Teacher's Guide: Exploring Gravity in the Visual Arts

Lesson 1:

What is sculpture? Creating Sculpture in an Gravity-Influenced Environment

Materials:

- Gravity Online Lesson 1 (PDF): What is Sculpture?
- Paper
- Scissors
- Tape

Learning Objectives:

- Students will understand the characteristics that define sculpture
- Students will understand the artist's considerations for creating sculpture in a gravity-bound environment
- Students will practice creating a sculpture that utilizes a base or support

Vocabulary:

- **Sculpture:** a 3-dimensional object with length, width, and height.
- **Base:** a support that holds or secures the position of a sculpture.
- **Realistic:** something you see in real life
- **Abstract:** unrecognizable as a particular object in life.

Lesson Sequence:

1. ***Ask:*** What is a sculpture? What is the difference between a sculpture and a drawing?
    a. A 3-dimensional structure. It has height, width, and depth.
2. ***Show:*** *Spider* by Louise Bourgeois*, Brick House* by Simone Leigh*, Lobster Telephone* by Salvador Dali
    a. *Ask for each image:* Is this a sculpture? How do you know that?
3. ***Ask:*** What considerations do artists need to make when creating sculpture in an environment that has gravity?
    a. Material, surface upon which the sculpture will be displayed.
4. ***Show:*** sculptures with bases that act as a counterbalance

i. *Cradle: Cobble* by Mary Watt
ii. *Force of Nature II* by Lorenzo Quinn
iii. *Horse Galloping on Right Foot* by Edgar Degas

5. ***Ask:*** How did these artists make sure their sculptures didn't fall over? What role do you think the base plays in these works?
    i. Some sculptures do not require bases, because the artist trusts that the sculpture can stand on its own on any flat, sturdy surface and/or that the orientation of the sculpture is obvious without a base telling you that "this side goes down".
6. ***Activity:*** Using paper, create a sculpture, realistic or abstract, that stands up either on its own or with the support of a base. The sculpture should be able to be picked up and moved while maintaining its shape.
    a. In order for an artist to make something flimsy, like paper, and remain standing upright, what do they need to do? (Create a "foot" or "tab" that connects to the base.)
    b. Structural support. Something that connects it to a surface. A base could mean a flat piece of paper that holds the sculpture in place.

Assessment Rubric:

1	2	Bonus
The sculpture cannot stand up on it's own with or without the support of a base.	Student's sculpture has utilized a base to maintain the structure and orientation of their sculpture. Or, the sculpture stands up on it's own and does not require a base.	The sculpture utilizes a base that acts as a counter-balance.

Lesson 2:

Creating Sculpture for Zero-Gravity

Materials:

- Gravity Online Lesson 2 (PDF): Creating Sculpture for Zero-Gravity
- Eyal Gever video (on Gravity homepage)
- *Cosmic Dancer* video Youtube Link: https://www.youtube.com/watch?v=-RsBoftdVLc
- Thick paper (ideally construction paper, however any available paper or cardboard will work fine too)
- Tape (any kind that will adhere to the material used above)
- Scissors

(Materials can be adapted to whatever is available in the classroom. Cardboard or clay could also be used.)

Learning Objectives

- Students will explore artists that create sculpture in and for a zero-gravity environment
- Students will build an abstract sculpture that has ambiguous orientation

Vocabulary

- **Zero-Gravity:** An environment where there is no gravitational force
- **Resting Point:** The point of contact between the sculpture and the surface on which it rests.
- **Orientation:** the direction and position of an object

Lesson Sequence:

1. ***Say:*** In our last lesson we explored sculpture and the ways that artists create sculptures that exist in a gravity-influenced environment. Today, we are going to ask the question, "What if an artist was to create a sculpture for a zero-gravity environment? What might they do differently? What might they create that could not be possible on Earth?
2. ***Show:*** Watch the Eyal Gever video
    a. *Ask:* What did Eyal create in space?
    b. *Ask:* How was gravity important or unimportant to his work?

Educator Notes: Eyal Gever was commissioned by NASA to create the first artwork to be printed in space. Eyal used a 3-D printer technology that could print in zero-gravity. Eyal aimed to give a "shout out" to space and print a sound wave of a human laugh. He chose human laughter because it is universal and uniquely human. He did not want to choose one language over another, or represent one nationality over another. He envisioned the sculpture floating freely in space in a continuous, wave-like motion.

3. ***Show:*** *Cosmic Dancer* youtube video by Arthur Woods (Link: https://www.youtube.com/watch?v=-RsBoftdVLc)
    a. *Ask:* What do you see?
    b. *Ask:* What do you think it is?
    c. *Ask:* How did the artist intend this sculpture to be displayed, which side is up, which side goes down? Explain your answer.

Educator Notes: Arthur Woods wanted to explore new possibilities to create art in a zero-gravity environment. Without access to zero-gravity space in which to create his artwork, Woods imagined a way to create artwork that appears to have no predetermined orientation, or no obvious right side up or right side down. His goal was to create a sculpture that turned and danced in weightlessness. A sculpture with no defined top or bottom, front or back.

4. ***Discussion*** Questions following Woods and Gever Examples
    a. *Ask:* How do the artists (Woods, Gever) envision sculpture that can exist in a gravity-free environment? What was their goal or intent?
    b. *Ask:* What new opportunities does the gravity-free environment offer these artists (Woods, Gever) in creating their sculptures?
    c. *Ask:* What similarities exist between *Cosmic Dancer* and *Laugh*?
5. ***Activity:*** Your sculpture is going to the international space station! Can you create a sculpture that does not have a single, defined resting point? Can you design your sculpture to be viewed from all angles as if it was floating weightlessly in space? How could you design your sculpture to always look "right-side up" no matter the orientation?

Educator Notes: Encourage students to continually reorient their sculpture throughout the construction process to reduce the likelihood of creating a single, fixed orientation.

Peer Assessment: Did the student create ambiguity in the orientation of their sculpture? Is there an obvious "this side up" or "this side down" orientation or does the sculpture offer opportunities to orient it in many different ways?

Assessment Rubric:

1	2	3
Student's sculpture has only one resting point and a single orientation	Student's sculpture has two sides that function as resting points	Student's sculpture has multiple resting points and an ambiguous orientation

*Display suggestions: tape fishing line to sculptures and hang them.

Lesson 3:

Art that Challenges Our Perception of Gravity

Materials:

- Gravity Online Lesson 3 (PDF): Disrupting our Conception of Gravity through Art
- Drawing Paper
- Pencils, Markers, Crayons
- Erasers

Learning Objectives:

- Students will be able to design a sculpture that plays with our earth-bound perception of gravity.

Vocabulary:

- **Orientation:** the direction and position of an object
- **Disturbance:** an interruption
- **Gravity:** the force of attraction that pulls two objects toward each other

Lesson Sequence:

1. ***Show:*** images of *Elephant*
    a. *Ask:* What do you see?
    b. *Ask:* Does the artist's orientation of the elephant surprise you?
    c. *Ask:* Why?
    d. *Ask:* Why do you think the artist orients the elephant in this way?
    e. *Ask:* What would happen if we placed a real elephant in this position?

Educator Notes: The elephant is not the subject of his artwork. He wants to create a gravitational disturbance. He wants us to think about how we perceive space and surprises us with unexpected and potentially impossible orientation of a very large land mammal. He creates a stop of time where the elephant can remain in one position without falling and can defy the laws of gravity.

Example 2: Eyal Gever "Waterfall" 2014

Show: Eyal Gever's Waterfall

Questions for discussion:

- What do you see?
- How does this artist approach the passing of time?
- How does this sculpture reflect the passing of time?
- Is this sculpture abiding by the laws of gravity on Earth?

Notes for Educators: The artist is interested in stopping time to closely observe that which is impossible in our gravity-influenced world. The 3-D printing of the waterfall allows us to take in all aspects of the water, that in normal circumstances would be in constant downward falling motion.

Final challenge: Design a sculpture on a piece of paper that appears to be ignoring the laws of gravity but will be displayed on Earth (meaning it has to have contact with a surface). What could you make that challenges gravity as we understand it on this planet? Something that is frozen in time or something oriented in a weird and unexpected way. Create a drawing that illustrates something that could not be possible on our gravity-bound planet.

1. Draw a surface for your sculpture to rest on.
2. Consider the shape of your sculpture. Then pick a point for it to connect to the surface. It is probably not the one that makes the most “sense” . For this to work, it needs to be something realistic, meaning something you can find on Earth. OR it can be abstract, but does not abide by the laws of gravity.

Assessment Rubric:

1	2	3
Student’s sculpture design does not depict any challenge to the perception or reality of gravity on earth.	Student’s sculpture design depicts a slight challenge to the perception or reality of gravity on earth.	Student’s sculpture design does not depict an extreme challenge to the perception or reality of gravity on earth.