



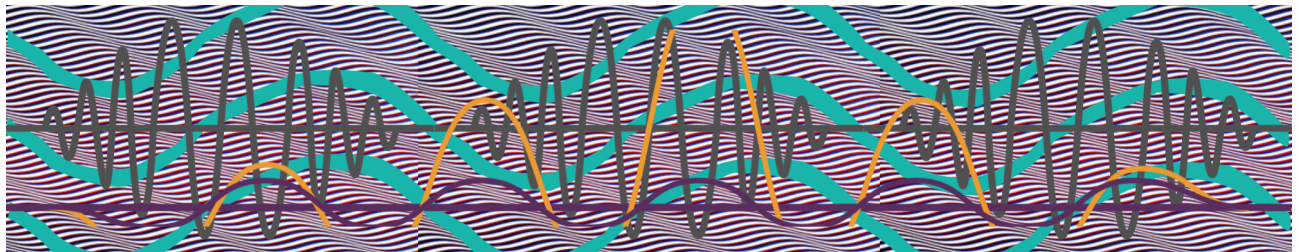
artsNOW

Integrated learning solutions

EXPLORING WAVELENGTHS THROUGH OP ART

Grade Band: 6-8

Content Focus: Visual Arts & Science



LEARNING DESCRIPTION

In this visual arts integrated lesson, students will understand and demonstrate the concept of wavelengths by creating Op Art using line and color.

LEARNING TARGETS

Essential Questions	"I Can" Statements
What is Op Art?	I can describe the style of Op Art.
How can I use the element of line to demonstrate wavelengths and amplitudes in the style of Op Art?	I can demonstrate wavelengths and amplitudes in the style of Op Art using the element of line.
How does using a complementary color scheme in art create contrast?	I can use complementary color schemes to create contrast.



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GEORGIA STANDARDS

Curriculum Standards	Arts Standards
<p>Grade 8 S8P4. Obtain, evaluate, and communicate information to support the claim that electromagnetic (light) waves behave differently than mechanical (sound) waves.</p>	<p>Grade 8 VA8.CR.1 Visualize and generate ideas for creating works of art.</p> <p>VA8.CR.2 Choose from a range of materials and/or methods of traditional and contemporary artistic practices to plan and create works of art.</p> <p>VA8.CR.3 Engage in an array of processes, media, techniques, and/or technology through experimentation, practice, and persistence.</p> <p>VA8.CR.4 Incorporate formal and informal components to create works of art.</p>

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
<p>Grade 6 6-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.</p>	<p>Anchor Standard 1: I can use the elements and principles of art to create artwork.</p> <p>Anchor Standard 2: I can use different materials, techniques, and processes to make art.</p> <p>Anchor Standard 7: I can relate visual arts ideas to other arts disciplines, content areas, and careers.</p>

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
<ul style="list-style-type: none"> • <u>Electromagnetic waves</u> - A form of energy that moves through space in the form of varying electric and magnetic fields; it doesn't rely on any medium and can travel through a vacuum • <u>Mechanical waves</u> - A type of wave that moves through a material medium, transferring energy by causing particles 	<ul style="list-style-type: none"> • <u>Line</u> - One of the elements of art, the path of a moving point • <u>Color</u> - One of the elements of art, light reflected or absorbed • <u>Complementary colors</u> - Colors that are across from each other on the color wheel



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in the medium to oscillate or vibrate as the wave travels

- Amplitude - The height or "size" of a wave from its resting position
- Peak - The highest point or the topmost part of the wave
- Trough - The lowest point or the bottommost part of the wave
- Wavelength - The distance between the peaks (or troughs) of a wave

- Op Art - An art movement of the 1960's; this movement used optical illusions to create abstract art
- Optical illusion - A visual that plays a trick on the eye
- Abstract art - Art that does not resemble something in the real world
- Composition - How the artist arranges the elements of art in an artwork

MATERIALS

- White paper
- Markers
- Pencils
- Rulers
- *Acceleration option - colored pencils*

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

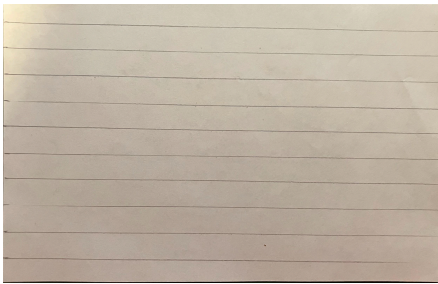
- Project the artwork, [Cataract 3 by Bridget Riley](#) (alternate artwork—[Arrest 3 by Bridget Riley](#)).
- In small groups, students should make observations about the artwork.
 - Students should identify as many characteristics of the artwork as they can. Examples could include that it has wavy horizontal lines, it is mostly black and white, it appears three-dimensional, etc.
 - Facilitate a discussion about what students observed.
- Next, have students make associations about the artwork in their small groups—what does it make them think of?
- Facilitate a group discussion about the associations that students make.
- Tell students that the artist, Bridget Riley, is one of the most famous artists associated with the art movement of the 1960's, Op Art. Artwork in this movement is abstract (does not resemble the real world) and creates optical illusions.

Work Session

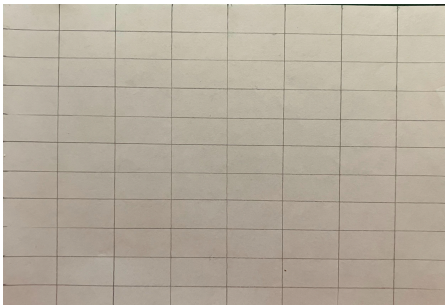


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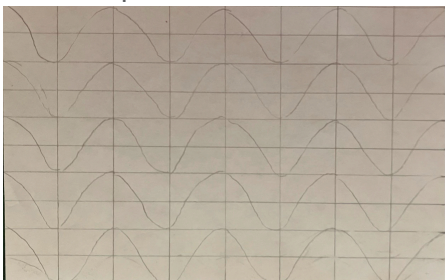
- Explain to students that they will create an artwork in the style of Op Art that represents different wavelengths.
- Review electromagnetic and mechanical waves with students. Look at diagrams of waves. Review specific terms related to waves such as peak, amplitude, and wavelength.
- Tell students that line is one of the seven elements of art. Ask students if they can see how a line is used to represent wavelength.
 - *If students have learned how to calculate wavelength, review this concept before moving on.*
- Distribute a set of criteria for a wavelength—this could be specific measurements that they use to calculate wavelength if students have learned this, or it could be specific measurements of a wavelength. Students will use the criteria to create their Op Art.
- First, students should turn their paper landscape style (wide).
- Second, using their understanding of the amplitude of their wave, each student should use a ruler to mark the both sides of their paper with the amplitude of the wave.
 - For example, if the amplitude is represented by .5 inches, students should make horizontal lines that are .5 inches apart on their paper.



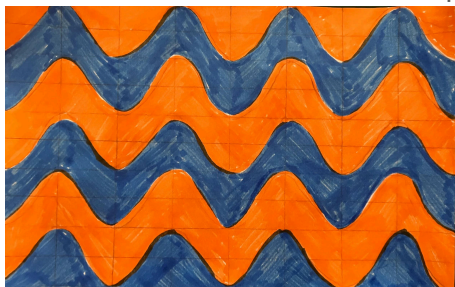
- Third, students should determine the wavelength. Students should use a ruler to mark the wavelength at the top and bottom of their paper; then, students should connect the marks to create vertical lines.



- Fourth, using these horizontal and vertical lines as a guide, students should draw their waves in pencil.



- Finally, show students a [color wheel](#). Explain to students that colors opposite each other on the color wheel are called complementary colors. Using complementary colors creates contrast, which is one of the characteristics of Op Art.
 - Students should select a complementary color scheme to use for their artwork. Students should fill in the space between their waves using alternating colors.



- Allow students time to create their artwork.

Closing/Reflection

- Students should describe in written form what their waves show.
- Students should then get into small groups to observe others' artwork. Students should be able to identify characteristics of the waves in their classmates' artwork.

ASSESSMENTS

Formative

Teachers will assess students' understanding by observing whether students are able to explain what Op Art is, how line and color are used in Op Art, and whether students are able to explain waves and what a visual of a wavelength shows.

Summative

CHECKLIST

- Students can accurately show the criteria of the wave provided to them in their artwork.
- Students can use a complementary color scheme in their own Op Art.
- Students can explain what their individual wavelengths mean. For example, a long wavelength will mean sound will carry farther.
- Students can identify which characteristics in their artwork demonstrate Op Art.

DIFFERENTIATION

Acceleration:

- Students can create three small pieces of Op Art using three different wavelength and amplitude criteria and three different color schemes.
- Students can study how the element of [Value](#) (the lightness or darkness of something) creates the illusion of form. Students can then explore how incorporating lighter values on the peaks and troughs with colored pencil furthers the illusion.
- Students can explore other types of Op Art on [Tate Kids](#).



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Remediation:

- Provide pre-measured paper for students so that they are only drawing and coloring the wavelengths. Have students use a ruler to measure the amplitude and discuss what the wavelengths show.
- Provide a visual diagram of a wavelength with labeled parts.
- Allow students to orally explain what their artwork shows.
- Allow students to make an artwork inspired by wavelengths rather than using precise measurements. Students should explain how their artwork shows the characteristics of waves (peak, trough, length, amplitude, etc.).

ADDITIONAL RESOURCES

- [Color wheel](#)
- [Cataract 3 by Bridget Riley](#)
- [Arrest 3 by Bridget Riley](#)
- [Examples of Bridget Riley's artwork](#)
- [Information for students about Op Art - Tate Museum. London](#)
- [PBS Learning Media on the Element of Art. Value](#)

**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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