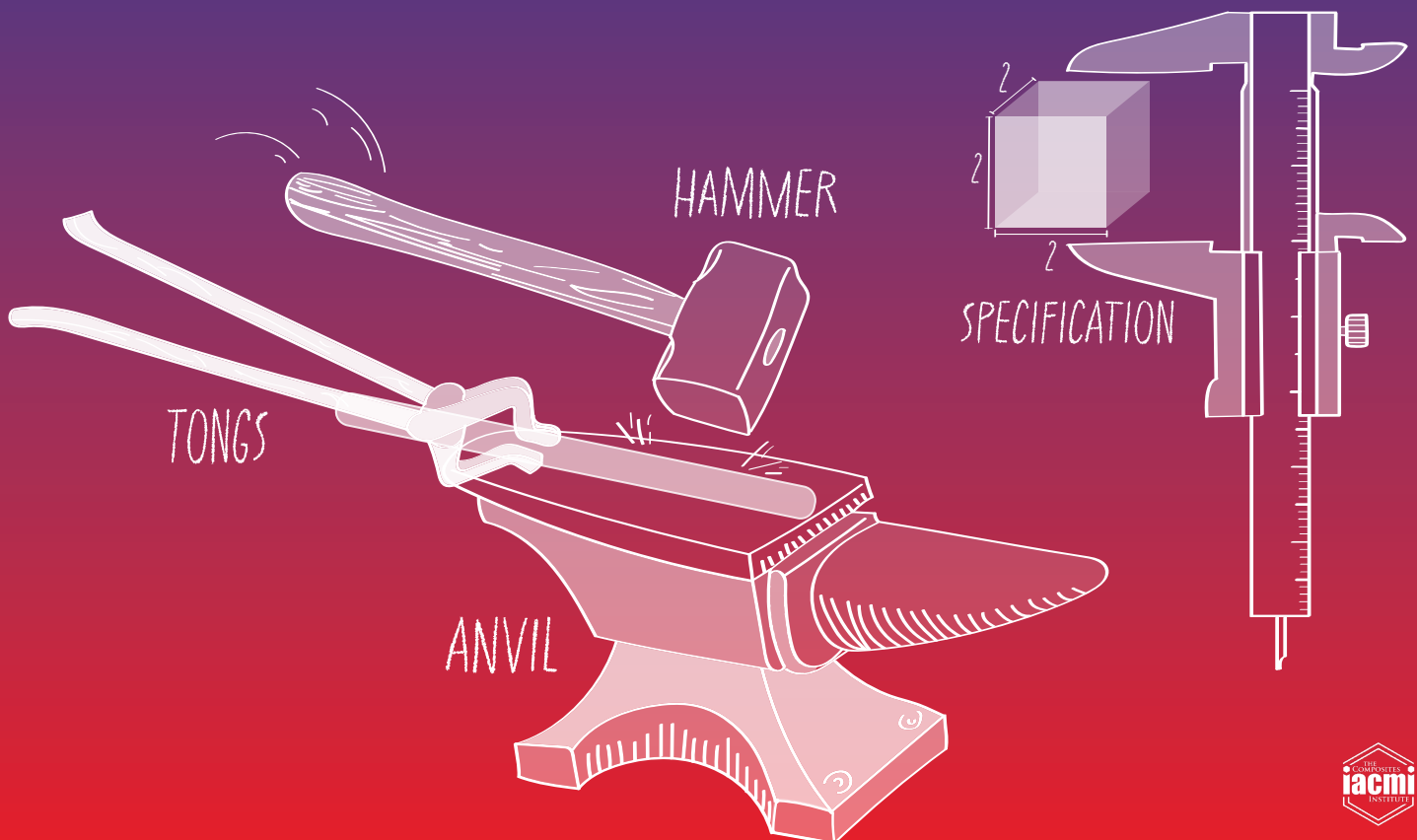


DREAM. BUILD. BECOME.

ACE METAL FOUNDATIONS

By IACMI

Clay Forging



Clay Forging



Prior Knowledge

Students should have experience handling and shaping soft materials, such as clay, play dough, or modeling putty. Students should also possess some basic sense of size and scale, and be able to compare whether two things are a similar size

Clay Forging

Lesson Overview

In this activity, students explore shape, measurement, and material properties by forming cubes from two different materials: play dough and aluminum foil.

Students begin by shaping play dough into a cube using their hands and small mallets. They aim to make each flat side approximately one inch, using a ruler to compare size. Precision is not expected; the ruler is used as a comparison tool rather than for exact measurement.

Students then repeat the activity with aluminum foil, attempting to create a cube that is about the same size as their play dough cube. This contrast allows students to observe how different materials behave and how material choice can affect the difficulty of shaping an object.

The lesson introduces an early manufacturing concept: parts often need to be made to the same shape and size (specification), even when materials vary. Emphasis should be placed on exploration, effort, and discussion rather than accuracy or perfect results.

Vocabulary

Shape: What something looks like (like a square or circle).

Size: How big or small something is.

Measure: To check how big something is.

Material: What something is made of.



Figure 1: A photo of 3D shapes.



Figure 2: Measuring Tape, a tool used to measure various lengths and objects.

Clay Forging

The Foundations of Making Things Match

Have you ever noticed that blocks stack neatly, or that puzzle pieces fit where they are supposed to? That's because they are made to match in shape and size.

When people make things, they often make many copies of the same object. If the shapes or sizes are not the same, the pieces may not fit together, may not work the same way, or may not be fair for everyone who uses them. Making things match helps them work better.

Today, you get to be a maker.

You will use different materials, like play dough and aluminum foil, and try to shape them into the same cube. Even when the goal is the same, some materials are easier to shape than others.

Makers measure and check their work to see if things are close to the same size. If something doesn't match yet, they try again.

Real builders do this every day. They shape materials, check their size, and work carefully so each piece can be used just like the others.

Materials

Materials Supplied in Kit

Per Student

- 1 six-inch ruler
- ½ a container of play dough
- 1 Wooden mallet
- 2 aluminum foil sheets



Clay Forging

Activity Directions

Step 1: Introduce Constraints

- Form a small ball or cube of play dough
- Use the mallet to gently tap the sides of the play dough to help flatten and shape the dough into a cube
- Use the ruler to check if the sides of the cube are roughly one inch
- If the cube is too big, continue hammering the cube to compress it or remove some excess material
- If the cube is too small, add more play dough and continue hammering until each side is about 1 inch



Step 2: Forge the Foil Cube

- Crumple 2 sheets of aluminum foil into a tight ball
- Gently tap the foil ball with the mallet to forge it into a cube
- Use a ruler to try to make the foil cube roughly one inch on each side
- The finished foil cube should be about the same size as the play dough cube

Step 3: Compare

Clay Forging

Discussion Prompts or Reflection

- Which material was easier to shape? Why?
- How did you measure or check the size of your cubes to see if they matched?
- Why might it be important to be able to make parts the same size?
- Why do you think people want the things they make to be the same size and shape?

Variations and Enrichment

- To introduce some variation for a conversation starter, instruct one group of students to try to form their cubes only with their hands, while another group uses tools. Have students compare the end results and discuss
- Challenge students who finish early to see who can forge a cube with the smoothest or straightest edges
- Challenge students to forge other 3-dimensional shapes, such as a pyramid

Foundation Exploration

- Toy makers shape parts so toys fit together and work the same every time
- Builders measure and shape materials so pieces fit together and stay strong
- Furniture makers make parts that need to match so that tables or chairs don't wobble
- Factory workers help make many copies of the same object so they all match



Figure 3: Blacksmith manually forging the molten metal.



Figure 4: Construction worker hammering building materials together.