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Geogebra Lesson: Area of a parallelogram using rectangles
Website used: <http://www.youtube.com/watch?v=qkqlZSvbmxA> (Area of a Parallelogram, Tina Helms)
Grade: 6th

**Step 1: Turn the Grid on**

* Click Settings (top right corner)
* Click the Graphics tab
* Click the Grid Tab
* Check off the Show Grid box



**Step 2: Create a Rectangle**

* Click the line tab on the tool bar and select Segment (2nd one down)
	+ Plot your segment points at (2,1) and (7,1)
* Click the perpendicular line tab on the tool bar and click on line a (segment AB) and point A
	+ Then click on B and line a (segment AB)
* Click the point tab on the tool bar and create the point C at (2,5)
* Then select the perpendicular line tab on the tool bar and click on line b (AC) and point C
* Click the point tab and select Intersect (4th one down)
	+ Click on the two lines g and h
* Click the Segment tab
* Connect AC, CD, and BD to make segments
* On the algebra tool bar, under the line tab unclick the circles for b,c, and d (the line x=5 will still be present)
* Click on the line segment AB
	+ Right click and press rename
	+ Rename the segment, Base
	+ Hit enter
* Click on the line segment AC
	+ Right click and press rename
	+ Rename the segment, Height
	+ Hit enter
* Click the polygon button on the tool bar
	+ Connect all the points A🡪B🡪D🡪C🡪A
1. Area formula for a rectangle: \_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Area of rectangle ABDC: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Click on the Angle table on the tool bar

	+ Select the Area tab (4th one down)
1. Is your area equal to the one on the screen? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 3: Create a Parallelogram using the Rectangle ABDC**

* Click the Point tab on the tool bar
	+ Plot the point (3,5) on line CD
* Click the Segment tab on the tool bar
	+ Connect points A and E
* Click the Perpendicular line tab on the tool bar
	+ Select Parallel line tab (2nd from top)
	+ Click line segment AE and point B
* Click the Point tab on the tool bar
	+ Select Intersect tab (4th one down)
	+ Click on line e & j
* Click the Polygon tab on the tool bar
	+ Connect all the points A🡪B🡪F🡪E🡪A
* Click on the Point tab on the tool bar
	+ Put your cursor in the parallelogram (anywhere it is not intersecting with rectangle ABDC)
	+ Right click
	+ Click object properties
	+ Select the Color Tab
	+ Change the Color to anything you would like
	+ Hit Enter
* Click on the Area tab on the tool bar
	+ Click on a spot in the parallelogram where it is not intersecting with rectangle ABDC

1. What is the area of parallelogram ABFE? \_\_\_\_\_\_\_\_\_\_\_
2. Is it the same area as the square ABDC? \_\_\_\_\_\_\_\_\_\_\_

**Step 4: Use the point on the parallelogram to measure area**

* Click the Point tab on the tool bar
	+ Click on Point E
	+ Drag it along the line e (CD)
1. Does the area change when you move the point? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What two measures do you think the area depends on? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is the area formula for a parallelogram? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. How do the area formulas for a rectangle and parallelogram relate?
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 **Practice problems:**

1. What is the area of a parallelogram ABCD with points A (2,3) B (5.3) C (2, 7) D (5, 7)? How did you find this answer?

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1. What is the area of a parallelogram ABCD with points A (6, 11) B (9, 11) C (6, 20) D (8, 20)? How did you find this answer?

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**Challenge Problems:**

1. If I had a rectangle ABCD with points A (1,3) B (6,3) C (1,8) D (6, 8), what would the area of a parallelogram, that has the same base and height of the rectangle, be? How do you know this?

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2. If I had a rectangle ABCD with points A (6,8) B (10,8) C (6,12) D (8, 12), what would the area of a parallelogram, that has the same base and height of the rectangle, be? How do you know this?