artsNOW
Integrated learning solutions

UNIT: CAN YOU BALANCE?
BALANCING ACT–CALDER MOBILE (Lesson 2 of 4)
Grade Band: 3, 4
Content Focus: Visual Arts & Science



LEARNING DESCRIPTION

In this lesson, students will use their knowledge of balanced and unbalanced forces to design and create a mobile inspired by the artist, Alexander Calder. A mobile is a sculpture of three to five levels that has various materials attached to wire that must be balanced upon completion. Students will use their critical thinking skills to utilize the materials provided to create a piece of artwork that incorporates the scientific concepts of gravitational forces, as well as balanced and unbalanced forces.

LEARNING TARGETS

Essential Questions	"I Can" Statements
How can gravitational forces affect the balance of objects? How does proportion affect balance?	I can identify and compare balanced and unbalanced forces. I can create a balanced mobile using unbalanced forces.

How can you identify balanced and unbalanced forces?	I can analyze how forces affect balance and revise my plan as I design. I can communicate my understanding of forces by reflecting upon my construction of my Calder mobile.

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
Grade 4: S4P3. Obtain, evaluate, and communicate information about the relationship between balanced and unbalanced forces. a. Plan and carry out an investigation on the effects of balanced and unbalanced forces on an object and communicate the results. b. Construct an argument to support the claim that gravitational force affects the motion of an object. c. Ask questions to identify and explain the uses of simple machines (lever, pulley, wedge, inclined plane, wheel and axle, and screw) and how forces are changed when simple machines are used to complete tasks.	**Grade 4:** VA4.CR.2 Create works of art based on selected themes. VA4.CR.4 Understand and apply media, techniques, processes, and concepts of three-dimensional art.

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
Grade 3: 3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	**Anchor Standard 1:** I can use the elements and principles of art to create artwork. **Anchor Standard 2:** I can use different materials, techniques, and processes to make art.

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
• Force - Any interaction that, when applied to an object, can cause it to change its motion or shape • Balanced forces - Two or more forces acting on an object in such a way that	• Balance - This is a sense of stability in the body of work. Balance can be created by repeating the same shapes and by creating a feeling of equal visual weight. • Proportion - The size relationships

they cancel each other out, resulting in no change in the object's motion • Unbalanced forces - Two or more forces acting on an object are not equal in size or are not opposite in direction, causing the object to accelerate (change its speed or direction) • Gravitational force - The force of attraction that pulls objects toward each other due to their mass • Motion - The change in the position of an object over time • Mass - A measure of the amount of matter in an object or substance	between different parts of an artwork. It determines how each element relates to the others in terms of size, scale, and placement.

MATERIALS

- Pipe cleaners
- Paper clips
- Foam sheets
- Card stock
- Beads
- String
- Calder Sculpture Rubric
- Calder Foundation–Mobiles https://calder.org/archive/all/works/hanging-mobile/
- 10x2 Artful Thinking Routine
- http://thekidshouldseethis.com/post/experimental-balancing-sculptures
- http://study.com/academy/lesson/gravitational-force-definition-equation-examples.html

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

Optional: Choose a book to explore as a class from the below list:

- *Alexander Calder: Meet the Artist by Patricia Geis*
- *Sandy's Circus: A Story About Alexander Calder by Tanya Lee Stone*
- *Alexander Calder and His Magical Mobiles by Jean Lipman*

- Show students an image of one of Alexander Calder's mobiles from the following site: https://calder.org/archive/all/works/hanging-mobile/.
    - Engage students in the 10x2 Artful Thinking Routine. Instruct students to do the following:
        - 1. Look at the image quietly for at least 30 seconds. Let your eyes wander.
        - 2. List 10 words or phrases about any aspect of the picture.

        - 3. Repeat Steps one and two–Look at the image again and try to add 10 more words or phrases to your list.
    - Ask students what they think the artist had to think about when he designed and created the mobile (i.e. how much do materials weigh, how strong is the structure, etc.?).
- Introduce the artist Alexander Calder to students and use this website to introduce students to the concept of mass: http://thekidshouldseethis.com/post/experimental-balancing-sculptures.

Work Session

- Facilitate class discussion on gravitational force. (http://study.com/academy/lesson/gravitational-force-definition-equation-examples.html)
- Tell students that they will be challenged to create a balanced mobile using unbalanced forces.
- Divide students into small groups of two to three students.
- Students should plan their mobiles:
    - Students should begin by sketching a design for their mobile.
        - Determine the number of levels for mobile (should be between three to five).
    - Determine the lengths of wires they will use.
    - Determine other materials for use and label them on the sketch.
    - Predict how the sculpture will balance.
- Students should then present their sketches to another group to get feedback on their designs.
- After making any needed revisions, students can begin creating their mobiles.
    - Students should begin by attaching materials, such as foam/cardstock/beads, to the ends of the wires.
    - Students should check for balance and re-check as needed as they construct.
    - Students should record in their journals how they balanced levels–did they have to omit materials, change materials, ect.?

Classroom Tips:

- *Review safe work procedures.*
- *Review classroom rules.*
- *Review peer interaction regulations.*
- *Teacher will be in charge of cutting wire.*
- *Other materials can be divided into kits or bags.*

Closing/Reflection

- After completing their sculptures, students should reflect on the following:
    - How did you visualize your mobile?
    - Did your original plan work?
    - What did you have to revise?
    - If you positioned levels differently, how would your final product change?
    - If you changed materials, what would have changed? Why?

ASSESSMENTS

Formative

- Teacher will observe the students to determine if they understand gravitational force.
- Teacher will observe the students to determine if they understand balanced and unbalanced forces.
- Teacher will observe the students' use of proportion in relation to balance.
- The teacher will check for student's communication of deeper thinking throughout the project (specifically checking for understanding of how proportion and gravitational forces affect balance).

Summative

- Calder Sculpture Rubric
- Have students respond to the following reflection questions after the creation of their artwork:
    - How are balance and gravitational force related?
    - How did you plan to balance your mobile?
    - How did you determine the material used to balance your mobile?
    - How did gravitational force affect your plan?
    - What did you have to rethink while attempting to balance your mobile?

DIFFERENTIATION

Accelerated:

- Increase the number of levels required in the design.
- Have students write instructions on how to build their mobile for a classmate to follow.

Remedial:

- Modify the number of levels required.
- Provide a graphic organizer with levels for students to draw and visualize materials to attach to each level.
- Give sentence frames for reflection questions.
- Provide opportunities for peer checks so students can get feedback on their project.

ADDITIONAL RESOURCES

- https://phet.colorado.edu/sims/html/forces-and-motion-basics/latest/forces-and-motion-basics_en.html
- http://archive.artsmia.org/artists_toolkit/encyc_balancesymmetry.html
- http://study.com/academy/lesson/gravitational-force-definition-equation-examples.html
- https://connecticuthistory.org/a-world-in-motion-artist-and-sculptor-alexander-calder/
- https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=video&cd=14&cad=rja&uact=8&ved=0ahUKEwiDsvOLvJ_UAhVB0iYKHeKECrw4ChC3AggvMAM&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DFjKYmD1HHKs&usg=AFQjCNELe6fcoVaXPsJdzlmyiGX-ehsIqw&sig2=1UfbCZBDcaDHVzpRWSMBxQ
- http://thekidshouldseethis.com/post/experimental-balancing-sculptures

CREDITS

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**This integrated lesson provides differentiated ideas and activities for educators that are aligned to a sampling of standards. Standards referenced at the time of publishing may differ based on each state's adoption of new standards.*

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