Art on a Cellular Level

Art and Science Educational Resource

Lesson 2

Phoenix Airport Museum

Educators and Parents,

With foundations in art, human anatomy and chemistry, the objective of this lesson is to **recognize** and **make connections** between our own bodies and our environment.

This educational resource is geared for interaction with students 13 years or older to support the understanding between art and science. Younger children may use this lesson too with the assistance of an adult.

This resource is designed based on our current exhibition, *Art on a Cellular Level,* on display at Phoenix Sky Harbor. This is not your typical science lesson. The questions and activities below were created to promote observation and curiosity. There are no wrong answers. If you enjoyed these activities and would like to investigate further, check back for new projects each week. We hope your student will have fun with this and make an art project to share with us. Please send an image of your student's artwork to Airport.museum@phoenix.gov for an opportunity to be featured on Sky Harbor's social media.

You may print this PDF to use as a workbook or have your student refer to the material online. We encourage educators to expand on this art and science course to create a lesson plan.

OBJECTIVES

- **EXAMINE** systems (both internal and external) that support life on our planet.
- **IDENTIFY** biological forms in both art and the human body.
- **IMAGINE** different ways of thinking of the human body as an organism.

OVERVIEW

- Learn about the Phoenix Airport Museum exhibition *Art on a Cellular Level* exhibition at Sky Harbor International Airport.
- Examine artwork inspired by the human body.
- Learn basics of biology and identify shapes in artwork.
- Create your own artwork inspired by the human body.

MATERIALS NEEDED

- **Paper**
- **Something to draw with** (pencil, pen, colored pencils, paints, crayons, etc.)

GLOSSARY

Biology: the study of living things.
Anatomy: a branch of science that describes what different parts of the human body look like and do.
Organism: a living thing made up of one or more cells and able to carry on the activities of life (as using energy, growing or reproducing).
Systems: a group of related parts that move or work together.
Microscopic: something that can only be seen through a microscope.
Organic shapes: curved or soft-edged shapes, usually from the natural world, or living things, like plants and animals.
Geometric shapes: squares, triangles and circles that have clearly defined edges.

Art on a Cellular Level exhibition

Sky Harbor, Terminal 4, level 3 Gallery

Art is a lens through which we view the world. It can be a tool for storytelling, expressing cultural values and teaching fundamentals of math, technology and science in a visual way.

The Terminal 4 gallery exhibition, *Art on a Cellular Level,* examines the intersections between **art and science**. Both fields involve exploration and discovery. Scientists and artists attempt to understand and describe the world around us by making observations. They strive to see things in new ways and to communicate that vision.

This exhibition features 7 Arizona artists who interpret parts of the natural world that we may otherwise need a microscope, telescope or x-ray to see. From the chemicals of stardust to the intricacies of the human body, these artists draw, paint, sculpt or construct the richness of life on our planet.

Lesson 2: Art can represent things we cannot see.

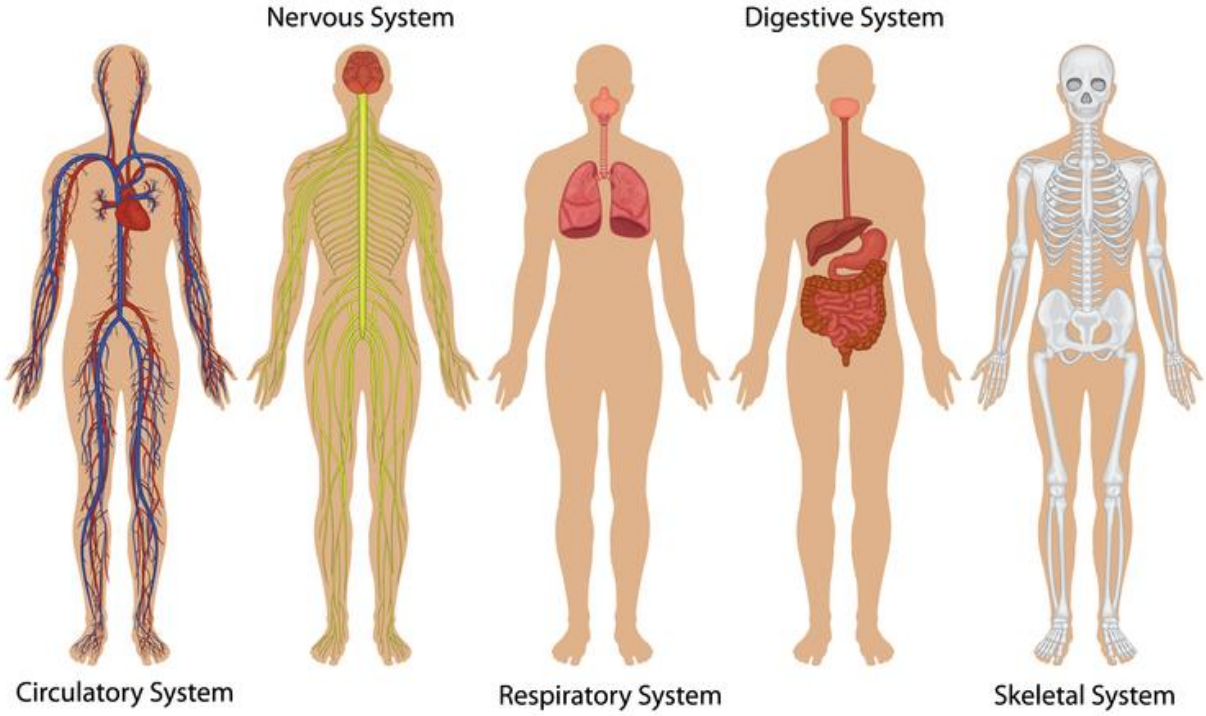
Our universe is teeming with life. Some of it is visible, like trees growing in our yards, birds perched on branches and the people in our household. However, there is a lot of life that cannot be seen without scientific tools. The bones in our bodies can only be seen with x-ray machines. We use microscopes to see tiny **organisms** all around us. Some people use telescopes to see stars in the night sky – which contain the building blocks for life on earth.

Using imagination, artists can interpret forms of life we cannot see with our eyes alone. Some artists study the human body (**anatomy**) to draw realistic images. Others visualize things that are less detectable, like energy or emotions.

In the following lesson, you will learn about some of the systems that make our body work, **microscopic** “ingredients” for life, and explore different ways of thinking about the human body as a living organism.

Art can help us appreciate systems within us and beyond us.
We are made up of smaller internal systems (like in our bodies) and a part of a larger system (like our planet and universe).

Below are some of the *internal* systems in the human body:



(image credit: socratic.org)

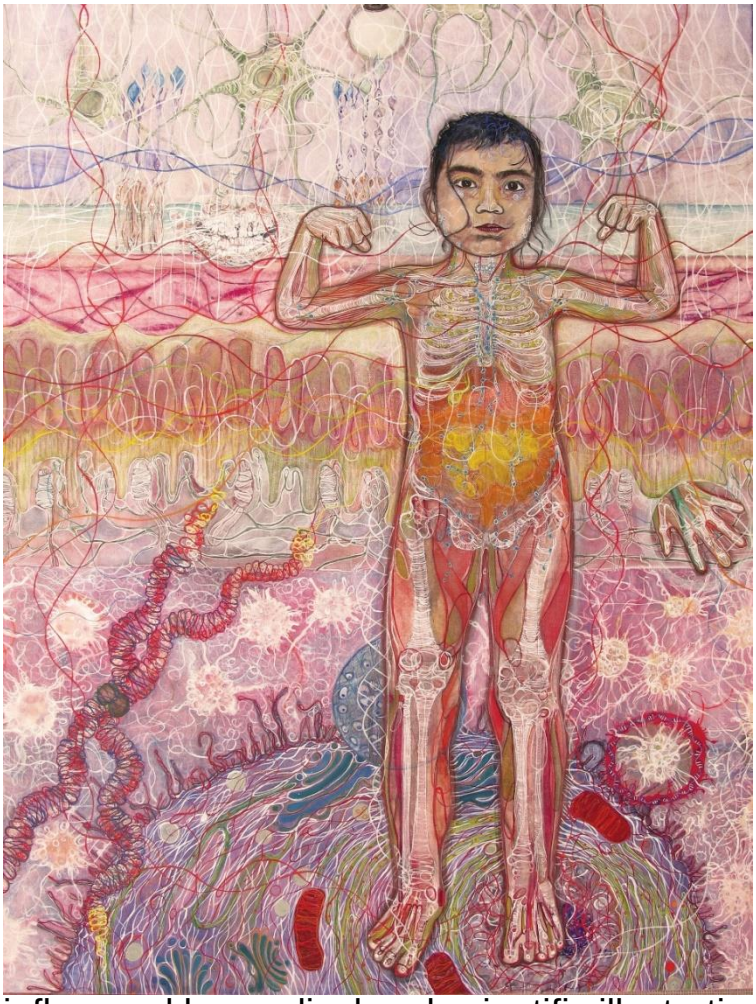
Circulatory system: helps deliver nutrients through the body. It consists of the heart, blood and blood vessels.

Nervous System: allows the brain to control various functions of the body. It includes the brain, spinal cord and a large network of nerves.

Respiratory System: brings oxygen into the body through the windpipe and lungs. It also removes carbon dioxide from the body.

Digestive System: helps to convert food into nutrients and energy for the body. Some of the organs included in the digestive system are the stomach, small intestine, large intestine and liver.

Skeletal System: is made up of bones, ligaments and tendons. It supports the overall structure of the body and protects the organs.



Monica Aissa Martinez

Phoenix, Arizona

This artwork is titled, ***Portrait of Pilar***. It is a drawing and a painting. Lines were drawn with graphite (pencil), ink and colored pencil to define and create the various shapes. *Gouache*, a type of paint and *casein* (which is made from milk) were applied with a paint brush.

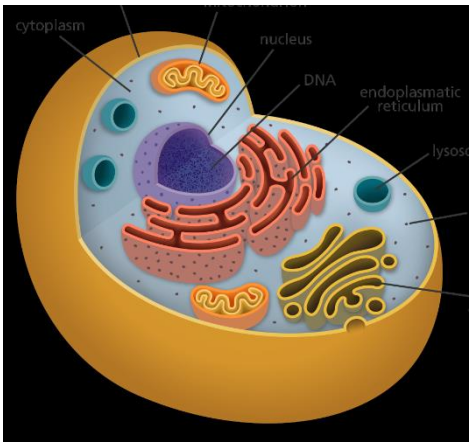
Artist statement:
"I draw and paint detailed images of anatomy and physiology including organs, systems and anatomical human figures. My work is influenced by medical and scientific illustration (including Leonardo Da Vinci) as well as mystical and spiritual teaching. In a nutshell – I am curious about what makes our body tick."

QUESTIONS:

- What internal systems do you recognize in the figure in *Portrait of Pilar*?

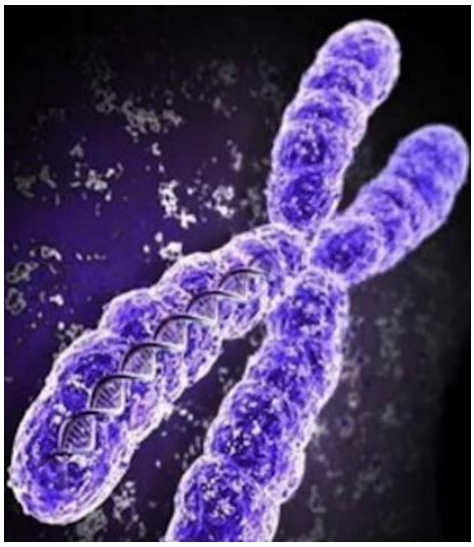
- Monica Aissa Martinez draws different **microscopic organisms** in the background of her artwork. Can you identify any of the following scavenger hunt organisms in the drawing above?

SCAVENGER HUNT



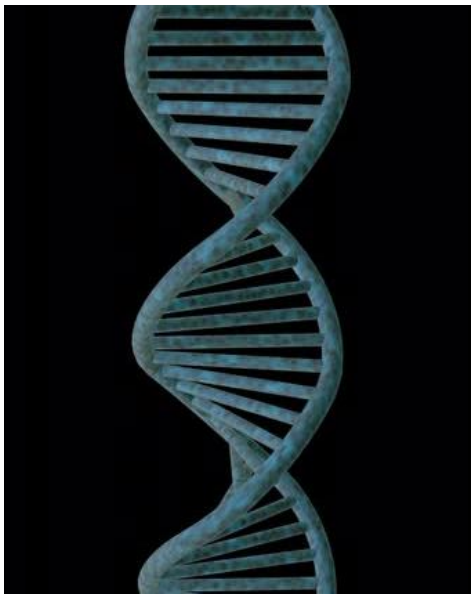
CELLS

All living things are made up of cells. They work together to create more complex organisms, like people and animals.



CHROMOSOMES

Inside of the cell are a bunch of chromosomes. They carry information used to help the cell grow and reproduce.



DNA

Inside of the chromosomes are DNA strands. These determine how things will look and function – for example, “genetics” inside of DNA is responsible for determining your eye and hair color.

Bill Dambrova

Phoenix, Arizona

This painting, titled ***We Came Here to Bring Home Here,*** is huge at 7 feet tall by 10 feet wide. It was painted on a tightly stretched cloth known as canvas. Acrylic paint and oil sticks (paint in a solid stick form) were used to create the colored shapes along with charcoal and wax.

Artist statement: “While painting **abstract** artwork, I often see organs and other biological images in the chaos of my own paintings - similar to seeing recognizable shapes in the clouds. I decided to turn the expressive brush strokes I had made into veins that were tied up in knots and the solid blobs of color turned into semi-recognizable organ-like forms. Adding more expressive marks and layers that show movement captured the energy of the dynamic hidden events that I imagine could be going on inside of our bodies.”

Abstract artwork is not meant to look like a person, place or thing. Instead, the artist uses shapes, colors and marks to represent an idea or feeling.

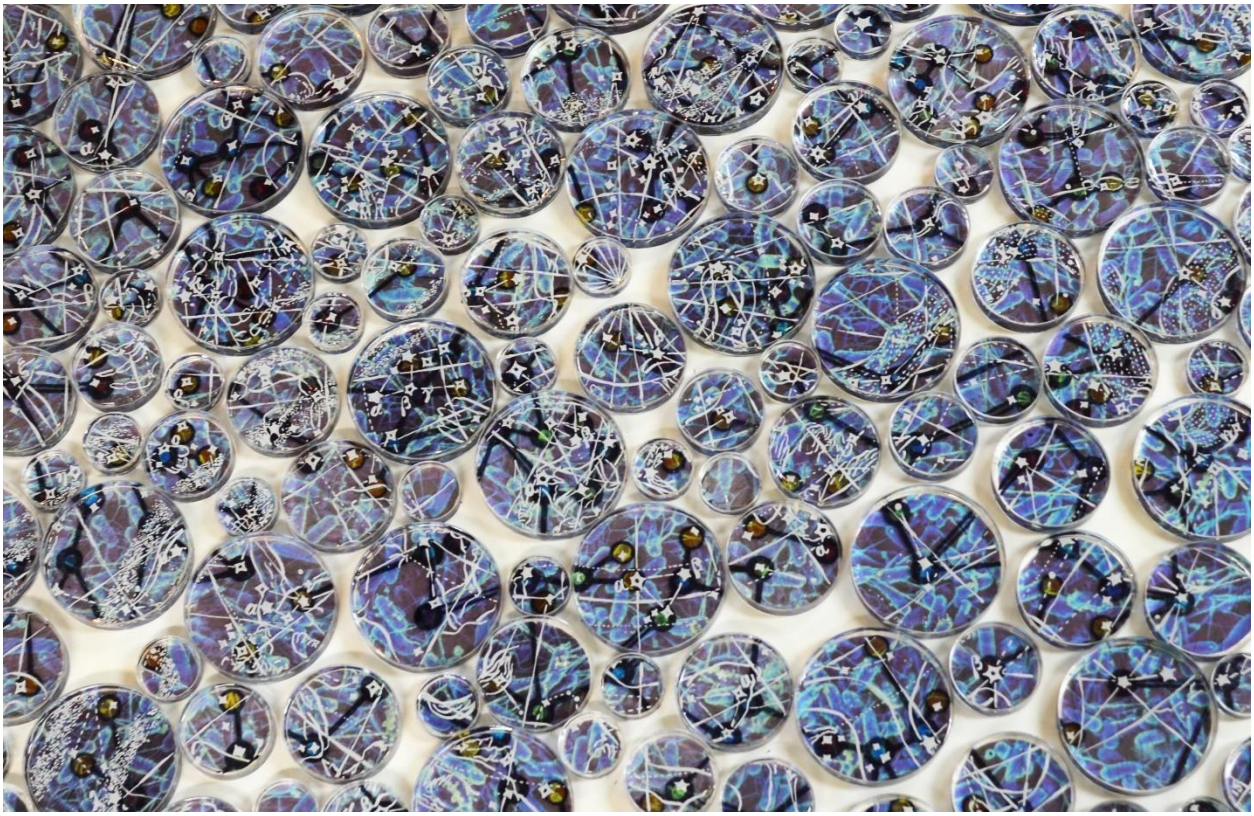
QUESTIONS:

- What kind of **geometric shapes** do you see in this painting?

- What kind of **organic shapes** can you recognize?

- Bill Dambrova imagines what is happening inside of our bodies through his artwork. In the painting (above) identify a shape that looks somewhat like an organ. What qualities does it have to make it look similar?

EXPLORE FURTHER: Each organ works both independently and with other organs to carry out a function in your body. For example, the heart pumps blood, the stomach digests food and the liver remove toxins. **Try sketching your own imaginative organ.** What would it do for your body? Would it immediately work to heal a wound? Would it turn cookies into fuel for super strength? Would it do your homework for you? Get creative!



Kathryn Maxwell

Tempe, Arizona

This artwork titled, ***We Are Stardust II*** was created with non-traditional art materials, including 180 various sized wax-filled *petri dishes*. These small round, lidded dishes are typically used by biologists to grow tiny organic things like bacteria. Here, the petri dishes have designs printed the bottom of the dish and on top of the wax, creating a layered design. When the dishes are arranged in a specific circular format, it results in an overall image of the night sky featuring groups of stars known as **constellations.**

Artist statement: "***We Are Stardust II*** explores the relation of humans to the universe. Astronomer Carl Sagan wrote in Cosmos, 'The nitrogen in our DNA, the calcium in our teeth, the iron in our blood, the carbon in our apple pies were made in the interiors of collapsing stars. We are made of star stuff.'

Through artwork, Kathryn Maxwell interprets the idea that every living thing, from the depths of the ocean all the way up to our atmosphere, is made of “stardust”.

We often think that plants, animals and people are created from completely different things. However, when we look far enough under a microscope, everything on our planet is created from the same elements (the smallest substances there are).

You may have heard of the “periodic table of elements.” Many of the elements found in plants, the earth, and the stars also exist in our own bodies.

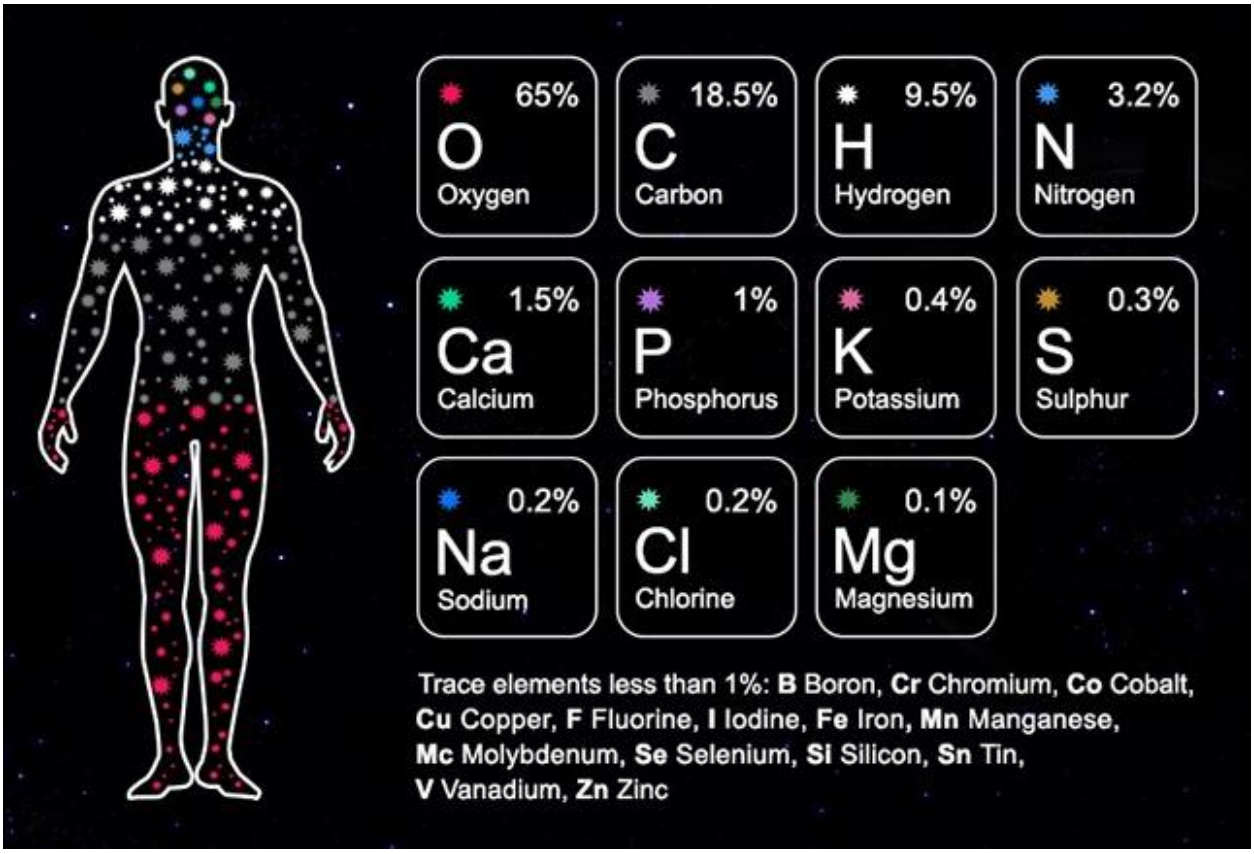
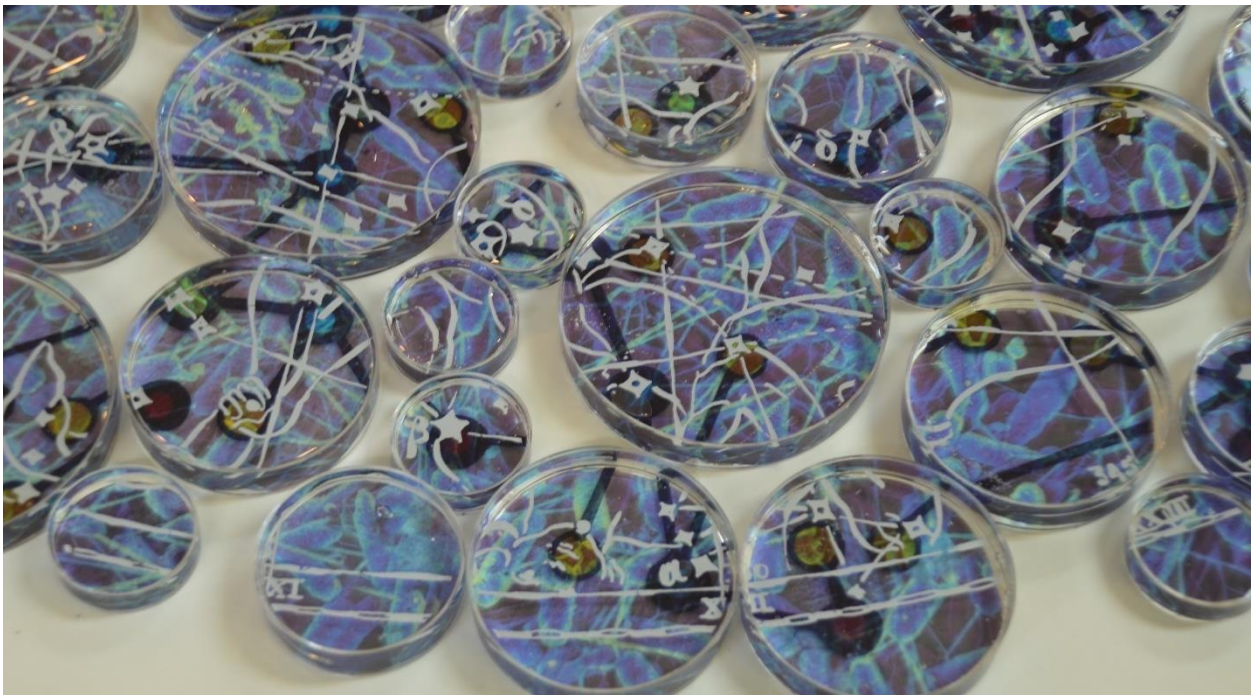


Image credit: Natural History Museum, London



QUESTIONS:

- How many different layers do you see in the petri dishes?
- Petri dishes are a non-traditional art material. What other sorts of tools/equipment for science could you use to create art?

EXPLORE FURTHER:

Since ancient times, people have created stories about stars in the night sky. **Constellations** are groups of stars that form a pattern. These patterns can take the shape of people, animals or objects. There are 88 constellations total – however – they cannot all be seen at the same time. The ones you can see depends on where you live on the planet and what season it is. People in South America see different groups of stars than people living in North America.

Ancient civilizations sometimes used constellation stories as a tool to mark the passage of time between planting agriculture and harvesting. These stories told the tales of gods and monsters, heroes and villains and other legends.

With your parent's permission, download the free "Night Sky" app or google the constellations visible in the night sky tonight. **See how many you can find.**

PROJECT 2:

IMAGINE the hidden world inside your own body.

What does this living organism look like inside? It can be imaginative shapes like Bill Dambrova's paintings, accurate references like Monica Aissa Martinez' drawings, or magnified microscopic life like Kathryn Maxwell's mixed media artwork.

You may use the body outline (for reference or printing) as a template on the following page. Get creative!

Pick one of the following prompts, combine a few, or create your own:

- **EXPERIMENT WITH OTHER LIFE FORMS:** What kind of organs look like other living organisms? Lungs can be leaves, hands can be tree branches, etc.

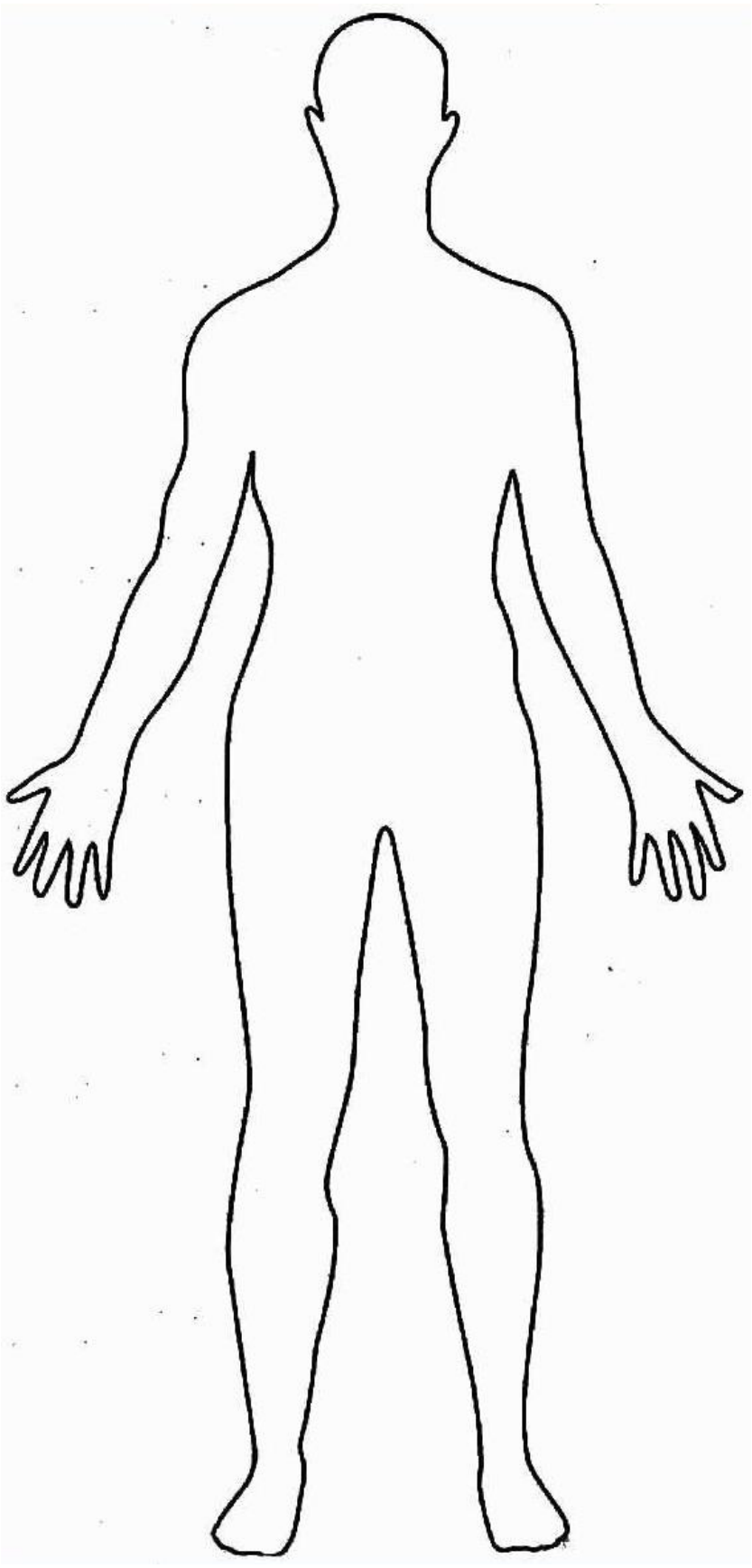
- **REDESIGN:** What if our organs were geometric instead of organic?

- **CREATIVE SPARK:** Imagine what the electricity looks like that makes our hearts beat

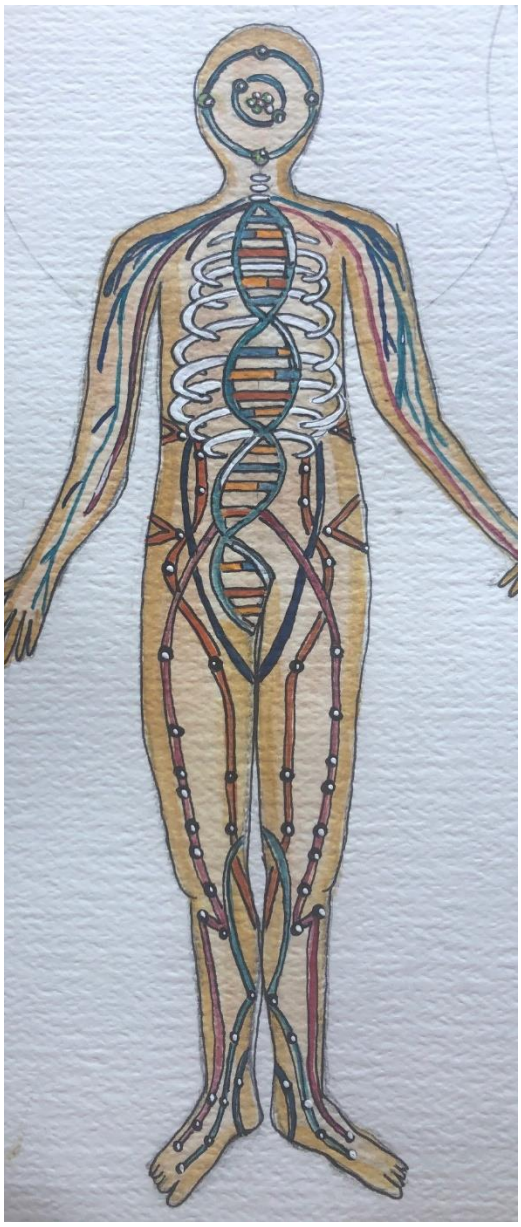
- **PLAY WITH SCALE**: What if the microscopic qualities that define our physical traits were much larger? What if atoms, DNA or bacteria were much larger?

- **REARRANGE**: What if our organs were in different places in our bodies?

What prompt did you choose, and why? Explain your artistic choices on the back of your paper.



Project examples:



Play with scale example

Other life forms example

Share your artwork with Sky Harbor for an opportunity to be featured on social media!

Email an image to airport.museum@phoenix.gov or hashtag #SkyHarborArts

This is 2 of 3 online Art and Science Courses made possible by the Phoenix Airport Museum at Phoenix Sky Harbor International Airport.