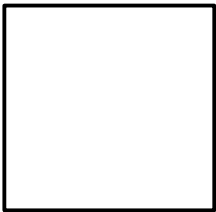
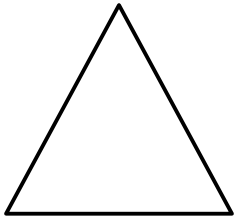


Investigating Surface Area and Volume of Cell Shapes

Let's take a look at how much honey could be stored in cells of different shapes.

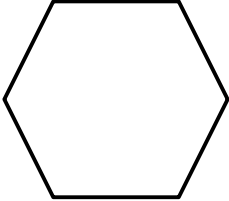
Area of a Honeycomb Cell

How might the **area** of different cell shapes affect honey storage? Let's investigate by calculating the area of a square and a triangle using the formula provided.

Shape	Formula for area	Area (in ²)
<p>Square</p>  <p>Side (S): 2 inches</p>	<p>Side X Side</p> <p>Or</p> <p>S^2</p>	
<p>Triangle</p>  <p>Base (b): 2 inches Height (h): 2 inches</p>	<p>$\frac{1}{2} b \times h$</p>	

What discoveries did you make based on the areas of the triangle and the square? Record them below:

Now, based on your earlier investigations, can you come up with the formula for the area of a hexagon? Use your formula to calculate the area of a hexagon with two-inch sides.

Shape	Formula for area	Area (in ²)
<p style="text-align: center;">Hexagon</p>  <p style="text-align: center;">Sides: 2 inches</p>		

How did you find the area of the hexagon? _____

Was there only one way to calculate the area of the hexagon? Explain.


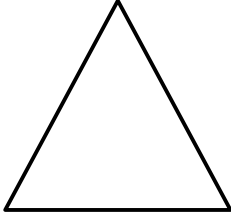
Is your calculation the same or different from what other groups calculated?

Now check your work for precision and accuracy. Your teacher will provide you with the mathematical formula for the area of a hexagon. Calculate the area using the formula given, and check how your new calculation compares to your previous one. Is it the same or different? Is your new calculation the same or different from what other groups got?

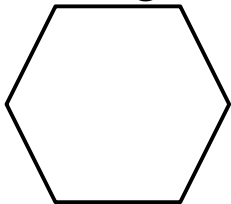
Volume of a Honeycomb Cell

Let's see how the **volume** of different cell shapes might affect honey storage.

- Create triangular and square cells from the prism templates provided.
- Pour sand to the top of the cells, and level the sand off.
- Measure the volume of sand you poured into the cells by transferring the sand into graduated cylinders. Record the volume for each shape in the table below.

Shape	Volume (ml)
<p>Square</p> 	
<p>Triangle</p> 	

Based on your earlier investigations, can you find the volume of a hexagon-shaped cell using the square and/or triangular prisms?

Shape	Volume (ml)
<p>Hexagon</p> 	

Question	Drawing of Cell Shape	Explain your answer using evidence from your investigations.
Which shape had the greatest area for honey storage?		
Which shape had the smallest area for honey storage?		
Which shape had the greatest volume for honey storage?		
Which shape had the smallest volume for honey storage?		

What can you conclude about the shapes of cells from this investigation of area and volume? Based on your results, which shape would work best as a honeycomb cell, and why? Use evidence to support your thinking.
