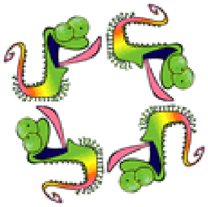
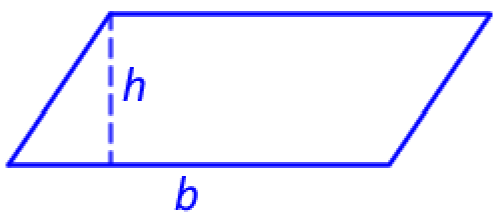


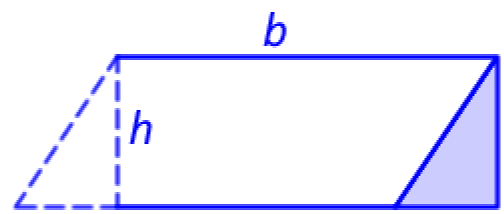
PROOF WITH TRANSFORMATIONS

In this activity you will be proving different things about shapes by using what we know about transformations.

> Recall that for every rigid transformation (rotation, reflection, and translation) we know:
> - Angle measurements are preserved (stay the same)
> - Lengths are preserved (stay the same)
> - Areas are preserved (stay the same)

Example 1: Use the properties of rigid transformations to write a convincing argument that the area of a parallelogram is given by $A = b \cdot h$. (Hint: Can you see a rectangle? Isn't the area of a rectangle the same formula?)



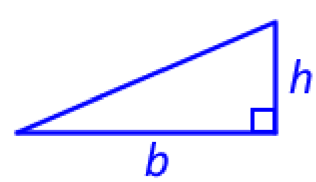


Sample response: If the height of the parallelogram is drawn to one of the corners, then there is a right triangle formed. Translating this triangle along the base of the parallelogram will form a rectangle. I know it will be a rectangle because the angle measurements of the triangle will stay the same and so it will fit perfectly to make a straight line across the bottom. Since the lengths are going to stay the same, the new base will still be "b" long and the triangle's hypotenuse length will fit perfectly. Now we know the area of the rectangle will be $A = b \cdot h$, so that's the area of the parallelogram since area's are preserved.

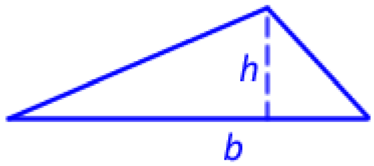
(There is another sample response in the "learning target sample solutions" your teacher might share.)

1. Highlight each time in the sample response above where a property of transformation was used.

2. Use the properties of rigid transformations to write a convincing argument that the area of a right triangle is given by $A = \frac{1}{2} b \cdot h$.
   (Hint: Isn't that ½ the area of a rectangle?)



3. Use the properties of rigid transformations to write a convincing argument that the area of a scalene triangle is given by $A=\frac{1}{2}b\cdot h$.



4. Look carefully at the picture of a generic kite shown on the right.
Try to come up with your own formula for the area of a kite.
Use the properties of rigid transformations to write a convincing argument to show your area formula works.