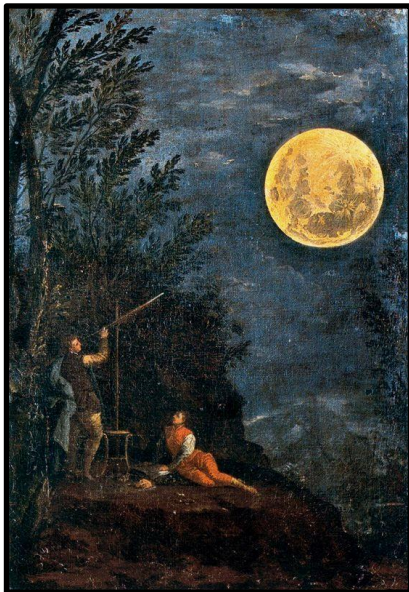


Introduction

We are the Center for STEM Education, STEM standing for Science, Technology, Engineering, and Mathematics. But have you ever heard of the other variant, STEAM? This actually stands for the exact same thing, but with the A standing for Art! For some reason, many of us tend to think of art and science as being completely separate, but STEAM is here to change that view. STEAM is everything STEM is, but more. It incorporates creative thinking and design in STEM, enhancing it without taking away from it. The “Art” in STEAM encompasses a wide variety of topics, such as history, social studies, music, and visual arts.



Humans have always tried to learn and describe the world around us. Science and Art are very different approaches to do exactly that! Engineering and Design can both be thought of as creating and inventing things to improve our lives. The ways that things happen for both sides can be very different, but the goals and motivation, in most cases, are the same. A great example of the merging of Science and Art is Leonardo Di Vinci. We’ve all heard about how he was a Scientist, Inventor, and Artist. Other historical examples are painting the Moon and Jupiter to showcase what the planets looked like through a telescope, developing pigments and dyes using chemistry for illustrations and paintings, inventing cameras to use for photography, and many buildings that required engineering, science, and art to be built. Nowadays, we combine science and art in ways we never did before. We can write programs to generate pretty patterns, and utilize computers to make digital art, animation, and CGI.

By adding the elements and skills associated with art with those associated with STEM, we can start being both analytical and creative, developing our abilities and giving ourselves the chance to be the best thinkers of the future.

Northeastern Connections

Faculty Connection

At Northeastern University, Khoury College of Computer Science and the College of Arts, Media, and Design (CAMD) has a variety of programs and organizations that allow students to express their creativity through science, or science through their artwork. The fluidity of Northeastern allows a student to explore artistic expression through emerging technologies by joining the CS & Arts Media combined-major program. This program is a partnership between Khoury and CAMD, and it helps students gain an understanding of computer science technology while receiving a foundational education in expressive aspects of media arts.

Another exciting opportunity is ARTH1400. ARTH1400 The Science of Art, The Art of Science is a course offered at Northeastern University that delves into the connections and intersections between art and science specifically during the Italian Renaissance (14th-17th century). The general themes of the course are invention, observation, and imagination while covering topics such as engineering, cartography, zoology, ecology, and anatomy. Students on the course also have weekly visits to the Museum of Fine Arts (MFA) to study the art and practice their writing and drawing.

Student Connection



Northeastern University Animation Club is an example of one of the student-led organizations on campus focused on the integration of art and science. This club hosts activities such as relevant lectures and technical skill-building exercises, for students interested in digital art and animation of all kinds including traditional, 2D and 3D, narrative, abstract, and visual effects related. In this image, the Animation Club hosted Darrin Butter, a character animator at Walt Disney Animation Studios, for a

question and answer about the film “Ralph Breaks the Internet”.

Northeastern Virtual Reality (NUVR) is another example of a club that integrates art and science. NUVR welcomes software developers and designers alike, working on virtual reality and augmented reality projects throughout the semester. Some of these projects include an AR (augmented reality) scavenger hunt across the Northeastern Campus, a VR (virtual reality) tabletop games and simulator, and an AR art canvas where each user can place a pixel in any color they want!



Do Now

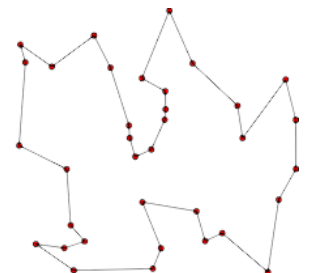
As mentioned in the “Northeastern Connections” section of this newsletter, the Museum of Fine Arts (MFA) is a great resource utilized by Northeastern Students (the MFA is also very close to the Northeastern Campus!). For this “Do Now” we’ll be exploring some different artworks featured in the MFA. If this is a safe and possible option for your family, you could visit the MFA (make sure you follow the COVID guidelines!) and study the different artworks and think of how they can link to science, technology, engineering, or math. Take a sketchbook with you and



sketch and draw anything that catches your attention. You can also add notes and label your sketches. If this is not possible, don’t worry! The MFA has a wide variety of [videos](#) showcasing their artwork. Watch as many as you want and sketch anything that catches your attention. Again, think about how the artwork can link to science, technology, engineering, or math. A great example of this is the [Diana and Stag Automaton](#), an intricate piece of machinery that is both artistic and relates to engineering and math.

Activity

How can you integrate science and art? You may not realize it, but these fields go hand in hand in nearly everything you use! From the aesthetics of your house to the home screen of a digital device, we can see that creativity and innovation are very crucial in STEAM.



In this activity, you will make a kaleidoscope which is an optical instrument that uses reflecting surfaces so that objects are seen as regular symmetrical patterns.

Materials Needed:

You can use any materials you want but here are some suggestions:

- Empty toilet paper roll
- Mylar sheets or mirrored sheets
- Tape
- White cardstock
- Bendy straw
- Markers, stickers, or other decorative materials

Steps:

- Cut mylar sheets into three equal strips, size them so that they fit snugly in the cardboard tube and won't fall out (cut the strips about 9.7cm x 3.5cm)
- Line up the strips, shiny face down, and leave a tiny space between them
- Tape the strips together over the spaces
- Fold the taped mylar into a triangular prism and tape along the top to hold it in place, this should fit snugly in the cardboard tube
- Cut off the bendy end of a flexible straw and tape it along the top of your tube with the flexible part of the straw hanging over the edge
- Cut out 3 circles from cardstock with a diameter of about 3.75in
- Poke a hole in the center of your circles
- Decorate the circles using your decorative materials, be creative and explore a variety of shapes and designs!
- Place the circle onto your straw with the design facing the kaleidoscope, you want the hole to fit over the flexible portion of the straw so it will turn easily
- Look into your kaleidoscope and see all the reflections!

The end result should look similar to the following picture:



Discussion Questions:

- Where else do you see reflectional symmetry?
- What do the new patterns look like? Do they look like the things you drew?
- What do you think your results would look like if your mirror was folded at a different angle or with more sides?

Share Your Results

We'd love to know how the activity and/or the "do now" turned out! What worked and what didn't work? Please share with us something you learned and/or send us pictures! Email us at stem@northeastern.edu.

Related links/Extensions

- [STEAM - The Importance of Art in STEM Education](#)
- [Combining Science and Art](#)
- [CS & Media Arts combines artistic expression with emerging technologies - Khoury College of Computer Sciences](#)
- [The Science of Art, the Art of Science - Northeastern CAMD](#)
- [STEAM Activities for Kids – Go Science Kids](#)
- [28 Days of STEM Activities and STEAM Activities for Kids](#)