

Absorbing and Reflecting Light

Materials: construction paper (1 black, 1 red, 2 white), dark room, flashlight, someone to help you

Light contains all the colors of the rainbow and every color in between! Remember how a rainbow appears after a thunderstorm? How about when you look directly at a candle flame, it looks mostly white. When you look at the light coming from a normal light bulb, it looks white. When you look at the sun high in the sky, the light looks white. However, white light is actually a mixture of many colors that is proven by that wonderful rainbow reflecting colors through water droplets. We just can't always see all the colors with our eyes!

Here is a really easy way for you to remember all seven of those rainbow colors as well as the order they appear. Just think of a man called "Mr. White Light." His real name? It's Roy G. Biv. Odd name but look at what it tells you: "R" is for red; "o" is for orange; "y" is for yellow; "G" is for green; "B" is for blue; "i" is for indigo; and "v" is for violet. Mr. White Light's odd name can remind you of all the colors in the rainbow as well as the order in which they appear, starting at the top of the rainbow and moving to the bottom.

Now let's look at an activity about **absorbing** and **reflecting** light.

Instructions:

1. Take the materials in the dark room and turn on the flashlight.
2. Close the door so the only light in the room comes from the flashlight.
3. Have your helper stand near you holding one piece of white construction paper.
4. Hold the flashlight so it is level with the piece of construction paper your helper is holding and shine it away from the paper.
5. Look at the paper. You can probably see it because some of the light from the flashlight reflects off the walls of the room, then reflects off the paper, and then ends up hitting your eyes.
6. Hold up the other sheet of white construction paper so it is level with your helper's sheet of paper and the flashlight shines on it.
7. Look at the paper your helper is holding. You should see it much more clearly now.
8. Put down the white piece of paper you are holding and pick up the black piece of paper. Hold it in the same way, so it is level with the white piece of paper your helper is holding and the flashlight shines on it.
9. Look at your helper's piece of paper. Can you see it very well? Probably not.
10. Put down the black piece of paper and now use the red paper in the same way. When the flashlight shines on the red paper, what does your helper's paper look like?

What happened in the experiment?

When you shone the flashlight on the white piece of paper, you saw your helper's paper more clearly because the light from the flashlight reflected off the paper you were holding and onto the paper your helper was holding.

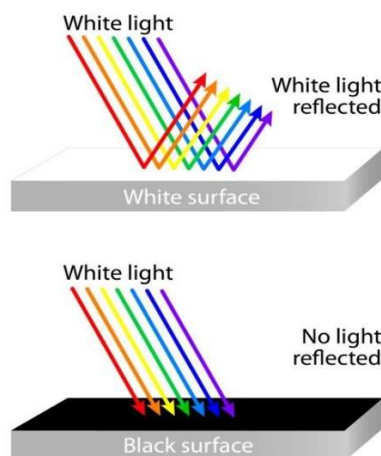
When you shone the flashlight on the red piece of paper, your helper's white paper should have looked red or at least reddish. That's because the red paper was reflecting light but only red light. Remember, the white light coming from the flashlight has all the colors of the rainbow in it. However, the red paper didn't reflect all those colors, it only reflected red. That's why the paper looks red. When white light hits red paper, the paper doesn't reflect blue, yellow, or green – just red.

What does that tell you about how we see color in objects? It is because colored objects reflect only one type of light. A red object reflects only the red light that hits it. A blue object reflects only the blue light that hits it. Now, wait a minute...

What happened to the other colors? After all, we know white light is really a mixture of all the colors of the rainbow. Well, think about what happened when you used the black paper. Were you able to see your helper's paper? Probably not very well. That's because the black paper didn't reflect any light. Instead, it absorbed all the colors. In other words, all of the light got "sucked up" by the black paper. It went into the paper and stopped; it didn't reflect. As a result, there was no light directed to your helper's paper, and you couldn't see it very well.

Conclusion: When white light hits an object, all the light might be reflected (making the object white) or all the light might be absorbed (making the object black). In addition, certain colors of light might be reflected while other colors are absorbed.

How do we see color? If we see an object as green, it is because the object absorbs all colors of light except green. When white light shines on it, only the green light reflects off it to hit our eyes. Since we see only green light, the object looks green. Black is what we see when an object reflects no light. White is what we see when an object reflects all the colors of the rainbow at once.



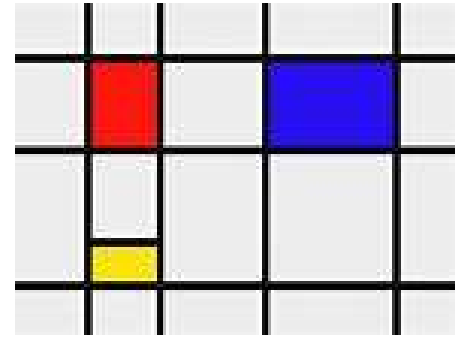
Mondrian's Art

Materials: construction paper (black, blue, red, white, yellow), glue, internet access

You can use the paper from the light project to make a reproduction of Piet Mondrian's art style. Mondrian avoided painting the real world using only the primary colors (red, blue, and yellow), the primary values (black, white, and grey), and the primary directions (horizontal and vertical). Piet Mondrian created abstract paintings through which he sought to reveal universal harmony and order.

Instructions:

1. Cut the black paper into strips, use the colored paper for rectangular shapes. Just start designing!
2. No colored paper? How about using colored pens, pencils, or markers. Got some Legos®? – That works!
3. Decide on the size of your canvas.
4. Throw on a scarf and beret and start creating!
5. Don't forget a flourishing signature and date.



Virtual Activity: Museum Tour

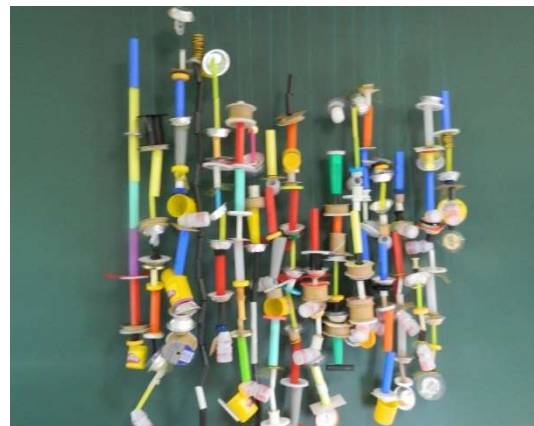
Materials: internet access

Instructions:

Take a virtual tour of the MoMA Museum of Modern Art.

<https://artsandculture.google.com/exhibit/sophie-taeuber-arp/swKioHhYqZoLw?hl=en>

Use some stuff (just some bits of odds and ends) and create some sculptures or designs of your own. Share your art by posting to friends or taking pictures of your creative process!



Make It Up or Look It Up!

Materials: internet access, markers, paper, pencils

Make it up or look it up

A choice, it is for you

Some may be facts, some not so much

Show everyone what you can do!



Instructions:

Here is a question topic to get you started and an example of the activity.

Where did emojis originate?

Make It Up answer: Aliens from space are trying to communicate, but they have no alphabet.

Look It Up answer: Emojis were first used in Japan and originally meant pictograph, with the first one showing up in 1998 or 1999. They were invented by Shigetaka Kurita, and the word, emoji, literally means picture(e) and character (moji). Hence, emoji! While they were originally only available in Japan, they quickly spread worldwide. **Why do you think this is?**

1. Now that you see how this activity goes – get going on these questions!
2. Set up your paper with the question at the top and your **Make It Up Answer** and your **Look It Up Answer** below.
3. Here are some question topics to get you started but you can create some of your own.

What makes a four-leaf clover lucky?

What makes glue sticky?

Why do snakes shed their skin?

What is a red herring?

Why are school busses yellow?

Why do we have leap years?

Why does water run downhill and not up?

Why isn't Pluto a planet anymore...or is it?

Why do we have eyebrows?

Why is the ocean salty?

Why do cats purr?

Some questions are courtesy of: <https://mysteryscience.com>

If writing is not your thing, draw some pictures to illustrate your answers. How about a rebus story?

What is a rebus story?!! **Look It Up**

Communicating without Words

Materials: markers, paper, pencils, pens

Instructions:

1. Here's a challenge question for you: How would you communicate without the written word?

No text, no sticky notes, no books, no words!

2. Here is a list of methods that could be used. It's your challenge to write and illustrate how they could be used.

Flags: Draw some flags that make a message. TIP: Think of lifeguards on a beach or railway crossings.

Semaphore: A system of sending messages using your arms, flags, or poles according to an alphabetic code.



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Message in a bottle: Where to put it? How do you get it from your house to another place in your neighborhood, town, country?



Singing or yodeling: Make up some yodeling tunes and call a friend to try out your skills! Curious about yodeling? Look it up!



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Hand Signals: What could your hands say if they could talk? TIP: Think of Helen Keller



Body Language: Can we communicate moods and emotions this way? Create some stick figures.



Morse Code: Who invented the code and how was it used? Send a message by making a sign and posting it on a door.

A •—	J •— —	S •••
B —•••	K —•—	T —
C —•—•	L •—••	U ••—
D —••	M —	V •••—
E •	N —•	W •—•
F ••—•	O — — —	X —••—
G —••	P —•—•	Y —•—•
H ••••	Q —•—•	Z —•••
I ••	R —•—	

Just Imagine Game

Materials: drawing supplies, index cards or small slips of paper (20), paper, pen or pencil

Instructions:

1. Divide the index cards/paper slips into 4 stacks of 5 cards each.
2. On the first stack, write the word **Feelings** on each card.
3. Repeat for the remaining 3 stacks, writing the words: **Character**, **Setting**, and **Condition**.
4. Turn the cards over. In the first stack, write a word that falls into the category of feelings on each card. Write a different feeling on each card.
5. Repeat for the remaining three stacks, but write different characters settings or conditions on the appropriate stack (depending on what stack you're marking).

Here are some ideas:

Feelings: happy, sad, lonely, excited, peaceful, stressed

Settings: somewhere in space, a castle, a zoo, on an island, in an airplane

Conditions: rainy, windy, sunny, full moon, sunset

6. To play the game, shuffle the stacks separately, then select one card from each stack.
7. Close your eyes and imagine a scene that your cards describe. Draw a picture that illustrates your set of words.
8. Return your cards to the proper stacks and give someone else a turn. If playing alone, draw again.

Bits and Pieces of Streaks and Strokes: Impressionism

Materials: cotton swabs, old magazines, paints (or markers), scissors

Preparation: Set up an **atelier** (a workshop or studio usually used by an artist or designer). This activity is called **Impression Me** after the most famous Impressionistic painter, Claude Monet. Use the below link to look closely at Monet's paintings and see they are made of many short unblended strokes of color. This style is called Impressionism.

<https://www.smithsonianmag.com/smart-news/step-claude-monets-world-immersive-vr-exploration-water-lilies-180970820/>

This is a famous quote by Claude Monet: "When you paint, try to forget what objects you have before you, a tree, a house, a field, or whatever. Instead think: Here is a little square of blue, here an oblong of pink, here a streak of yellow, and paint it just as it looks".

Instructions:

1. Cut out a photograph of a landscape from magazine. (Or look one up on the internet.)
2. Look closely at it. Notice how a solid color is really a combination of colors. Examples: White clouds also have purple, gray, and yellow. A blue lake may have many hues of blue, green, and purple. If the sun is setting you may see pink reflected in the water. Zoom in here to see:
https://artsandculture.google.com/asset/poplars-on-the-epte-claude-monet/tAF_YbFvVeIS9Q
3. Dip a cotton swab into one paint color. Add color to the photo by making bold, short strokes.
4. Use a clean swab for each color. Be careful not to blend the colors.
5. Continue until the entire picture is painted/marked in short, separate splashes of color.
6. Think of a catchy title for your picture starting with: **IMPRESSION** _____



Paper Bag Portraits - From Scraps to Treasures

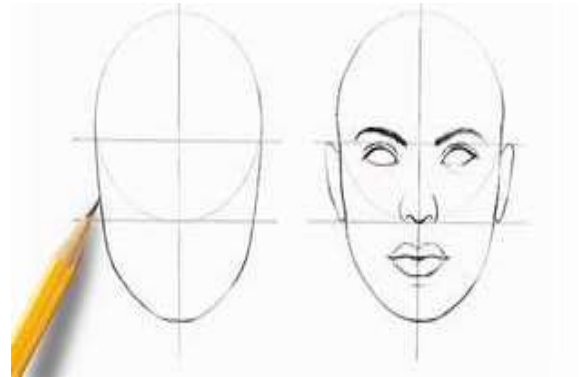
Materials: brown paper bag, cloth scraps, junk jewelry, markers, ruler, yarn

Preparation: Go to your atelier. Remember what that is? (It's French for workshop or studio.)

Instructions:

Drawing faces is challenging! Facial features need to be in proportion and centered. It's easier to draw a recognizable face if you know a few tricks!

1. Draw a large oval on the closed, flattened paper bag.
2. Draw a line dividing the oval in half so there is a top and a bottom.
3. Draw a line halfway between the line from step 2 and the bottom of the oval.
4. Draw a line halfway between the line you drew in step 3 and the bottom of the oval.
5. Draw a line going up and down, dividing the oval in half, so there is a left and a right half.
6. Using the lines as a guide, draw eyes, nose, and mouth in their correct places.
7. Each eye should be halfway between the center guide and the side of the oval. The mouth is as wide as the distance from the center of each eye. The nose is centered.
8. Add hair, ears, and other details you like. Glue some cloth scraps or yarn for some color interest - some people really like purple hair!



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Now that you know the tips and tricks of drawing faces, get creative with your brown bag art!



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***The One and Only Ivan* by K.A. Applegate**

Materials: internet access, link: <https://youtu.be/h6oi3PZc2ko>

Instructions:

The One and Only Ivan is a school age novel written by K. A. Applegate and illustrated by Patricia Castelao. The book is about a silverback gorilla named Ivan who lived in a cage at a mall. The novel is written in first person from the point of view of Ivan, the gorilla.

For a shorter (K-2) version, try this read-aloud. <https://youtu.be/FAtdZhK2yO4>

Try writing a **haiku** about Ivan. A haiku is traditionally a Japanese poem consisting of three short lines that do not rhyme and evoke a feeling or have meaning. Try writing a haiku about another book you like. Here's an example that might get the creative juices going:

Only Ivan

Ivan is a gorilla
stuck at the mall
now that's just plain wrong!



Virtual Activity: Census 2020

Materials: internet access

Instructions:

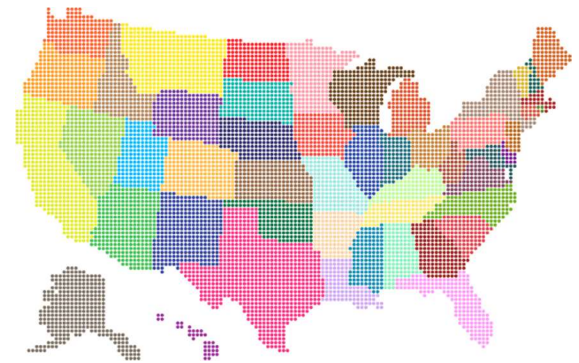
Take a virtual field trip to learn all about the Census 2020:

<https://www.census.gov/programs-surveys/sis/2020census/sisweek/thursday.html>

Now that you have taken the Census 2020 virtual field trip, you can discuss the information with your family. Ask them if they have filled out the survey for your household. If they haven't, maybe you can help them. If they have, talk about the information they shared for your family.

Discussion Questions:

- How often is the Census done?
- What is the purpose of the Census?
- What types of resources receive funding based on the census?



Make It Count!

Materials: paper, pencil

Instructions:

Start by choosing three (or more!) things in your house to count. i.e. shoes, pillows, chairs, doorknobs, cups etc. Make sure you think of all the places the items you choose could be kept in your house. Once you are sure you have counted each item and written them down, answer these questions:

Which item did you count the most?

Which item did you count the least?

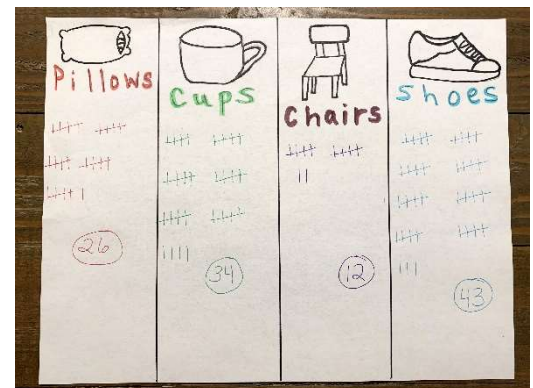
Which item do you think your family uses the most?

Some additional math for your findings:

I found more _____ than _____ I found less _____ than _____
The difference is : The difference is:

Example: I found more **shoes** than **pillows**: 43 shoes – 26 pillows = 17

The difference between shoes and pillows is 17.



City Planning

Materials: colored pencils, crayons, large paper, markers, pencil, ruler/tape measure

Preparation: Clear a large space to work on your project.

Instructions:

You are going to design and plan a city of your own! First, you will answer these questions about your city:

- What will your city be called?
- How many people live in your city?
- How many are adults and how many are children?

Ex: *If you have 100,000 people in your city then you could say 65,000 are adults and 35,000 are children.*

- How many are male and how many are female?

Ex: *If you have 100,000 people in your city then you could say 48,530 are male and 51,470 are female.*

Based on the number of people in your city, include community resources in your plan, ex: schools, city hall, hospital, police station, fire station, recycling center, the local dump, doctor's office, library, grocery store, park/sports fields, dentist, pet store, gas station, toy store, ice cream shop, restaurants etc. Don't forget to add roads, traffic lights, and road signs throughout your city for people to get around! You can also think about whether your city will have public transportation: buses, taxis, trains etc.

Next, you will plan for your city. Remember to check back to your population for accurate planning:

Based on the number of children in your population:

- How many schools do you think you need?
- How many toy stores?

Based on your total population:

- How many restaurants do you think you need?
- How many gas stations?

These are just some examples of things to think about in your planning process. Continue to evaluate your city plans based on the population make up that you have!

Lastly, now that you have your plan, begin to draw and bring your city to life. Have fun and build the city of your dreams!



STEAM Career Spotlight: Chef at the White House

Materials: internet access, website (2:51 min):

<https://youtu.be/MBUuFjQC58Q>

Preparation: This activity is best for grades 3-5 but can be modified for K-2nd.

Instructions:

Some information to listen for during the video:

Who is currently the Head Chef at the White House?

What tasks does this person perform? What responsibilities are there?

What is this job like? Can you come up with some strong words that describe it?

How does the chef show respect to important visitors while performing the job?

How did family play an important part of this person's path to a career at the White House?

What job did this person originally want to pursue before becoming a chef? How could the two be interconnected?



Extensions:

Explore the following questions. What other ideas can you come up with?

How much salary does a White House Chef earn? What are some other jobs at the White House that seem interesting? How could you explore this topic?

What is Cristeta Comerford's background?

I Can Be a Chef at the White House

Introduction:

Congratulations! You have been chosen to compete for an exciting job as the Head Chef at the White House! To win this high honor, you will create a gourmet menu based on a visiting foreign leader who will be visiting the White House in one week!

Materials: drawing materials, internet access, paper, pencils

Preparation: This activity is designed for grades 3-5 but can be modified for K-2nd.

Instructions:

You will research countries that have had leaders who have visited the White House, decide which one to focus on, and design a menu for the gourmet meal you will create for him or her. Be sure to include foods that may be growing in the White House garden. The menu should include:

Information about the country of the visiting leader with at least three interesting details.

Names of the dishes you will prepare with at least three courses, ex: appetizer, entrée, desert.

Vivid descriptions of each dish.

Here are a few examples of countries that have had leaders visit the White House: Afghanistan, Brazil, Cambodia, China, Cuba, France, Germany, Iran, Jamaica, Korea, Morocco, Slovakia, Sudan, or Zimbabwe

See this video of a boy who was invited to cook at the White House:

<https://youtu.be/QIXEn9wIHgw>

Here is another way to explore the science of cooking:

<https://www.exploratorium.edu/cooking/>



My Favorite Food: Creating Art Together

Materials: art materials, permanent black marker

Preparation: More than one person is needed.

Instructions:

Use the marker to draw hearts, favorite foods: fruits/vegetables/sweets, and other shapes.

Take turns dipping the paintbrush into the colors and fill in the shapes.

When you feel like it is finished, sign your names.

