Lesson Plan(s) For Kinetic Art Project

Content Areas: Mathematics, Science, Art

Theme/Topic: draw, construct, and describe geometrical figures and describe the relationship between them

Focus Standards and Skills: Draw (freehand, with a ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Pre-teaching: Discussion about field trips, where are they going and what will they be experiencing:

- Ask students if they can give a definition of kinetic art/sculptures. Can they give a simple example, i.e. mobiles. Supplement their answers with additional information.
- Present a list of vocabulary terms used in the construction of kinetic sculptures. Talk about each and give definitions with examples*:

Mathematics	Science	Art
Golden ratio	Spheres	Pattern
Golden angle	Levers	Contrast
Arc	Bearings	Emphasis
Circumference	Balance	Balance
	Torque	Proportion/Scale
	Friction	Harmony
		Rhythm/Movement

*These vocabulary lists are just examples and can be amended.

- Show pictures of complex sculptures and ask the students what materials are used in the sculptures. Also, what do they think makes it move?

- Show the videos listed in the resources section on "How to make a simple kinetic sculpture."

Goals:

- The students will be able to draw and/or construct a simple kinetic sculpture.
- The students will be able to describe the steps in the design and construction of the sculpture using some of the previously taught vocabulary terms.
- The students will be able to describe the relationship between the geometrical figures they used.

Objectives (what will I teach?)**:**

Mathematics	Science & Art
Explain the Golden Angle Explain the Golden Ratio	Go through the vocabulary terms and describe how these pertain to kinetic sculptures.

Materials needed for the Kinetic Art Project:

General Materials for Lesson:

- ___ Foam sheets
- ___ Scissors
- ___ Wire
- ___ String
- ___ Foil
- ___ Sticks
- ___ Wood
- ___ Aluminum cans
- ___ Glue

Possible Materials From Home:

- ___ Old toys
- ___ Computers
- ___ Printers
- ___ Household junk
- ___ Other?

Lesson Description and Procedure:

1. Break the students into groups. Talk about the sculptures at the Arboretum.
2. Tell the students to look at the materials that are available to them. Explain that they will decide as a group what kind of kinetic sculpture they can build.
3. Tell the students that they will have to describe their sculpture and what principles of kinetics they used.
4. Let the students decide on materials then proceed with their project. Decide on an appropriate time frame for the project's completion.

Assessment Objective:

- To take apart toys, household junk, old computers, printers, etc.
- Use the materials to make a new kinetic sculpture
- Explain their process of construction
- Using 2-3 principles of design, describe how they pertain to your sculpture
- Write a 2-3 paragraph report on their findings.

Modifications: Adjust vocabulary pre-teaching, and assessment to the appropriate grade level and content area

Accommodations: Special needs students may have to have a partner to progress through all of the steps in the lesson plans

Lesson Plan Resources:

Kinetic sculpture basic techniques on YouTube:
https://www.youtube.com/watch?v=aLhOFHaJzeM

Simple Kinetic Wire Sculptures by Clayton Boyer:
https://www.youtube.com/watch?v=-To5b03cdW0

Kinetic Sculpture - Art-O-Motion - Lesson Plan
https://www.youtube.com/watch?v=qs88aC0k0yI

Art-O-Motion 2 - Lesson Plan:
https://www.youtube.com/watch?v=nc_6Xo2N1mg

Vocabulary Terms & Definitions

Used in the Kinetic Art Project

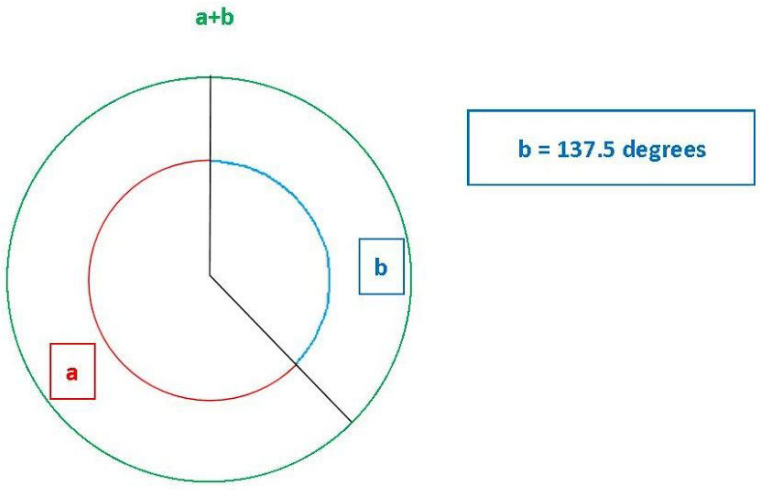
<u>Content Area</u>: Mathematics

1. <u>Golden Ratio</u> – This term is often defined as the ratio a/b, where the ratio of "a" to "b" is the same as the ratio of the entire segment to "a".

$$\frac{a}{(a+b)} = \frac{b}{a}$$

a/b = (a+b)/a

2. <u>Golden Angle</u> – This happens when you break up a circle so that the ratio of the big arc to the smaller arc is the Golden Ratio. It's like taking the line definition of the Golden Ratio and wrapping it into a circle as illustrated below: green is to red, as red is to blue. The resulting angle is the Golden Angle which is equal to about 137.5 degrees.



3. Arc – This term refers to a portion of the circumference of a circle, referred to as a circular arc.

4. Circumference – This term is the distance around the edge of a circle (or any curvy shape).

Content Area: Science

1. Spheres – A perfect sphere is defined as being completely symmetrical around its center, with all points on the surface lying the same distance from the center point.

2. Levers – Rigid objects used with a pivot point or fulcrum to multiply mechanical force on an object.

3. Bearings – Components that are used between moving parts and stationary parts for support and reduction of friction.

4. Balance - Balance can be accomplished in three ways:
    a. Two things can weigh exactly the same
    b. Push down on one side with the same amount of force as the weight on the other side
    c. If difference weights, the lighter weight one must be farther from the fulcrum in order to be balanced

5. Torque - How hard something is rotated. Torque is force multiplied by the perpendicular distance to the axis of rotation. This distance is also called the lever arm or moment arm.

Torque = Force x Distance

6. Friction – Friction is a force. The force of friction is a percentage of any object's weight.

Content Area: Art (Principles of Design)

Balance
Contrast
Emphasis
Pattern
Unity
Movement
Rhythm

(see attachment for definitions)

The Principals of Design
tools to describe art

Balance

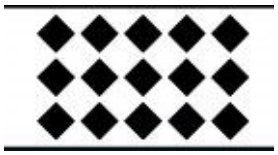
Balance is the distribution of the visual weight of objects, color texture, and space. If the design was a scale, these elements should be balanced to make a design feel stable. In symmetrical balance, the elements used on one side of the design are similar to those on the other side; in asymmetrical balance, the sides are different but still look balanced. In radial balance, the elements

Contrast

Contrast is the difference between elements in a work of art. This can happen through a variety of elements such as value change, size difference, etc.

Emphasis

Emphasis is the part of the design that catches the viewer's attention. Usually the artist will make one area stand out by contrasting it with other areas. The area could be different in size, color, texture, shape, etc.



Pattern

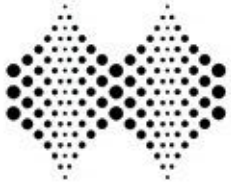
Pattern is the repeating of an object or symbol all over the work of art.

Unity

Unity is the feeling of harmony between all parts of the wok of art, which creates a sense of completeness.

Movement

Movement is the path the viewer's eye takes through the work of art, often from one focal point to another. Such movement can be directed along lines, edges, shape and color within the work of art.



Rhythm

Rhythm is created when one or more elements of design are used repeatedly to create a feeling of organized movement.

THE FOUR STEPS OF ART CRITICISM

DESCRIPTION
Describe what you see. Be very detailed. Include objects and their placements in the artwork, the art elements you see, everything you notice about the work. Could someone find their work by your description?

ANALYSIS
Tell how the artist has arranged the elements of the artwork using the art principles. How is the artwork "put together?"

INTERPRETING
What do you think the artist was trying to say? What is the message or meaning of the artwork? What emotions are caused in the viewer?

JUDGEMENT
Make a decision as to the artwork's success or lack of success. Give reasons to support your opinion. Was the artist successful in what he/she was trying to do? Is the work good art, or bad art?