ART OF MATH

Focus: Alexander Calder, Numbered One to Seven

Objectives – Students will:
- Create a balanced asymmetrical mobile inspired by Alexander Calder.
- Respond to the thought that air is a design element of a mobile and the concept of chance.
- Present their sculptures and mobiles created.
- Connect with the idea of balance through breathing exercises and gentle movement.


Vocabulary: asymmetrical balance, creativity, figurative, kinetic, maker, mobile, plates, shapes, stabile, and symmetrical

Procedure:
- Engage: Makers. Gather a basket full of shapes and have students select a set number of items. They must now create something from those items and share with their classmates.
- Art Talk: What is creativity? Have students discuss the difference between being inspired and copying. Talk about how Calder's visit to the studio of Piet Mondrian inspired the direction of his artworks.
- History: Who was Alexander Calder? Refer to resources in the Teacher Support Materials for additional information. http://goo.gl/BTkzcF
- Aesthetics 1: Balance. Use Calder's kinetic sculptures as inspiration to practice breathing exercises and gentle movement exploring the concept of balance. Refer to the lesson plan presented by Michelle Miller at Thursdays for Teachers.
- Aesthetics 2: Air. Discuss with students what items all mobiles have in common. Talk about how wind/air is a design element of Calder's mobiles. His works went from using mechanical power to the power of chance with air.
- Production: Sculpture Calderesque Style. Have students create a mobile using Calder as a foundation while incorporating figurative wire sculptures. Refer to the lesson plan presented by Pamela Conyers-Hinson at Thursdays for Teachers.
- Close: Create a balance mystery for students to solve. Give them "clues" in the form of shapes and to "solve," they must create balance with them. The final composition can be 2D or 3D, but must be asymmetrical.
Extensions:

- **Cultural Connections**: Calder split his residency between the US and France. Why do you think he did that? How did his life in France influence his artworks?

- **Fine Arts**: Dance. Calder wrote about his mobiles, “It is this unpredictable yet ordered action, a sort of abstract dance, which intrigues the fancy and makes other explanations superfluous.” Show students videos of Calder’s mobiles moving. Have students pair music with one of Calder’s mobiles. They can create a dance inspired by the movement of their selected mobile. Consider balance.

- **Language Arts**: Have students take a full-length photograph, and answer the question “who are you?” Cut up the 2D picture to make the “plates” of a mobile with descriptive text on the reverse side of the image. Is there balance?

- **Math**: For younger students, talk about shape, balance, weight, symmetrical and asymmetrical. For older students, define the shapes used in the mobiles (i.e. right triangle, isosceles, etc.). For all students, you can use this site for play and competitions: [https://solveme.edc.org/Mobiles.html](https://solveme.edc.org/Mobiles.html)

- **Science**: Looking at leaves. Some of Calder’s plates in the mobiles resemble leaves. Take students outside to collect leaves then create mobiles to hang from the trees from where the leaves were collected. When possible, watch how leaves fall from the trees.

**Academic Standards & additional resources:**
Available on online version at [www.joslyn.org/education/teachers/thursdays-for-teachers](http://www.joslyn.org/education/teachers/thursdays-for-teachers) [select Lesson Plans, then Modern & Contemporary]

**About the Artwork:**
While Alexander Calder was not the first artist to incorporate motion into sculpture, he was the first to create an entire aesthetic language based on motion itself. Marcel Duchamp (1887–1968) coined the term “mobile” in 1932 to describe Calder’s motor-driven sculpture, *Untitled*. In French, the adjective “mobile” means movable, but also implies something is nimble or quick; as a noun the word means “motive.” Calder was amused by the word’s double entendre and began using it to describe his artworks.

Calder estimated that he created over 2,000 mobiles in his lifetime and though no two were alike, all mobiles have certain things in common. They are supported by string or wire and balance objects that move around as a result of chance encounters with wind or another force.

*Numbered One to Seven* is a combination of circles and shapes that resemble leaves or fins, which add variation to the movement. The flat metal pieces operate in a similar way to the sails on a boat – when air pushes a vertical plate it will move horizontally, and a horizontal plate will move vertically. But the way in which they are hung and balanced makes the movement and interaction between the pieces complex.

Calder preferred to work directly with the materials at hand and determine balances and counterbalances as he went, which allowed for spontaneous new combinations to arise. He explained that the small holes in the plates added movement. “When I cut out my plates I have two things in mind. I want them to be more alive, and I think about balance. Which explains the holes in the plates. The most important thing is that the mobile be able to catch the air. It has to be able to move.”
LESSON PLAN

The Yoga of Balance

Inspired by Alexander Calder's Numbered One to Seven
Created by Michelle Miller, certified yoga & meditation instructor
Grade Level All grade levels (adapt as needed for elementary students)

Overview
Using Alexander Calder's kinetic sculptures as inspiration, practice breathing exercises and gentle movement while exploring the concept of balance.

Anticipatory Set
Using the wall as support, students will practice a series of graceful gentle balancing yoga postures. The same postures will then be practiced away from the wall demonstrating the relationship between support and balance.

Objectives
• Students will identify their “center” (both literally and figuratively) and learn how their balance is affected by moving away from center
• Students will learn a series of breathing exercises designed to trigger the parasympathetic nervous system
• Students will learn many definitions of “balance” and apply these concepts to their own lives
• Students will learn several balancing yoga postures
• Students will learn how to meditate

Resources
• Joslyn Art Museum’s Alexander Calder teaching poster*
• Carmen Gimaenez, Calder: Gravity and Grace book*
• Jean Lipman, Alexander Calder and His Magical Mobiles book*
• Mike Venezia, Alexander Calder book*
• Calder: Sculptor of Air DVD*

Supplies
• Yoga mats

Vocabulary
• parasympathetic nervous system
• sympathetic nervous system
• asana
• gunas: tama, raja, sattva
• Ayurveda
• centering
• mindfulness
• yoga
LESSON PLAN

Lesson Outline
1) Introduction:
   a) Yoga postures at the wall
   b) Same postures “unsupported”
   c) Same postures, slight shifts in focus

2) Definitions of Balance (Terminology from Calder/Yoga)
   a) Physical Balance
   b) Emotional Balance
   c) Being in balance with Nature
   d) Visual Balance
   e) Lifestyle Balance

3) Centering
   a) Breathwork
   b) Meditation/Mindfulness Practice

Additional Ideas: You can use these practices in your classrooms as tools for behavior management, focus, learning and memory, and creativity.

Academic Standards
Available on online version at www.joslyn.org/education/teachers/thursdays-for-teachers [select Lesson Plans, then Modern and Contemporary]
LESSON PLAN

Sculpture Calderesque Style
Inspired by Alexander Calder's Numbered One to Seven
Created by Pamela Conyers-Hinson, artist
Grade Level All grade levels (This lesson can be adjusted to any grade or age level. The main factor will be how much preparation the teacher will have to do.)

Overview
This lesson will give the students an opportunity to merge and morph art techniques. They will create a mobile using Calder as a foundation; while incorporating figurative wire sculptures.

Anticipatory Set
To get the students' attention and desire to participate, a completed example of the project should be available before and during the project. An excellent way to get buy-in is to show the completed project and then ask the question, “How do you think this was created?” This will get students thinking about the process and how they can duplicate it or come up with their own way of creating an artwork.

Objectives
If a “How” or “Why” question is used this workshop will help students in the development of the following:

- Critical Thinking Skills
- Problem Solving Skills
- Expansion of the imagination
- An understanding of role of motion and movement in our world.

Resources
- Joslyn Art Museum's Alexander Calder teaching poster*
- Alexander Calder: An American Invention book*
- The Life and Work of Alexander Calder book*
- Carmen Gimaenez, Calder: Gravity and Grace book*
- Jean Lipman, Alexander Calder and His Magical Mobiles book*
- Mike Venezia, Alexander Calder book*
- Calder: Sculptor of Air DVD*
- www.artsy.net/artist/alexander-calder
- www.theartstory.org/artist-calder-alexander.htm

Supplies
- Images of Calder's artwork
- Completed sample of the artwork project
- Electrical wire - multiple colors
- 12 gauge armature wire (each student will have 3-18" pieces)
- Tissue paper - Multiple colors
- 2" metal rings (one for each person)
- 1 2’ x 2’ piece of plywood for beeswax application
- old fashion iron (no steam holes)
- Wire cutters
- Scissors
- Beeswax
- Fishing Line (any size)
- glue guns
- pencils
LESSON PLAN

Vocabulary
- Transformation
- Imagination
- Motion
- Movement
- Balance
- Critical Thinking
- Problem Solving

Lesson Outline
Examples of the project and images of Calder’s artworks will be placed around the classroom.

1) Each student should receive the following:
   - (3) 18” pieces of armature wire
   - glue
   - scissors
   - tissue paper
   - pencil

2) A brief demonstration on how to –
   - shape the armature wire
   - create corresponding shapes out of tissue paper
   - if selected, create the stain glass effect on tissue paper using beeswax
   - create figures out of electrical wires

3) The students will be guided through the process of adhering the tissue paper to the wire.

4) The students will be shown how to construct the mobile pieces and attach the electrical wire sculpture. (The mobile will be constructed using fishing line). The fishing line will be knotted and held in place with hot glue.

5) The completed mobile will be attached to a 2-inch metal ring for presentation purposes.

Extensions
- This lesson can be used in math class when working on balance.
- This lesson can be used in science class when discussing motion and or movement.

Academic Standards
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