STATION CARDS

Station 1: Precision

In this activity, you will see how laser cutters work on an x- and y-axis. You will collaboratively work together to connect the dots on grid paper.

Materials:

- String
- Marker
- Scissors
- Tape
- Station 1 Precision Dots handout

Procedures:

1. On your Frayer Model, predict strategies for how to best connect the dots together.
2. Cut up to four pieces of string to desired lengths. Experiment to find the right lengths so you can hold the string easily.
3. Attach the pieces of string to your marker, leaving the two ends of each string free.
4. On your Frayer Model, sketch an image of your setup. Include the length of your string and how you attached it to the marker.
5. Each student holds on to one end of a piece of the string to create an x-axis and a y-axis, pulling the string taut.
6. While maintaining the axes, work together to pull the string and move the marker to connect the dots on the paper.
7. After you connect all the dots, summarize the process on your Frayer Model. Discuss how this activity models a laser cutter and the challenges your group faced.

In the question section of your Frayer Model, write down three questions you have about precision and laser cutting.

Station 2: Software Simulation

In this activity, you will explore the software Tinkercad, which is used to design images to be used in laser cutters.

Materials:

- Internet-connected device

Procedures:

1. In the predictions part of your Frayer Model, write the answer to this question: How do you think Tinkercad compares to other drawing apps/software you're familiar with?
2. With the laser cutter limitations in mind (see below), design a keychain that represents your interests in Tinkercad.
3. Sketch an image of a design you are going to create in Tinkercad. Tinkercad has a 20x20 grid; make a design no bigger than 6x6.
4. In the summary section of the Frayer Model, summarize your experience. Be sure to include challenges you encountered.
5. In the question section, write three questions you have about what laser cutters can and cannot do in relation to the design.

Limitations of Laser Cutters:

- Materials that can be cut: wood, acrylic, leather, cardboard, and cork.
- Thickness can't exceed ¼" for a single pass.
- Intricate shapes don't work on delicate materials.
- Some materials easily burn or warp under heat.
- On some materials, it is difficult to make clear differences in color during engraving.

Station 3: Material Interaction

In this activity you will explore different materials and cutting tools to determine how they relate to one another.

Materials needed:

Cutting Materials

- Foam
- Balsa wood
- Tortilla
- Plastic
- Cardboard
- Fabric
- Cork

Cutting Tools

- Pizza cutter
- Plastic knife
- Exacto knife
- Scissors

Procedures:

1. On your Frayer Model, predict which tool will be best for which material. Explain your reasoning.
2. Sketch an image of your predicted pairings. Include details in texture and thickness of the materials.
3. Cut the materials with each tool. Write down notes about how effective each tool was in the summary section of the Frayer Model.
4. In the question section of your Frayer Model, write down three questions you have about precision and laser cutting.