Holey Cup Lab names:

**Can you make a polynomial that will model the flow of water out of a container?**

PART 1: Collect Data

1. In groups, find a container that you can puncture with a nail to create a drainage hole. You could use plastic cups, water bottles, juice boxes, or any other container that will hold 500 mL to 1000mL of water. The containers must have an open top.
2. Start by making a 50 mL or 100 mL scale along the side of the container, using a graduated beaker or measuring cups. This scale will help you measure the volume of water as the container empties.
3. While the container is empty, puncture the side close to the bottom to create the drainage hole. Use a nail or screw 2 to 3 mm in diameter.
4. Put the container over a basin to catch the water and plug the hole while you fill the container up, to your highest measurement, with water.
5. Before uncovering the hole, decide who will be watching the water level and calling out when it reaches each mark, who will be watching the time and calling it out and who will be recording the time. **Do not stop the timer, keep it going during the whole experiment.**
6. Uncover the hole, and allow the water to drain into the basin. Collect and record the measurements. You want to record the time when the water level reaches each increment.

PART 2: Analyze the data. Answer all of the following questions.

1. Present your data in a table.
2. Sketch a graph and plot the points on the graph.
3. Which polynomial will best represent your data?
4. Using a calulator, regress the data into the most appropriate polynomial. Give the domain and range of the polynomial.
5. If you were trying to find how much fluid was in the container at the beginning of the experiment, what part of the graph would you be looking at?
6. If you wanted to know when the container was empty, what part of the graph would you be looking at?
7. Using the regression polynomial, when did the container have 115 mL in it?
8. Using the regression polynomial, how full was the container at 25 seconds?
9. Did you expect the results that you saw? Hypothesise why the container drains the way it does.