DESIGN CLUB!

DAY 3 ARCHITECTURE IN 3D

CAC FOR THE FAMILY

VOCABULARY

ARCHITECTURE IN 3D

3D is short for 3-Dimensional, meaning that it is not flat and has **volume**, or takes up space. The following are all examples of 3D shapes.

Cubes are 3D shapes that are made up of six squares, one on each side.

A **prism** is a 3D shape that has two end faces that are similar shapes, equal, and straight connected by parallelograms on the sides. Example: **rectangular** and **triangular prism**

A **sphere** is a round solid figure, like a basketball or a tennis ball.

Cylinders are 3D figures, with straight parallel sides and a circle or oval at each end.

Massing refers to the overall shape and form of a building, without details like windows, doors, or applied ornamentation.

WARM-UP

3D SHAPES

- Before you build a 3D model of your building, it's important to understand what three-dimensional shapes make up your building.
- Print, or draw, the set of templates on pages 8–15 for building three-dimensional shapes (rectangular prism, sphere, cube, etc.). Cut out the templates and fold along each line. If you need help, check out the examples or ask an adult.
- Assemble the shapes by adding glue or tape to the tabs along the sides of the template. Once you've practiced making a few of these shapes, it's time to bring your model to life!

DESIGN PROCESS

3-D model digital rendering

STEP 4: BUILD A MODEL

- Gather your favorite set of sketches from the previous day and look at the elevation view. Refer again to the PDF illustrating 3D shapes to see if you can find any of them in your sketch. Maybe your tower is 4 cubes stacked on top of each other. Maybe it's a triangular prism on its side.
- Pull up the PDF for 3D shapes listed under Day 3 and print, or draw, the templates for the 3D shapes you think would look the most like your design. Cut them out and put them together, folding along the lines, and gluing the tabs together. Assemble as many of the figures as you need to get the shape of your design.

DESIGN PROCESS

STEP 4: BUILD A MODEL

- Stack and arrange your figures in the shape of your building (Example: a tower might look like a stack of cubes, or one rectangular prism). Once you have decided which arrangement works the best for your design, glue or tape the 3D shapes together.
- You've just assembled a **massing** model! These models give architects and designers a feel for the overall shape and volume of a building. They make it easier to understand the relationship between your design and the buildings and spaces around it.

DESIGN PROCESS

STEP 4: BUILD A MODEL

- **Extra Challenge:** Using and identifying shapes in our massing models is a great way to start understanding how buildings are designed. Here is another way to think about massing models. Think back to the skeleton model that you made previously. What other materials and shapes could you use to create a 3D model?
  - When brainstorming different materials, observe and test their qualities. Is this material strong or weak? Where do I want to place this material and why?
  - Architects use all kinds of different materials for inspiration and to use in their models. Sometimes even *recycling* is useful to create new designs and imagine a new model. Where can you look for inspiration?

DESIGN PROCESS

STEP 4: BUILD A MODEL

- If you used glue, allow for your build to dry before moving on to Day 4, where you will continue building and fleshing out the rest of your model, this time focusing on the exterior!

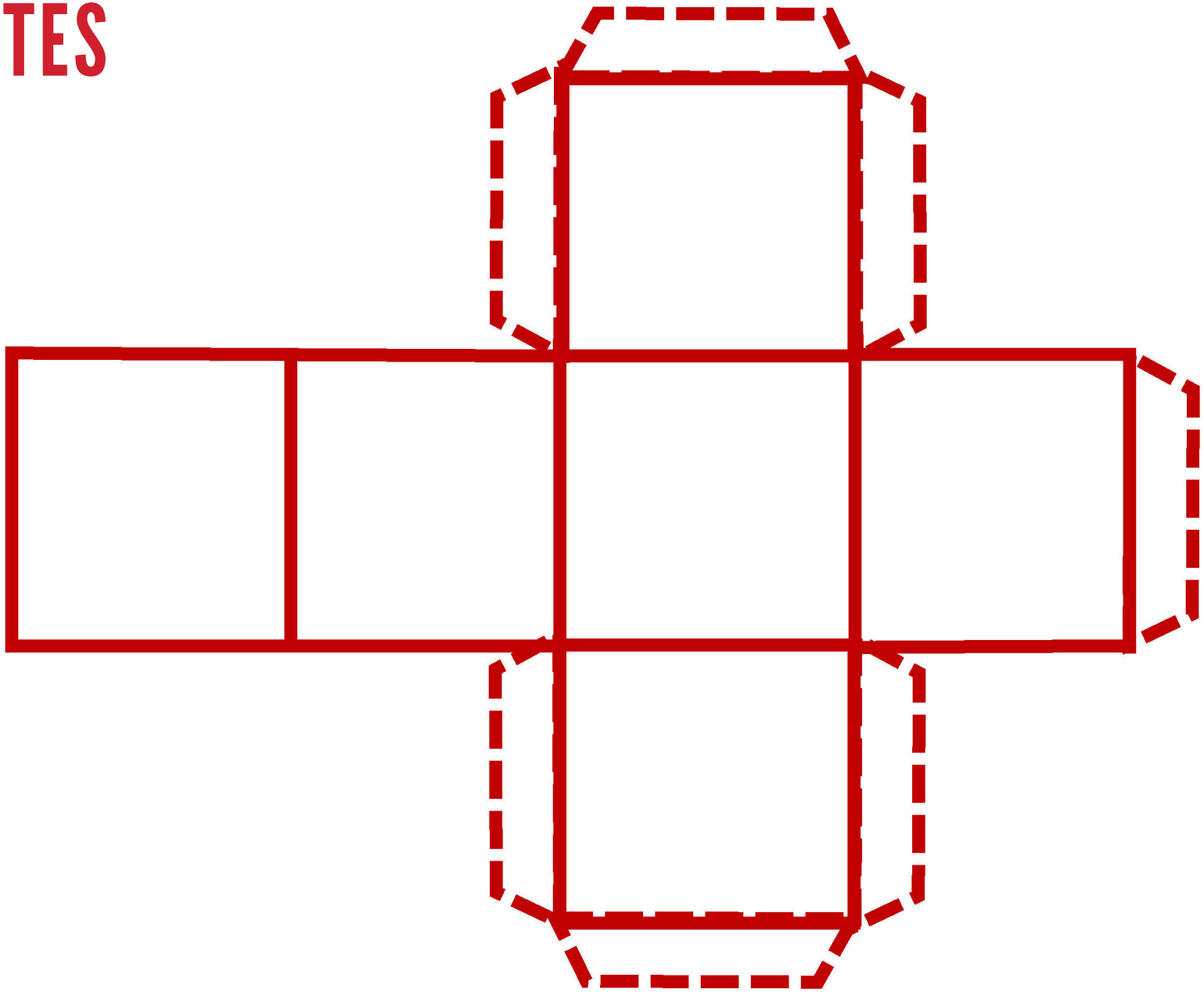
TEMPLATES

ARCHITECTURE IN 3D

Print, or draw, the following templates.
Cut out each net, then fold along each line.
To assemble, fold and add glue on tabs
with dashes.

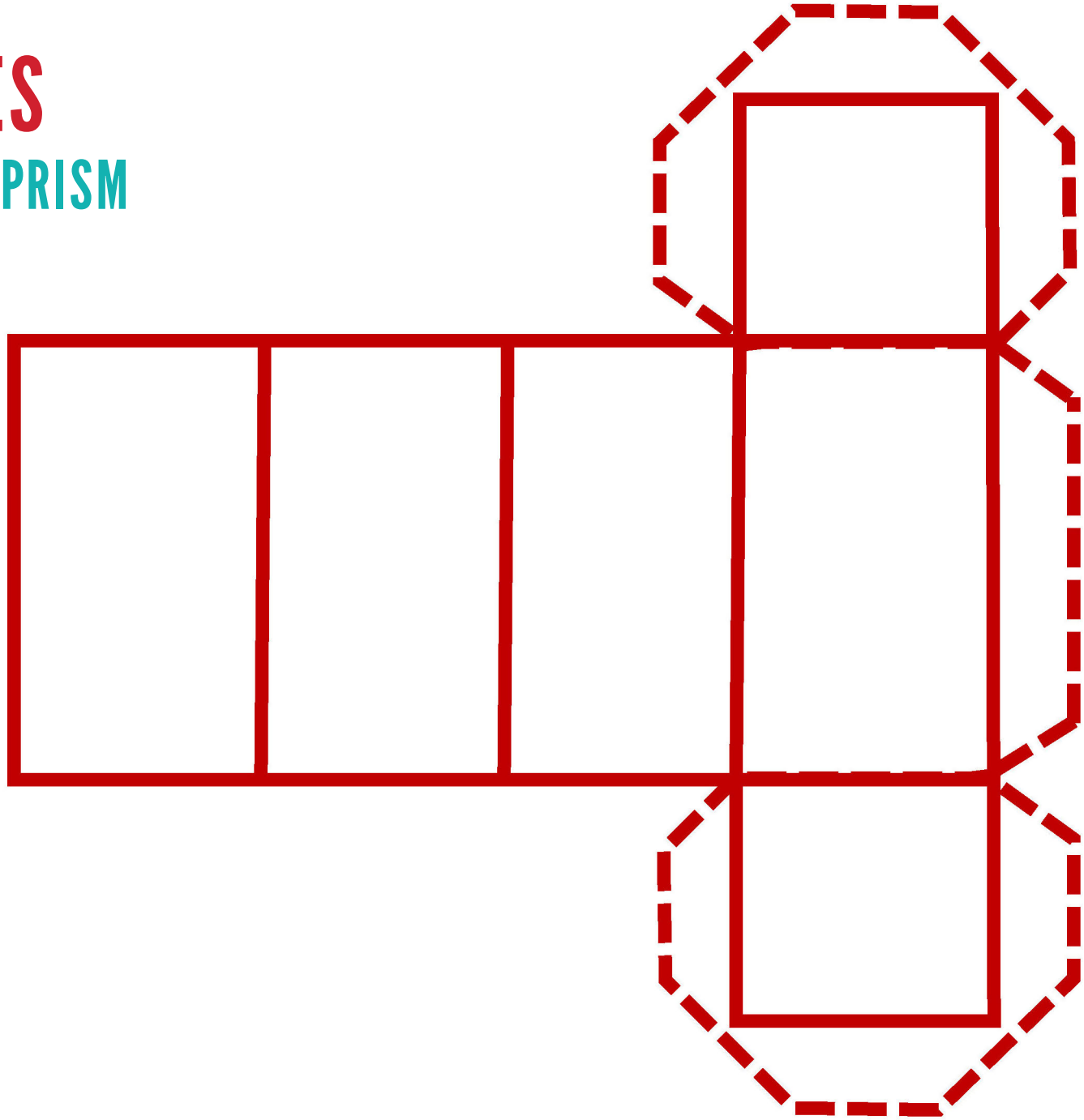
TEMPLATES

CUBE



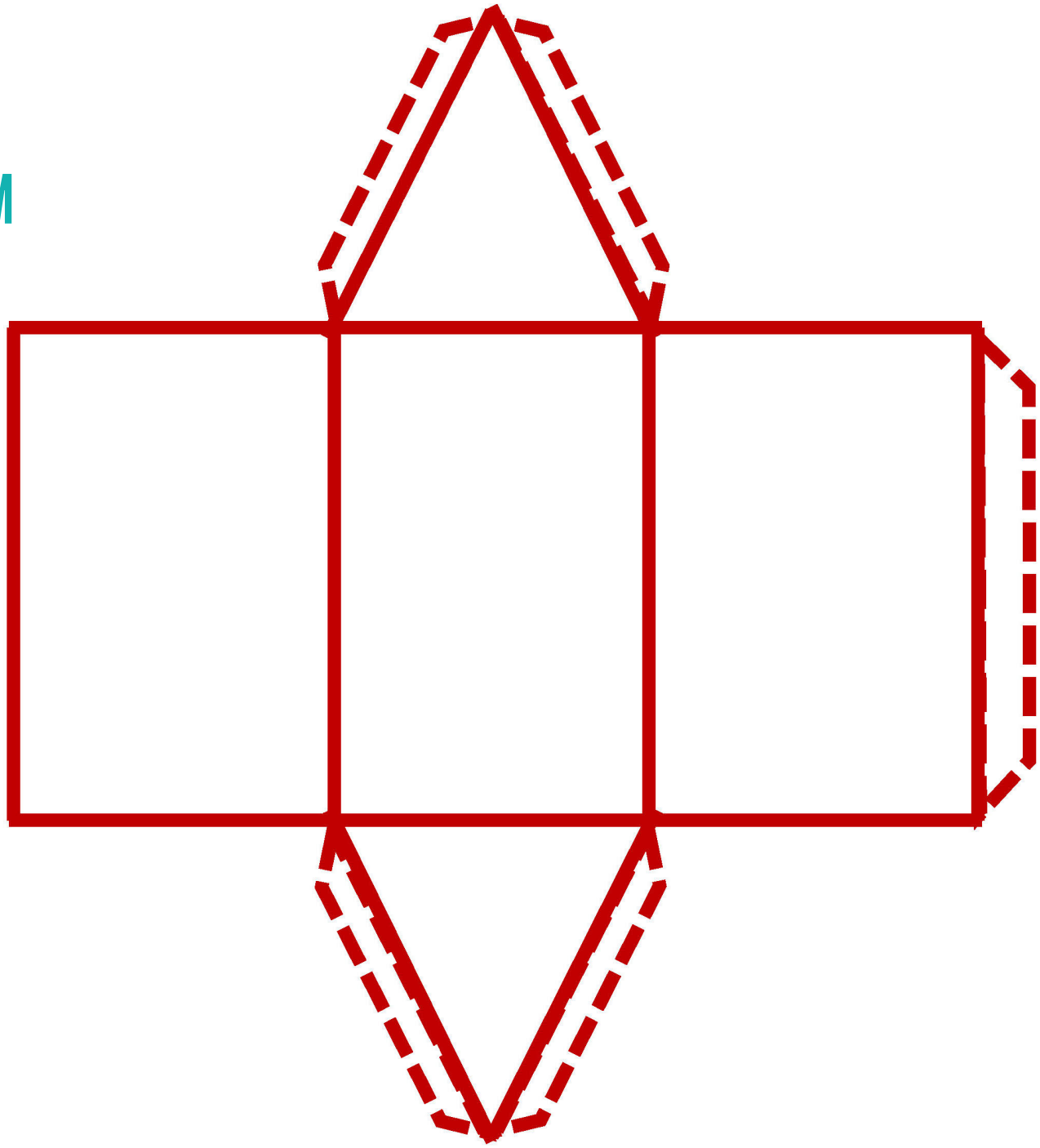
TEMPLATES

RECTANGULAR PRISM



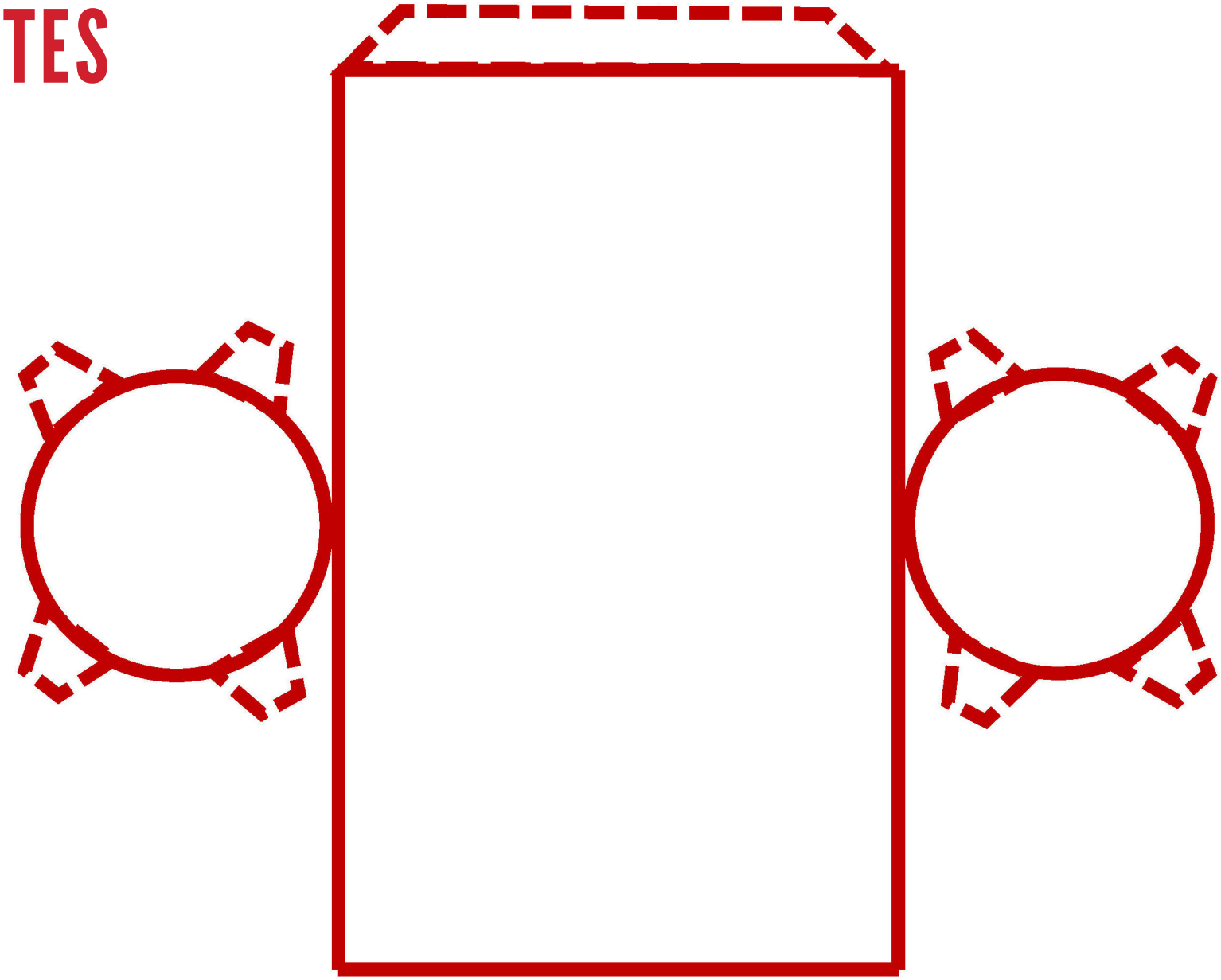
TEMPLATES

TRIANGULAR PRISM



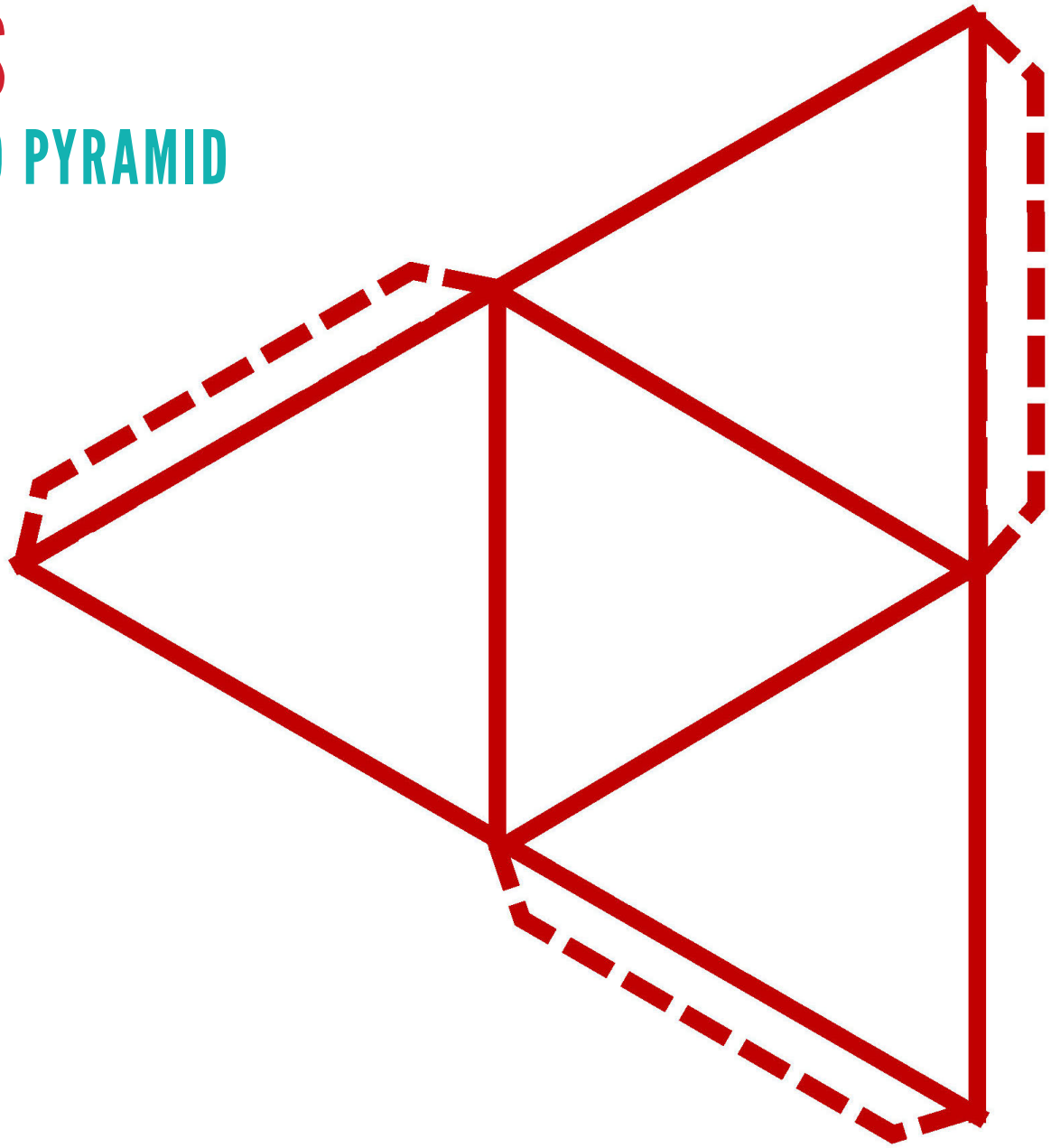
TEMPLATES

CYLINDER



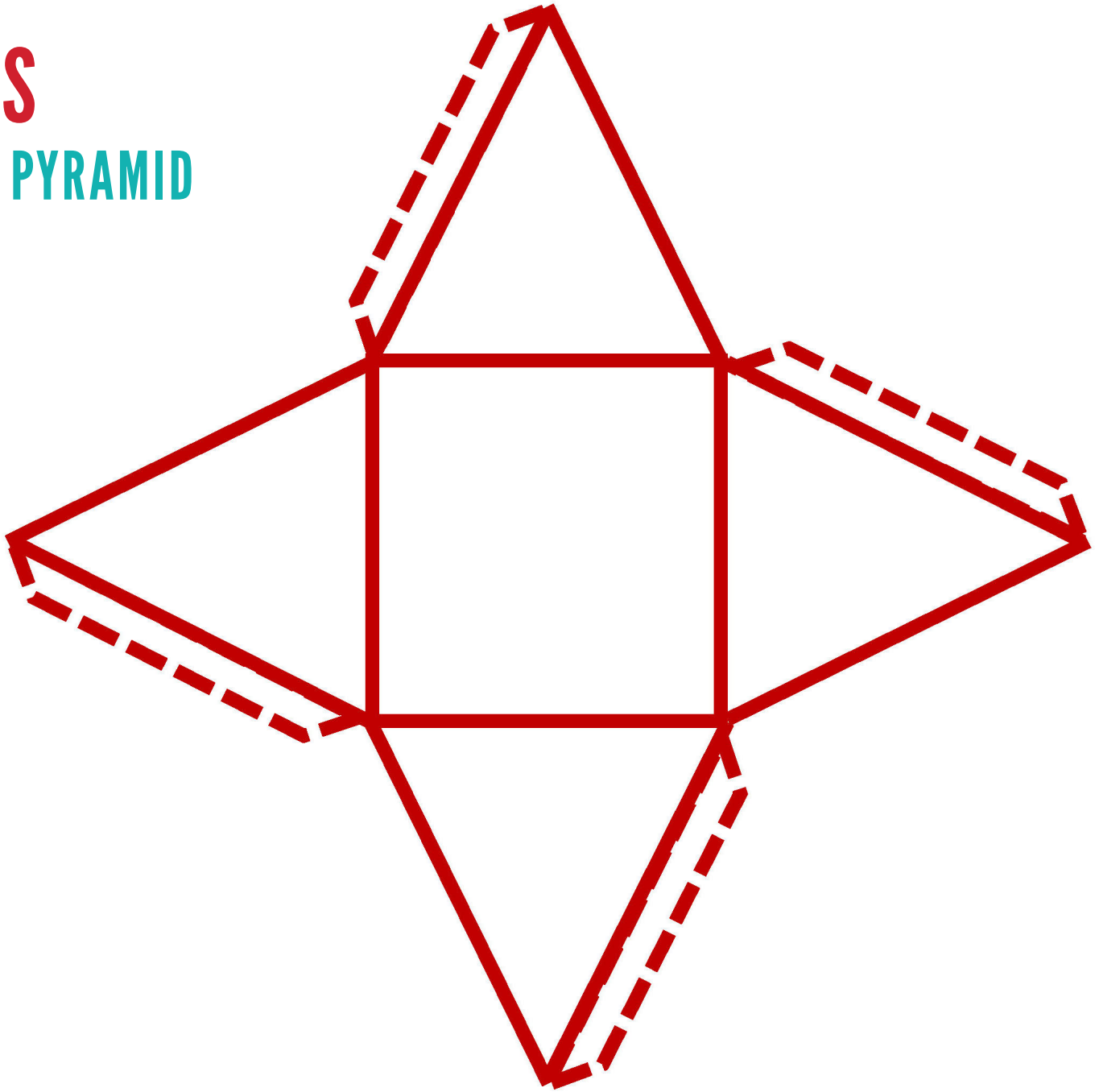
TEMPLATES

TRIANGLE-BASED PYRAMID



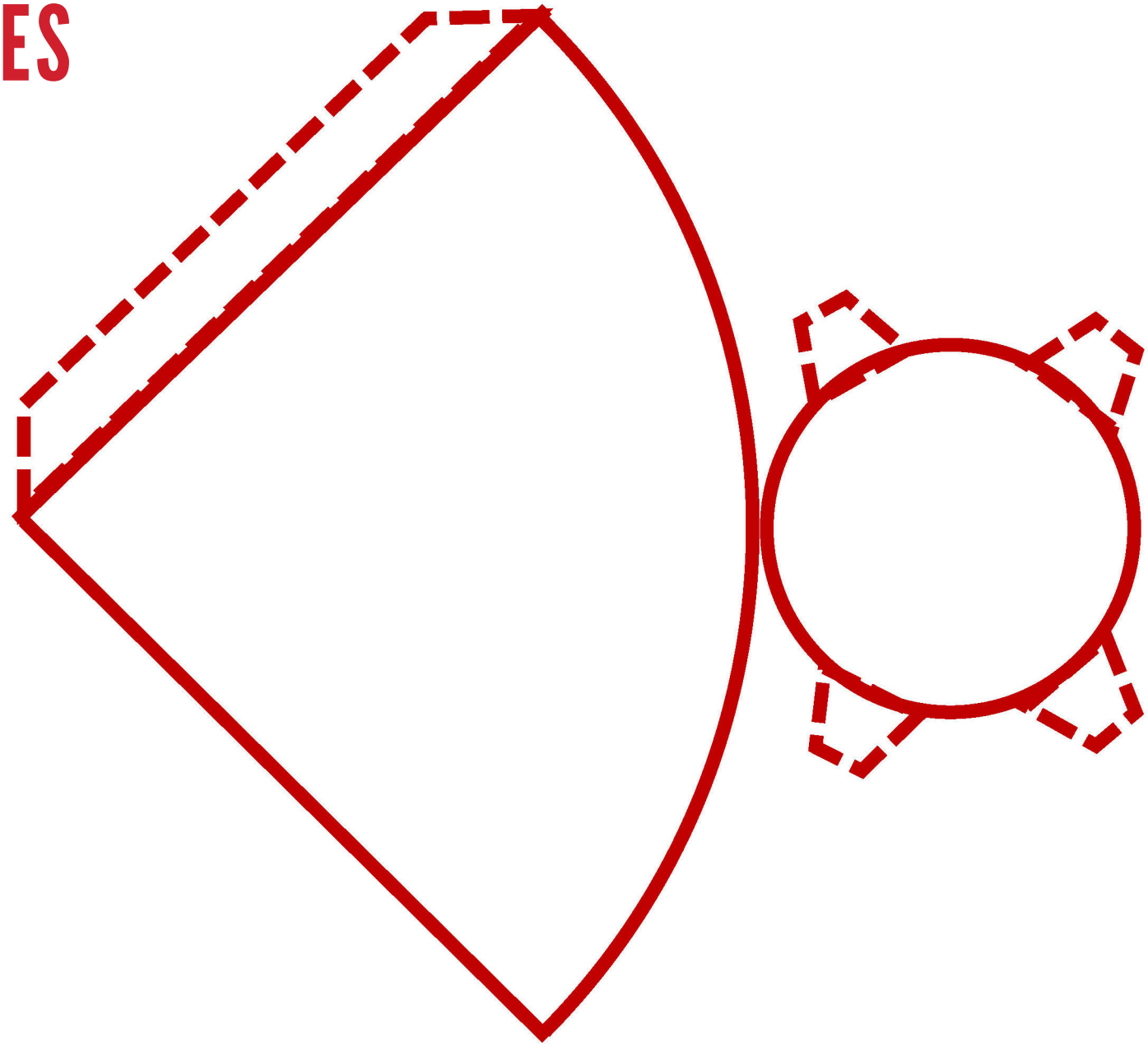
TEMPLATES

SQUARE-BASED PYRAMID



TEMPLATES

CONE



DESIGN PROCESS

BONUS CHALLENGE

Do you know of any other 3D shapes?

For a bonus challenge, measure your 3D shapes and calculate their volume using the formulas provided below. Maybe you can even figure out a way to measure the volume of your final build!

Volume: how much space a 3D object takes up!

L = Length *H* = Height *A* = Base Area *W* = Width *r* = Radius

SHAPE	FORMULA
Cube	$V = L \times W \times H$
Rectangular Prism	$V = A \times L$
Triangular Prism	$V = A \times L$
Cylinder	$V = \pi \times r^2 \times H$
Triangle-based Pyramid	$V = \frac{1}{3} \times A \times H$
Square-based Pyramid	$V = \frac{1}{3} \times A \times H$
Cone	$V = \frac{1}{3} \pi \times r^2 \times H$