OVERVIEW
Systems within Systems

Presented by the Gallery at Tempe Center for the Arts
Unit written by Mary Erickson, Ph.D., with Monica Aissa Martinez, Artist

Systems within Systems is a set of lessons designed in conjunction with the STEAM exhibition at the Gallery at the Tempe Center for the Arts.

Preview the STEAM Exhibition Preview PowerPoint.

Themes

- We are all both parts of larger external systems, and made up of smaller internal systems.
- Art can help us appreciate connections both within us and beyond us.

Key Questions

CHOOSE: How can I mix the distinctive characteristics of various media within one artwork?

LEARN: What can I learn about nature (parts that work together in my body)?

SEEK: What art ideas can I get from my (internal) natural environment?

Community Connections

We are surrounded by and have grown dependent on human-made systems. Hohokam farmers built a system of canals to irrigate their crops a thousand years before Phoenix was founded. A century or so ago, European-Americans extended and rebuilt those canals to irrigate citrus orchards, cotton farms, and to water livestock in the Valley of the Sun. Not so long ago, a new light rail system was integrated with the existing railroad, highway, aviation, and growing bicycle transportation systems of the greater Phoenix area. Digital electronic systems undergird our personal, professional, educational, recreational, and family lives through smartphones, laptops, wearable medical devices, credit card chips, gaming platforms, online courses, and social networks. These digital systems store, exchange, and share data through an electronic mega-system called the Internet.

A natural system of systems has existed immeasurably longer than any human-made system: a universe of billions of galaxies, including our own Milky Way, where our solar system is but one in billions of stars, and the earth, with all its natural systems, is just one of eight planets in our solar system. The Mogollon Rim, resulted from the movement of a system of tectonic plates riding on a core of molten rock. Systems of plant and animal life adapted to movements of air and moisture controlled by the climate systems of the biosphere to populate and thrive in the Valley of the Sun.

Lessons

Lesson 1: Systems Everywhere pdf
Lesson 2: Exploring Science and Art at the Tempe Center for the Arts pdf
Lesson 3: My Body Works: High School pdf
Lesson 4: My Body Works: Elementary pdf

Resources

- Systems Everywhere PowerPoint
- Questor Questions about Science and Art in Insect Images pdf
- STEAM in the Standards pdf
- STEAM Exhibition Preview PowerPoint

HIGH SCHOOL

- My Body Works: High School PowerPoint
- Reflection Log (High School) pdf
- Exhibition space in art classroom or elsewhere in the school
  OR
- Camera (or cell phone camera), computer with PowerPoint and projector
- Human anatomy references, such as books, chapters in science textbooks, posters, printouts from the Internet, etc.

ELEMENTARY

- My Body Works: Elementary PowerPoint
- Simple anatomical drawings of heart, brain, lungs, and hand (Elementary) pdf
- Sample Body Outline pdf

Supplies

HIGH SCHOOL
High quality paper such as vellum
Graphite, colored pencils, colored markers
Colored inks with pens, nibs, and watercolor palettes for mixing

ELEMENTARY
Large pieces of draft paper for tracing
Assorted colored markers
Assorted crayons
Paper scraps for experimentation
OPTIONAL: Wall space where one large drawing at a time can be displayed for presentation to the class.

Credits:

Monica Aissa Martinez for photographs and documentation of her anatomy workshop on her blog
Chrystal Bridges for bringing Monica Aissa Martinez to Arkansas to teach her high school anatomy workshop
Michelle Nichols Dock and Monica Aissa Martinez for planning and photographing their anatomy drawing activity at Tempe's Geeks' Night Out Science and Engineering Festival
Nancy Egly for consultation on content and photography

Estimated Time:

Lesson One = 20-40 minutes
Lesson Two = Field Trip
Lesson Three = 240-300 minutes
Lesson Four = 40-100 minutes

Arizona Visual Arts Standards

HIGH SCHOOL
VA.CR1.HS1a: Use multiple approaches to begin creative endeavors. (Lesson 1)
VA.RE.7.HS1a: Speculate about ways in which art impacts people's perception and understanding of human experiences. (Lesson 2)
VA.CN.10.HS1: Document the process of developing ideas that reflect group concerns from early stages to fully elaborated work. (Lesson 3)
VA.PR.4.HS1: Analyze, select, and curate artifacts and/or artworks for presentation. (Lesson 3)

ELEMENTARY
VA.RE.8.2: Interpret art by identifying the mood suggested by a work of art and describing relevant subject matter and

elements and principles. (Lesson 2)
VA.CR.2.2a: Experiment with various materials, tools, and approaches to explore personal interests in works of art or design. (Lesson 3)
VA.PR.6.2: Analyze how art exhibited inside and outside of schools contributes to communities. (Lesson 3)
VA. CN.10.2: Create works of art about events in home, school, or community life. (Lesson 3)

English Language Arts Standards (Lesson Two)
ELA-Literacy.CCRA.R4 : Interpret words and phrases [or visual qualities] as they are used in a text [artwork], including determining technical, connotative, and figurative meanings, and analyze how specific word [or visual] choices shape meaning or tone.
ELA-Literacy.RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6–8 texts and topics.*
ELA-Literacy.RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
ELA-Literacy.CCRA.R1: Read closely to determine what the text [artwork] says explicitly and to make logical inferences from it; cite specific textual [visual] evidence when writing or speaking to support conclusions drawn from the text [artwork].
ELA-Literacy.RST.6-8.1: Cite specific [visual] textual evidence to support analysis of science and technical texts [artworks].
ELA-Literacy.RST.9-10.1: Cite specific textual [visual] evidence to support analysis of science and technical texts [artworks] attending to the precise details of explanations or descriptions.
ELA-Literacy.CCRA.R.9: Analyze how two or more texts [artworks] address similar themes or topics in order to build knowledge or to compare the approaches the authors [artists] take.
ELA-Literacy.6-8.RH.9: Analyze the relationship between a primary and secondary source on the same topic.
ELA-Literacy.9-10.RH.9. Compare and contrast treatments of the same topic in several primary and secondary sources.
ELA-Literacy.CCRA.W1: Write arguments to support claims in an analysis of substantive topics or texts [artworks] using valid reasoning and relevant and sufficient evidence.
ELA-Literacy.WHST.6-8.2f: Provide a concluding statement or section that follows from and supports the information or explanation presented.
ELA-Literacy.WHST.9-10.2f: Provide a concluding statement or section that follows from and supports the information or explanation presented.