Lights, Color, Action

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This curriculum unit is recommended for:
Art and Science/Grade 4

Keywords: Primary Colors, Wave lengths, Visible Spectrum, White light, Mixing, Refraction, Reflection, Soo Sunny Park, installation, Primary Colors, Secondary Colors, Jack Storms

Teaching Standards: See Appendix 1 for teaching standards addressed in this unit.

Synopsis: My fourth grade students will recognize how light travels and when it strikes another medium it is refracted, reflected, and absorbed. Students will apply skills and concepts needed in other disciplines such as a Science to become an informed creative artist. Students will look at the differences of mixing primary colors, mixing filtered colored lights, and of how colors can be layered. My students will learn the science behind light and color while experimenting with glass prisms and dichroic glass cubes. Showing my fourth graders how white light separates into the color spectrum when hitting a glass object will fascinate them making them more curious.

There are two different but similar sculptors within this unit Soo Sunny Park and Jack Storms. Soo Sunny Park refers to herself as a Kinetic Grid Artist she creates twisted chain link fence designs using colored plastic squares then placing it in an empty space to see how the light reflects and absorbs on the walls. Jack Storms is a cold press sculptor who layers glass with metal oxides to create reflections of different colors when moved. Both artists use reflection of light and color in their work. My students will create their own color wheels, kaleidoscopes and layer paint using a liquid pour technique. The large culminating project will be weaving colored plastic strips through the chain link fence that divides our playgrounds. This will be similar to Soo Sunny Park’s grid installations.

After studying all of the ways color can be reflected, refracted and absorbed my students will have a better understanding of color at the same time looking at two contemporary modern artists.

I plan to teach this unit during the coming year to 110 students in Art/Science Grade 4.

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**Introduction**

“Don’t Mix” all of the colors it makes mud! Students in general believe mixing colors is magical! Every chance my students get to mix colors they will! They ask questions such as “What does blue, orange, and purple make?” my response, “Sorry, those colors make mud!” Remember learning about the color wheel as I sing the saying “Red, Yellow, Blue, I hear you” My students are impulsive so once they see paint they immediately put fingers in it or want to mix colors. In the book “Sky Color” by Peter Reynolds students believe that the sky is only one color, blue. Marisol realized quickly that the sky can be many colors. Marisol’s art teacher took away blue so Marisol would observe the true colors of the sky.¹ Her art teacher placed confidence in Marisol’s artist ability. Marisol first believed she could mix the colors then soon realized that the sky is made up of many colors.²

My fourth grade students are very interested the science behind color mixing, how light reflects color, and recognizing how light (energy) takes various forms. My students will learn how filtered light mixes to create colors and how to mix primary colors to create other colors also how colors can be layered to create separate colors when poured. When my students start out as kindergartners I discuss how important color is by referring to the elements of art as a recipe for a drawing and color is one important ingredient. Generally a painting has color within it somewhere to serve as a feeling of cool or warm, to direct your eyes to a certain place in the composition, or to evoke an emotion in a painting. The students will experiment with mixing primary colors and then overlapping colored filters of light to see how the results are similar yet different. They will experiment with layering colors to create liquid pour designs. The final project will be a collaborative installation using colored plastic strips woven through an existing chain link fence on the playground.

This unit will incorporate two abstract artists who use color in similar ways. An abstract artist, Soo Sunny Park creates large installations of colorful cells that reflect light. She refers to her installations as photo kinetic grid designs similar to how a kaleidoscope moves colored shapes around in light. Her installations are on exhibit at the North Carolina Museum of Art which represents her emphasis on light and color.

Another artist that will be featured in this unit is Jack Storms; he is a cold press glass sculptor that uses layered dichroic glass in his pieces. My students will enjoy his work and especially like learning that his work is displayed in a familiar movie, Guardians of the Galaxy. Dichroic glass is layers of glass with microlayers of metal or oxides that when cut reflect colors in the angles.

**Background**

Barringer Academic Center is an elementary school located in Charlotte, NC. It is in the Mecklenburg school district, which is very diverse with 178 schools. There are 640 students within the school with a wide range of academic abilities. Barringer Academic Center is a partial magnet school providing specialized public education. Language Immersion Talent Development for the academically gifted is the focus. The school promotes excellence in student achievement and growth. There are 36 classrooms with 100% fully licensed teachers, 85% are highly qualified.
I teach Visual Arts at Barringer Academic Center once a week for 45 minutes to all students. Due to the nature of the topics and the limited time with students, most of my lessons require at least two or more class sessions. This specific unit “Lights, Color, Action” will take approximately six weeks to complete. As an art educator, I inspire my students by exposing them to famous artist masterpieces that relate to the themes I am covering. I routinely look for ways to connect my art lessons to the subjects that the students are focusing on in the regular classroom setting.

I am lucky to have a large art room with eight tables and a large drying rack. I have storage for supplies, three sinks and a separate room for the kiln. My students can create an array of 2D and 3D projects. My school website has student work displayed and a blog page for families to post comments about student work. I frequently display student work in the community.

This unit “Lights, Color, Action” will be implemented in the fourth grade. Because I teach both academically gifted and general education students, it is imperative that I differentiate my lessons to keep the students motivated and challenged in my art room. Art brings forth excitement and enthusiasm of most students and these fourth graders are no exception! I will be teaching these lessons to four separates classes. Producing art taps into the critical mind-set of students as they develop answers to questions, conduct research, develop comprehensions skills, make meaningful connections, communicate meaning, show beauty and practice creativity.

**Rationale**

My “why” for any unit I am teaching is for my students to leave my class with a strong understanding of the content whether it is art, science, social studies, etc. I continually stress to my art students that color is an ingredient for a successful a painting this unit will complete their understanding of color by learning the science behind it. I want my students to understand what light is and how light travel in a straight line until it strikes other mediums and that light can be reflected, refracted, and absorbed to create different colors. My students will learn the difference between mixing primary colors red, yellow, blue and mixing the same colors using filtered colored lights. They will experiment with the visible color spectrum learning its unique qualities and predict the outcomes using the scientific method. Hopefully by integrating science into art lessons about color the students will connect their prior knowledge of science into these light and color lessons. The goal for our school is to strengthen a student’s abilities in science getting them ready for end of year 5th grade science test, what better way than integrating science with art.

As artists, my fourth graders struggle with working collaboratively this unit will strengthen collaborative skills such as working together, team work, and decision making. One of the lessons in this unit will be coloring plastic strips then weaving it through an existing large chain link fence on our schools playground. This lesson is similar to Soo Sunny Park’s large installation called Unwoven Light. Learning about the artist Soo Sunny Park will help my students understand how color reflects light by studying her large installations and the physical space needed for one. My students will also be introduced to another glass artist, Jack Storms that way my student will be able to identify a new glass technique, cold press. This particular artist has a cold press dichroic cube in a familiar movie Guardians of the Galaxy proving to my students that art is everywhere.
My students will grow as artists if I continually explore other art techniques and integrate other disciplines to give them an understanding that art is everywhere and in everything they do.

Objectives

The objectives of this unit are for my students to recognize how light travels and when it strikes another medium it is refracted, reflected, and absorbed. I want my fourth graders to apply the skills and concepts needed in other disciplines such as in Science to become an informed innovative artist. My intention is to reinforce the idea that creativity is thinking rather than producing a product. Creativity is turning new and imaginative ideas into reality, making connections between different disciplines, and to generate solutions.

Combining art and science together will give my students an understanding of interdisciplinary connections made throughout all content areas. By using scientific method in the art room such as in a color theory lesson will reinforce Science content. For example my students will have a simple color mixing experiment in front of them; they will make an observation, and then form a question. Together they will form a hypothesis (what do they think will happen), conduct the experiment then analyze the data and draw a conclusion. In the end the students will have a product to show as their evidence.

The Science Behind It

What is color? Light causes color, without light color would not be possible. My students are going to learn about splitting of white light which splits the light into seven different colors when is passes through a transparent solid medium. The wavelength doesn’t change the angle of refraction it depends on the lights wavelength, the distance between crests of electromagnetic waves. All of the colors were travelling in the same direction then they leave the prism at different angles spreading the beam of white light into a spectrum of colors. We perceive the colors as blue which has a shorter wavelength or red that has a longer wave length. Jack Storms, the dichroic cold-press glass sculptor harnesses patterns of light to create less optical scattering. Dichroic colors are stacked layers of glass and micro-layers of metals or oxides gives the glass shifting qualities depending on the angle of the view causing an array of colors.

The history of dichroic glass originated from the 4th century during Roman times, a glass Lycurgus Cup. The 6.5 inch glass cup changes colors when reflecting the light. At first it was said to be a mistake the glass got mixed up with other metal particles but in the 1950s while the Lycurgus Cup was on display at a British Museum an archeologist scientist, Ian Freestone discovered small metal fragments were intentionally placed inside the cup resulting in the color changes. There were two distinct metals gold and silver placed in a certain way to reflect color changes.

Light defined by Sir Issac Newton “as little particles emitted by hot objects such as sun and fire.” A Physicist named James Clerk Maxwell soon discovered that light is energy an electric field tied up with a magnetic field, flying through space.” Light or energy runs into an object it reflects, sometimes light can be absorbed and at times it can refract when it passes...
through a solid object. So how do we see light as color? Each person has three color receptor cones in their eyes that identify light as color.

My students will experiment with mixing the three primary colors of paint and mixing filtered color lights to see the differences and similarities. My students will mix three primary colors red, yellow, and blue to experiment with equals amounts of one color mixing with equal amounts of another color and see how to get a true secondary color. Primary colors are known as subtractive colors first discovered by LeBlon. Primary colors subtract out certain wavelengths of light from the white light spectrum. The combination of wavelengths removed from the spectrum register as a new color through your eyes.

Filtered glass works by scattering, absorbing or transmitting various colors of the spectrum at differing levels. This is the technique Soo Sunny Park uses in her large installations. Parks attaches small pieces of colored plastic to a chain link fence then bends the links to capture the scattering of the colored plastic pieces.

Colors can also stay separate due to the weight of the colors. I will demonstrate how colors might react separately through a liquid pour technique artist are using on canvas. The science behind liquid pours are simple each paint color is layered in a cup without being mixed the colors are dense so they will not mix on their own then add alcohol to repel the paint then controllably pour the paint on a canvas. The results are colors lying on a canvas with bubble designs throughout.

Biography

Soo Sunny Park, Photo Kinetic Grid Sculptor

Soo Sunny Park was born in Seoul, South Korea. She is a sculptor who received a BFA in painting and sculpture from Columbus College of Art and Design in Columbus, Ohio and a MFA in sculpture from Cranbook Academy of Art in Bloomfield Hills, Michigan. She has won numerous awards for her work. Most recently in a group exhibition called, You are Here: Light, Color and Sound Experiences at North Carolina Museum of Art in Raleigh, NC. Park lives in New Hampshire and teaches at Dartmouth College.4

When I reflect on Parks’ work it is peaceful and calming the movement pairs well with the hints of color from the reflection of light on the sculpture. I feel that my students need to be reminded of calm and mindfulness. My students need to see that being at peace in your own mind will bring calmness to your life. Some of my students have seen unimaginable things for being so young and showing them how to view this large installation will hopefully bring them peace. Park says, “We don’t notice light when looking so much as we notice the things light allows us to see. Unwoven Light captures light and causes it to reveal itself, through colorful reflections and refractions on the installations surfaces and on the gallery floor and walls.”5
Capturing Resonance Video The work of Soo Sunny Park
https://www.youtube.com/watch?v=l7DMp1CRMIY

Jack Storms, Cold Press Dichroic glass sculptor

Jack Storms has always been interested in some form of art he was not sure what direction his art would take. In Jack Storm’s junior year at Plymouth State University he got a job working with a glass artist that was experimenting with combining lead crystal and dichroic glass using a cold-press process. He was intrigued! This process is something he had never seen before most glass artists were blowing glass from molten glass. Jack Storms opened his own studio in 20078 delving deeper into the process by perfecting his creations and inventing a cold-working lathe. He has won numerous awards for his gorgeous designs. His glass cube and tear drop were featured in a scene from the movie Guardians of the Galaxy.⁶

https://www.youtube.com/watch?v= Y0GAEWreXo
When I reflect on Jack Storm’s work I feel like it is solid and at the same time light and reflective. My students will enjoy looking at his work for two reasons because it is shiny and because it is featured in a current movie that they are familiar with, Guardians of the Galaxy. When I compare artists, Parks and Storms both use the same reflective properties of light but they create different feelings within their work, by using different techniques. Storms uses layered dichroic glass with a cold press technique and a lathe to sculpt the shapes while Parks uses filtered glass to create reflections from the light then placing each square into the fencing design.

**Instructional Implementation**

**Teaching Strategies**

The teaching strategies will vary greatly throughout the lessons to ensure all learning styles are met. There are some strategies that work better than others within certain lessons.

**Collaboration**

I am not lucky enough to have a formal time to collaborate with my colleagues so organizing, executing, and planning are done after school hours. In my experience the benefits to students outweigh the challenges of planning a collaborative lesson. Students retain much more content when there is an extension into one of the special area classes, especially art. Students are more apt to remember and make connections to the art discussed if they create a tactile project. This unit will use cross disciplinary teaching strategies. Classrooms like this require planning and cooperation. Creating integrated lessons give the arts greater visibility in the school and community because they create hands-on activity related to the content area. Teachers create more rigorous and meaningful lessons by working together. As teachers, displaying collaboration in their classroom will set an expectation for students to work together and communicate more effectively.
**Technology**

Technology will be used as a tool to engage student learning. Students respond well to technology because of the overwhelming use of it in our society today. In our district student’s grades 3-5 are 1:1 so everyday my students bring their chrome books to art. I will have my students download an extension on their chrome books called Kaleido Free it is design your own kaleidoscope. A great teachable moment! When students produce something on a technological device they seem to absorb it more easily because students today are modern learners. The best teaching strategies are the ones in which students do not realize they are learning.

**Art Talk**

Throughout the school year I encourage my students to speak using art vocabulary. I call this Art Talk. I feel strongly that students should use art words to analyze art, interpret art and reflect on their own artwork. As I set this expectation year after year I see the students use the words correctly not just in the art room but in their classrooms.

**Word Wall**

The word wall that is posted in the art room is divided into modes of creative expression such as clay, fiber arts, drawing, painting, and sculpture with art terminology listed under each category. Vocabulary is an important teaching strategy. I start every year with a word wall lesson specific for each grade level. I continually point out the art word that I am concentrating on in the lesson. Students need to be aware that words have different meanings within different content areas. I set this expectation in the art room at the beginning of the year while in my room the students will speak using the protocol of art talk. I will remind them to use their art words. This sets an expectation that the visual arts matter!

**Differentiate Learning**

Differentiated learning strategies look different in the art room than in general education classrooms. I encourage creative chatter. Having only 45 minutes proves difficult to help all 25 students. I have 3-4 students assigned to each table. Peer assistance is available at every table because when I assign seats I put at least one student who is able to work cooperatively per group. I frequently roam the classroom to assist students with more support. When a student asks for help in the art room, he or she most likely wants you to draw for them; I solve that problem by drawing with the eraser and not the pencil. The eraser technique assists them by giving them confidence in their own artistic abilities.
Reflection

Rubrics are a strategy that I often include in my lessons. A rubric focuses on a specific skill and places accountability on the student. I find it easy to measure a student’s performance through rubrics. I have students glue their rubrics on the back of their art so students and I can easily see their performance over the school year. This year every student has an art journal; on the inside cover of the journal there is a checklist for their artwork. I have the students glue the checklist in their journals as a reminder to be creative, neat, colorful, and complete. Another strategy for reflection is called two stars and one wish and it is conducted after a student completes his/her work. The students answer two questions on the back of their work. The questions are: What two things did you like best about your work? And what is it that you might change about your work? I lead a discussion on the answers that are acceptable to these questions. The expectation in my classroom is while discussing works of art they must cite supporting information about the piece of art. I want students to be aware of how the viewer analyzes art and that it is an opinion of the viewer, there is not a right or wrong answer. My instructional goals for using this strategy are to strengthen public speaking.

Demonstration

Throughout this unit I will review previous learned material due to fifty-five minute blocks once a week. One week is a long time between lessons. All activities are modeled first to demonstrate the art technique. I feel the students have greater success at the activity if they see examples. All four lessons in this unit require hands-on participation so there will be an art product after every lesson. This hands-on strategy meets the needs of the tactile and visual learners. If I model the activity step-by-step, the student feels more successful at each step. By transferring knowledge that can be easily replicated, students will understand logical steps; this will use their optimistic left brain.

Classroom Activities

Students will have hands-on experience with two kinds of glass prisms a glass prism and a dichroic glass cube. Before starting the art lessons I want students to see how light reflects on both objects.
Lessons

Lesson One: Mixing Primary Colors

Students will … apply skills and concepts learned in other disciplines such as Science and understand how an element of art (color) is mixed.

I will handout a worksheet on Color Theory students will read the worksheet at their table they will work together to fill in the worksheet. I will give them only three colors of paint red, yellow and blue. This project is relatively easy for fourth graders to work on together but I seem to have to remind them of how to mix the primary colors. When the color wheel dries students will cut out the shape and place it is a picture somehow such as a person holding a color wheel umbrella or a bicycle color wheel.

Materials needed: Tempera Paint, Brushes, and worksheet

Lesson Two: Kaleidoscopes

Students will … apply skills and concepts learned in other disciplines such as Science and understand how an element of art (color) is mixed

Materials needed: Pringles containers, lamination, colored gems, colored plastic, construction paper, Glue

Students will see how light absorbs and reflects colors by constructing a kaleidoscope out of empty pringles can. First fold the lamination film into a triangle that fits into the empty can take cap off can and place colored gems colored tissue paper and colored plastics onto it then place on the end of the tube. Trace the other end of the can to make an eye hole out of paper. Decorate it!
Lesson Three: Liquid Color Pours

Students will ... apply skills and concepts learned in other disciplines such as Science and understand how an element of art (color) is layered not mixed.

Materials needed: small canvases, acrylic paints, paper cups, rubbing alcohol

How does acrylic paint react when not mixed? The pigments or colored paint have varying densities along with the ability to move and spread. This experiment is letting the layered paints do what they want in a controlled environment. By adding white gesso to the layered paints improves the flow and cracking on the canvas. When paint is poured and moved on canvas then add alcohol drops to produce a cellular effect.

Lesson Four: Soo Sunny Park installation artist

Students will ... apply skills and concepts learned in other disciplines such as Science and understand how an element of art (color) is reflected.

Materials needed: clear plastic strips, colored sharpie markers, and scissors

Students will create a large installation on the existing fence that divides the playground. Students will color designs on long pieces of clear plastic using sharpie markers. Students will weave strips into the fence on the playground. Students will need to paint a wide white line on the blacktop so that the colors on their plastic will reflect on the ground.

Assessments

Two Stars and One Wish - This is a self-reflection activity. I use it at the end of most art lessons. This gives my students a chance to think about their own picture or project and to reflect on their own growth.
On the back of every art piece students fill out their art rubric it gives them a checklist to complete. This is a way for students to gage their effort put into every project.

List of Materials for Classroom Use

- Red, yellow, blue paint
- LED mini colored lights
- Batteries
- Dixie cups
- Canvas
- Colored acrylic paints
- Clear Plastic film strips
- Colored sharpie markers
- Pringles can
- Sequins, glitter, plastic pieces
- Kaleido Free app
- Colored paper
- Glass prism
- Dichroic glass cubes

Vocabulary

- **Wave length** is the distance between successive crests of electromagnetic wave.
- **Dichroic** is a layered crystal showing different colors when viewed from different directions.
- **Density** is a degree of consistency measured by the quantity of mass per unit volume.
- **Color** is the property of an object that produces different sensations on the eye as a result of the way the object reflects light.
- **Light is energy!** Light is the natural agent that stimulates sight and makes things visible.
- **Refraction** is the phenomenon of light, radio waves, etc., being deflected in passing through the interface between one medium or through a medium of varying density.
- **Reflection** is the throwing of surface light without absorbing it.
- **Installation** is a large piece of art constructed outside or inside.
Appendix 1 - Implementing District Standards

Science Essential Standards

4.P.3 Recognize that energy takes various forms that may be grouped based on their interaction with matter.

4.P.3.1 Recognize the basic forms of energy (light, sound, heat, electrical, and magnetic) as the ability to cause motion or create change.
4.P.3.2 Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed.

Visual Arts Essential Standards

4.CX.2.2 Apply skills and concepts learned in other disciplines, such as math, science, language arts, social studies and other arts, in the visual arts.

4.CX.2 Understand the interdisciplinary connections and life applications of the visual arts.

4. CX2.3 Understand individual roles, while applying collaborative skills in creating art.
Bibliography

This is a student magazine focusing on the colored glass work of artist, Dale Chihuly.

This is a student and teacher magazine focusing on mixing primary colors.

Jobson, Christopher. "Soo Sunny Park's Unwoven Light Documented by Walley Films."
A website reviewing Soo Sunny Park’s large installation Unwoven Light.

This is a website focusing on the science behind light, waves, and color.

This is a website defining what is light and how it can be manipulated.

Phil. Trans. 1671 6, 3075-3087, published 1 January 1671.
http://intl-rstl.royalsocietypublishing.org

A children’s book about a girl painting a sky for a class mural and she can’t find the color she needs to complete it.

This is an informational text on artists, art movements, and art history.

This is Jack Storm’s website which has his biography and collection of his glass sculptors.

A website for understanding the technique of liquid pours a popular art technique used on canvases.

https://www.soosunnypark.com/unwoven-light. This is a website that lends biographical information on large installation artist, Soo Sunny Park.
End Notes


3 Phil. Trans. 1671 6, 3075-3087, published 1 January 1671.


6 Storms, Jack [https://jackstorms.com/](https://jackstorms.com/)