    With your group, discuss and describe how the vector affects the translation.

8. Open the Options menu (press 👁 or ([O]). Use the directional arrows (▲ ▼ ◀ ▶) on the touchpad to move to 'Connected Segments' and press the space bar ([⎵]) to put a check mark there.
    Press [enter] or [esc] to close the menu.
    Look at the dashed segments, $\overline{AA'}$, $\overline{BB'}$, *and* $\overline{CC'}$.

    Grab and move the three vertices ([A] ,[B], [C]) and observe the three dashed segments.

    To change the length and direction of vector $\overrightarrow{WV}$, grab point V ([V]) and move it around the screen.

    Discuss in your groups what you observe. What do you observe?

    Grab point W ([W]) and move it to coincide with vertex A. What point coincides with V?
    Grab point W ([W]) and move it to coincide with vertex B. What point coincides with V?
    Grab point W ([W]) and move it to coincide with vertex C. What point coincides with V?

Look at the dashed segments, $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$. Discuss in your group what you notice about those 3 segments and the vector $\overrightarrow{WV}$. Write conjecture(s) below.

9. Many different triangles have been translated in several different directions about several different vectors.
   Based upon your observations, write several conjectures about what seems to be true about a triangle and its translation about a vector.
   A *conjecture* is an opinion or conclusion based upon what is observed.

10. In a translation $\triangle ABC$ is typically called the _____ triangle and

    $\triangle A'B'C'$ is typically called the _____ triangle.

    How is $\triangle A'B'C'$ read? _____

11. What is another word or words that could be used to describe what a translation does?

    _____