

Lesson Plan Title

Biotic and Abiotic Art

Grade Level

6th Grade

Subject Area

Science

MSCCRS

L.6.3.1 Use scientific reasoning to explain differences between biotic and abiotic factors that demonstrate what living organisms need to survive.

Art Form

Visual Art

MSCCR Creative Arts Standards

VA: Cr2.1.6 Organize and develop artistic ideas and work

- a. Demonstrate openness in trying new ideas, materials, methods, and approaches in making works of art and design

VA: Re8.1.6 Apply criteria to evaluate artistic work.

- a. Develop and apply relevant criteria to evaluate a work of art.

Duration

2 hours

Materials

Large screen to show this image: <https://us-east-1-blow-web.s3.amazonaws.com/d3/3faf403f0611e8bff1236256d3d7ba/thumb.jpg>

Art supplies

- Option A: Individual student computers with access to Sketchpad 5.1 website (<https://sketch.io/sketchpad/>)
- Option B: Paper of two different sizes, glue sticks, any art supplies that are readily available in your classroom (colored pencils, markers, paint, etc.)

Objectives

The student will examine and explain the artistic and scientific elements of a piece of artwork.

The student will create an ecosystem scene with forced perspective (foreground, middleground, and background) that shows biotic and abiotic factors within the ecosystem.

Students will explain how biotic and abiotic factors within their artwork affect the ecosystem.

Vocabulary

Science Vocabulary:

Biotic factor

Abiotic factor

Ecosystem

Art Vocabulary:

Foreground

Middleground

Background

Forced perspective

Lesson Description

1. Begin the lesson by showing this image: <https://us-east-1-blow-web.s3.amazonaws.com/d3/3faf403f0611e8bff1236256d3d7ba/thumb.jpg>

Point out the foreground, middleground, and background of this picture.

(Foreground: deer, chipmunk, log, etc.; middleground: farm, river, etc.; background: mountains)

Explain that the artwork is divided into these sections to give the viewer a sense of depth and dimension on a surface that's actually flat. Using foreground, middleground, and background correctly means that closer objects appear larger and objects farther away appear smaller. Also, detail is clearer up close and grayed and hazy in the distance (atmospheric perspective)

There are also other elements of art at work here that help us perceive the depth of this scene. For example:

- 1) Overlap - shapes in the distance will be overlapped by shapes that are closer.
- 2) Placement - objects that are farther away are placed closer to the horizon line.
- 3) Shading - giving the illusion of three-dimensional shapes.
- 4) Value and focus - objects that are farther away appear lighter and less clear than objects that are closer.

Take time to look at how all of these elements apply to this picture. Students will later be assigned to create their own artwork using these tricks, so it is important that they can readily recognize how to achieve this 3D illusion on a 2D surface.

2. Now that students are familiar with the artistic illusions at work in the image, ask them these questions:
 - 1) Do you see both living and nonliving things in this artwork?
 - 2) What are some examples of living things you see in the foreground/middleground/background? (Ask these separately so that students can focus on one area at a time and learn to differentiate between these areas.)
Explain: These living things are biotic factors. **Biotic factors** include any living components that affect or shape an ecosystem.
Bring special attention to biotic factors that may not be seen in the picture but would exist in real life, such as fungi/bacteria on the rotting log.

- 3) What are the characteristics that all biotic factors (living things) share? Allow students to make educated guesses. Explain that living things need nourishment/require energy, can grow and reproduce, and respond to stimuli. Abiotic factors/nonliving things do not have these characteristics.
 - 4) What are some examples of nonliving things you see in the foreground/middleground/background? (Ask these separately so that students can focus on one area at a time and learn to differentiate between these areas.) Explain: **Abiotic factors** are nonliving things or conditions that affect or shape an ecosystem. These can include soil, water, air, temperature, sunlight, human activity, etc.
Bring special attention to the abiotic factors that are not tangible objects like water and soil; encourage students to think about the importance of the “invisible” abiotic factors such as temperature and human activity, as these factors affect an ecosystem greatly.
Although things like temperature are not visible, ask students what evidence from the picture can we use to determine the effects of these abiotic factors.
3. When students have an understanding of the differences in biotic and abiotic factors and how they both affect ecosystems, students will now create their own artwork depicting an ecosystem.
- Depending on the resources available to you, students may design their ecosystem scene in a digital format using Sketchpad 5.1 (website) or on the smaller sheets of paper with any art supplies you have available in your classroom. (See Tips section for Sketchpad tips.)
- Students may choose to create any ecosystem of their choosing -- forest, mountain, ocean, lake, etc. -- as long as they use their learned skills of forced perspective in the artwork.
- The ecosystem scenes created by students must meet these requirements:
- 1) Contains a foreground, middleground, and background
 - 2) Objects in the foreground appear larger than objects in the background
 - 3) Foreground must contain 3 biotic and 3 abiotic factors.*
 - 4) Middleground must contain 2 biotic and 2 abiotic factors.*
 - 5) Background must contain 1 biotic and 1 abiotic factor.*

*The teacher may choose to alter these requirements.

Sketchpad assessment: Have students place arrows pointing to the foreground, middleground, and background as well as each biotic and abiotic factor. Label the arrows or assign a color-coordination to the arrows that represent each requirement.

Paper assessment: Have students glue their completed artwork on the larger sheet of paper. Use the border area to label foreground, middleground, and background as well as each biotic and abiotic factor.

4. To wrap up the lesson, have students share their artwork in small groups. Topics of discussion during the small group talks should focus on what qualifies each factor in the student artwork as either biotic or abiotic, as well as the effects that these factors have on the ecosystem. The teacher should facilitate by walking around the room to listen in on each group's discussion.

Recommended Resources

Sketchpad User Guide: <https://sketchpad.app/guide/>

Extended Learning Activities

Pose a question to students about if one of their biotic/abiotic factors in their art changed.

Example: a new predator species is introduced, a natural disaster occurs, etc.

Have students write about how the changes of these biotic/abiotic factors would affect the entire ecosystem. (L.6.3.3)

Sources

<https://www.kitchentableclassroom.com/foreground-middle-ground-background/>

Tips

Sketchpad is fairly user-friendly; however, there are many choices of functions that may be overwhelming for students. The teacher should take time to become familiar with the website and its main components that students will be using and allot a portion of the lesson to teaching students to use this website. The clipart tool will be particularly useful for this activity.

When students begin creating their artwork, encourage them to begin with the background first, then layer the middleground and then foreground on top of it. Remind them that the objects in the background will appear smaller than they actually are, and objects will appear larger the closer they are to the forefront of the image.

Author

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