**Portrait Proportions: An Art & Math Discovery Lesson**

To complete this activity, students can look at their own faces in mirrors, or work with partners to measure each other’s features.

The questions on the following page are intended to help students discover facial proportions and the locations of key features. When sketching a self-portrait or a portrait of someone else, an artist does not follow an instructional manual, but is informed by an understanding of the natural placement of human features.

This understanding begins by looking closely at a face, and discovering where particular features are located (relative to other facial features). At times, an artist thinks like a mathematician, and applies an understanding of measurement, fractions, symmetry, and proportion.

Because this is a discovery lesson, we encourage teachers to ask students to answer the questions on the following pages **before** beginning the actual sketching lesson. In the *Portrait Sketching Lesson*, an SBMA Teaching Artist gauges distances and proportionate placement of features, and demonstrates to students how to sketch a simple portrait.

UNKNOWN, Roman
Portrait Head of a Philosopher
Early 3rd c. CE
Marble
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Note: Special permission was given to the producers of this lesson, and all photography was closely supervised by Museum staff. Although fingers and objects appear to be close to the bust, they are actually several inches away at all times. When looking at original works of art, it is very important NOT to touch; that's how we ensure they will be here for future generations to enjoy.

Using your thumb and index finger (see the image on the right), determine the length of the area between the bridge of your nose and the top of your head. How long is it?

Next, measure the area between the bridge of your nose and your chin? How long is it? How do these two lengths compare?

Note that each eye is slightly lower than the location of the bridge of your nose. Therefore, if you were to sketch a line across an oval (that represents your face) to indicate the placement of the tops of your eyes, where would it appear?
Now, using your fingers, measure the distance from your chin to the tip of your nose.

Keeping your fingers in the same position, touch your thumb to the tip of your nose, and see where your index finger lands on your face.

Then touch your thumb to that same spot, and notice where your index finger lands. From top of head to chin, how many equal segments did you note (when using this measurement)? Therefore, where would the tip of your nose appear in a portrait, relative to your chin?
Next, place your thumb on the bridge of your nose, and lightly rest your index finger over the center of a closed eyelid.

Keeping your fingers in the same position, move your thumb to the center of your eyelid, and your index finger to the side of your face. What do you notice? Where does the center of your eye appear, relative to the bridge of your nose and the side of your face?

Now place your index finger on the tip of your nose, and your thumb in the center of your lips. Keeping the same distance between your fingers, move your index finger to the spot between your lips, and your thumb to your chin. What do you notice? How do the measurements compare?

Lightly place the tip of a pencil over the center of a closed eyelid. Let the pencil create a line – how does the center of your eye align with your mouth?
Place your index finger on the top of an eyebrow, and draw an imaginary line straight across to the top of your ear. What do you notice? Do the same thing with the bottom of your ear – what does it align with?

Now that you have discovered for yourself the relative location of facial features, you are ready to sketch a portrait of yourself or someone else. Refer to the PDF file that shows an SBMA Teaching Artist sketching a portrait in the style of Portrait Head of a Philosopher.

Perfect Proportions
Here’s what Dr. Jessica Ambler, Curatorial Assistant, SBMA says in the introduction to Art on a Human Scale: Antiquities from the Permanent Collection

Ancient artists from Greece to Rome were captivated with the task of representing the human form and continually attempted to canonize, or regulate, the process, creating standard forms and derivations thereof. The challenge for ancient artists was finding a way to not only accurately depict the human form but also to attempt to breathe anima, or soul, into their work, a quality very much apparent in the art in this exhibit.
More on Math and Art: Polykleitos and Perfect Proportion

In this thinking and sketching lessons, we looked at the proportions or relative measurements used in representing the human face. The model used in the exercise, titled Portrait Head of a Philosopher, was created by an unknown Roman sculptor in the early 3rd century CE, out of marble.

The ancient Greeks’ methods, as you see in the two examples from the SBMA collection, were often copied by the Romans. Both were fascinated not only with the human head or face, but also with the entire human form. The Greeks developed a system of rules that would become the standard by which sculptors measured their work. Among the most well known sculptors of this classical period was Polykleitos. To create a statue of an ideal human form, Polykleitos developed a mathematical system of proportions that brought sculpture to a new level. He called his system the Canon (meaning “rule”).

The Doryphoros or Spearbearer, a bronze statue produced by Polykleitos ca. 460 BCE and now lost, was among the most famous statues in antiquity. Along with a treatise written by the sculptor and called the Canon (rule or law), the statue established the basic form of the classical male nude in Western art. As Pliny wrote in the first century CE, “Polykleitos…alone of men is deemed to have rendered art itself in a world of art.” The Santa Barbara Doryphoros, although fragmentary, preserves much of Polykleitos’s original design, including its emphasis on perfect measurement and balance.

For Greek artists, the harmony, order, and balance they saw in nature was the standard of perfection they aimed for in art. In his Canon, Polykleitos set forth the mathematical relationships between different body parts that would result in a perfect human form. Historians think he based his system on the concept of symmetria, or harmony between the parts and the whole. They believe he may have used the proportions of a finger to determine the proportions of all the body's parts to each other and to the body as a whole.

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