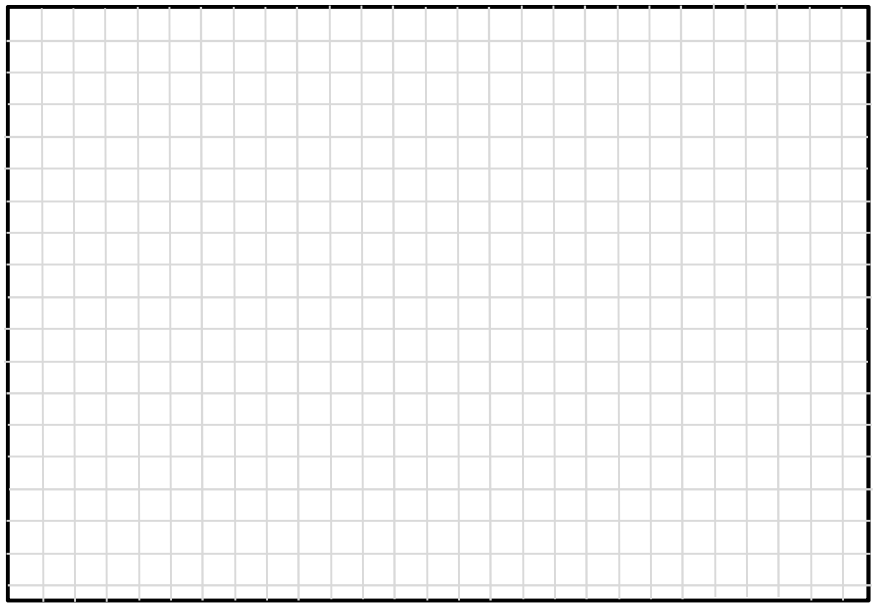
Draw a picture showing how the primary and secondary colors of light are connected to the primary and secondary colors of paint.



I think cyan, yellow, and magenta are the primary colors of paint because _____

_____

_____

_____

_____

_____

_____

_____

_____

Phenomenon

Question

Research investigation

Science story

Teach me more

Primary Colors

_____

Student Name

Notice, Wonder, Learn Journal

I think the primary colors are _____

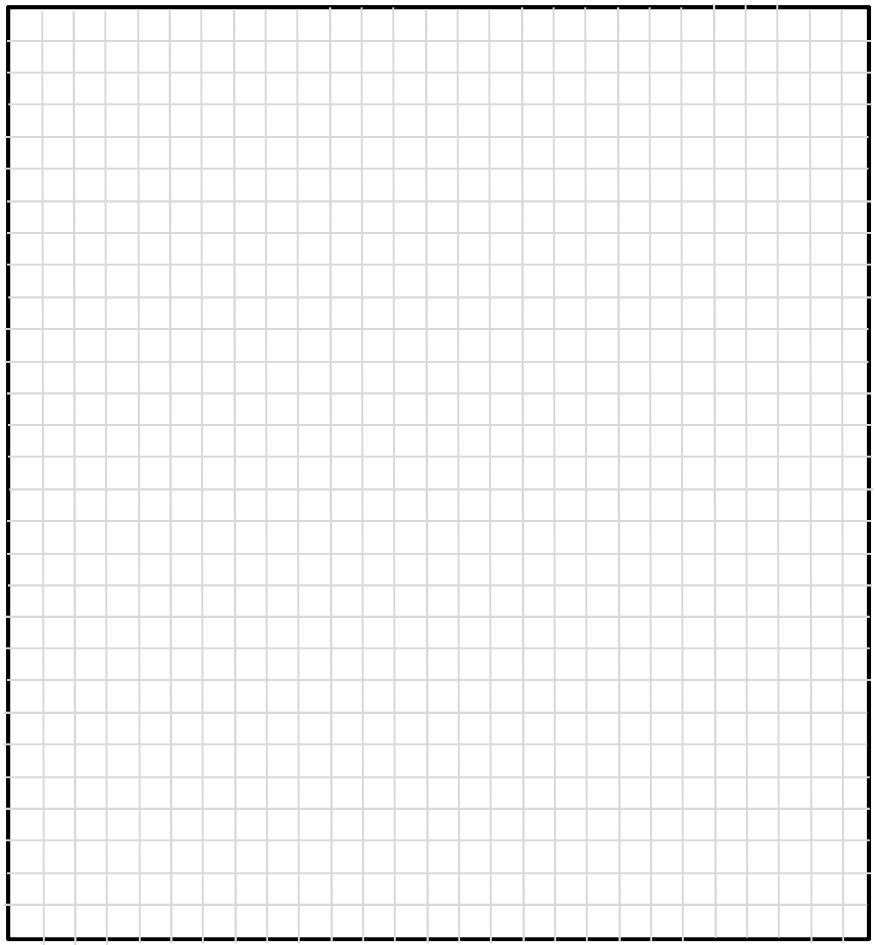
_____

_____

_____

_____.

Draw and label a model of the eye seeing a red apple.



The primary colors of paint are:

_____

_____

_____

The secondary colors of paint =

(Use your best formulas!)

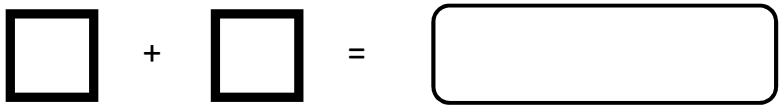
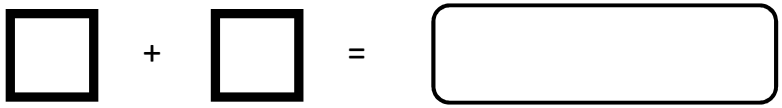
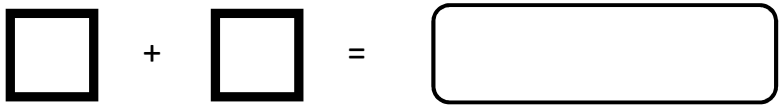
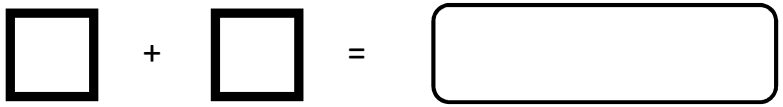
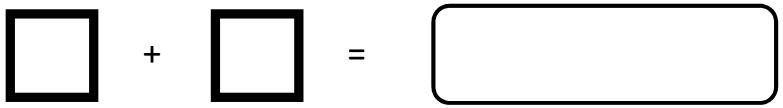
_____ _____ _____

_____ _____ _____

_____ _____ _____

Research Investigation: Mixing Paints

C = cyan, Y = yellow, M = magenta

Cause Color Formula	**Effect** Final Color
____X____ + ____X____ = 	_____
____X____ + ____X____ = 	_____
____X____ + ____X____ = 	_____
____X____ + ____X____ = 	_____
____X____ + ____X____ = 	_____

Apple in the Dark

Imagine you are sitting at a table with a red apple in front of you. Your friend closes the door and turns off all the lights. It is totally dark in the room. There are no windows in the room or cracks around the door. No light can enter the room.

Circle the statement you believe best describes how you would see the apple in the dark:

A. You will not see the red apple, regardless of how long you are in the room.

B. You will see the red apple after your eyes have had time to adjust to the darkness.

C. You will see the apple after your eyes have had time to adjust to the darkness, but you will not see the red color.

Describe your thinking. Provide an explanation for your answer.

_____

_____

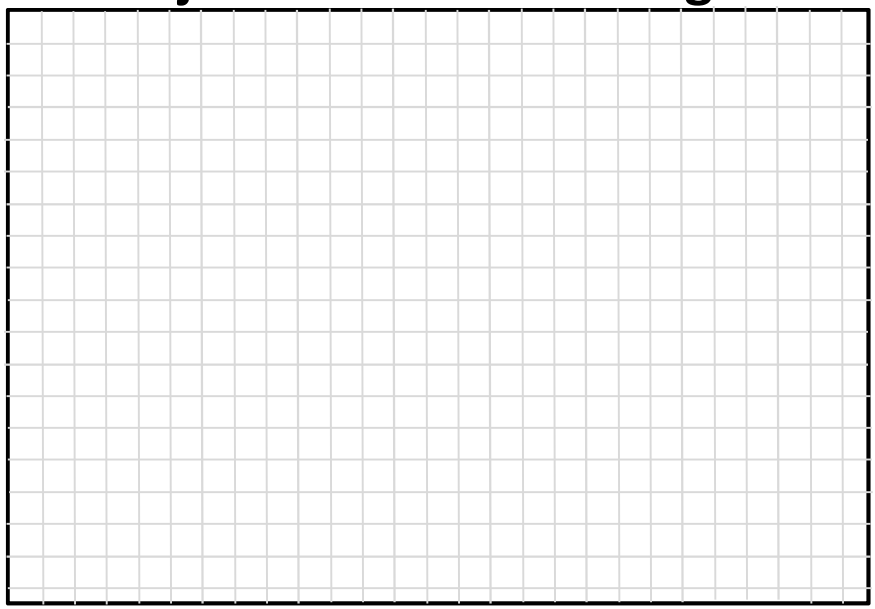
_____

_____

_____

Part 1: Color Addition

Objects Sorted in Red Light



I notice _____

_____

_____

_____.

I notice _____

_____

_____

_____.

Research Investigation: Mixing Paints

C = cyan, Y = yellow, M = magenta

Cause Color Formula	**Effect** Final Color
____X____ + ____X____ = ☐ + ☐ =	_____
____X____ + ____X____ = ☐ + ☐ =	_____
____X____ + ____X____ = ☐ + ☐ =	_____
____X____ + ____X____ = ☐ + ☐ =	_____
____X____ + ____X____ = ☐ + ☐ =	_____

I wonder why…? I wonder if…? I wonder what…?
I wonder how…? I wonder what would happen if…?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder why…? I wonder if…? I wonder what…?
I wonder how…? I wonder what would happen if…?

I wonder _____

_____

_____

_____?

I wonder _____

_____

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_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder why…? I wonder if…? I wonder what…?
I wonder how…? I wonder what would happen if…?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

Rainbow-ish

I notice _____

_____

_____

_____.

I notice _____

_____

_____

_____.

I wonder _____

_____

_____

_____?

I wonder _____

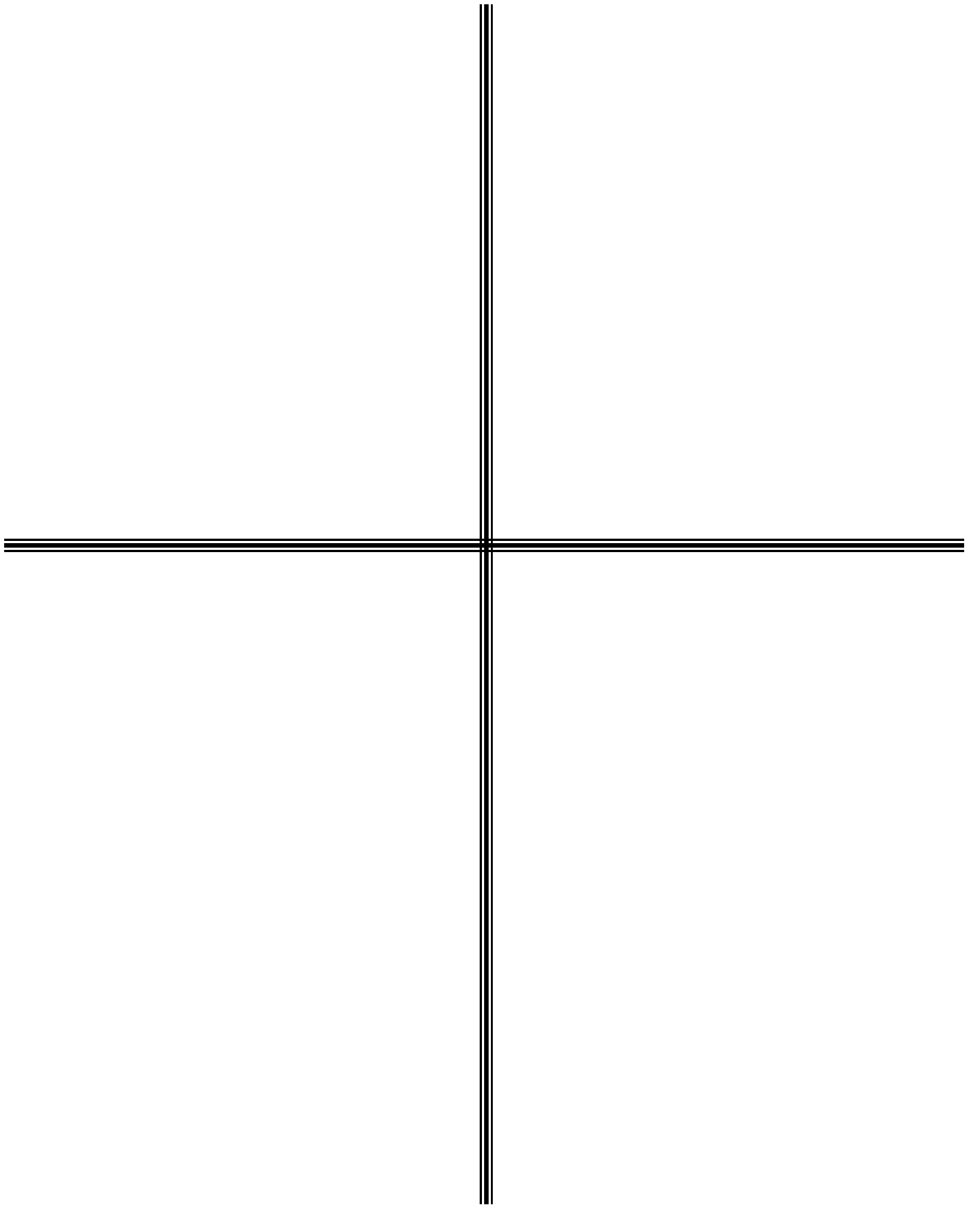
_____

_____

_____?

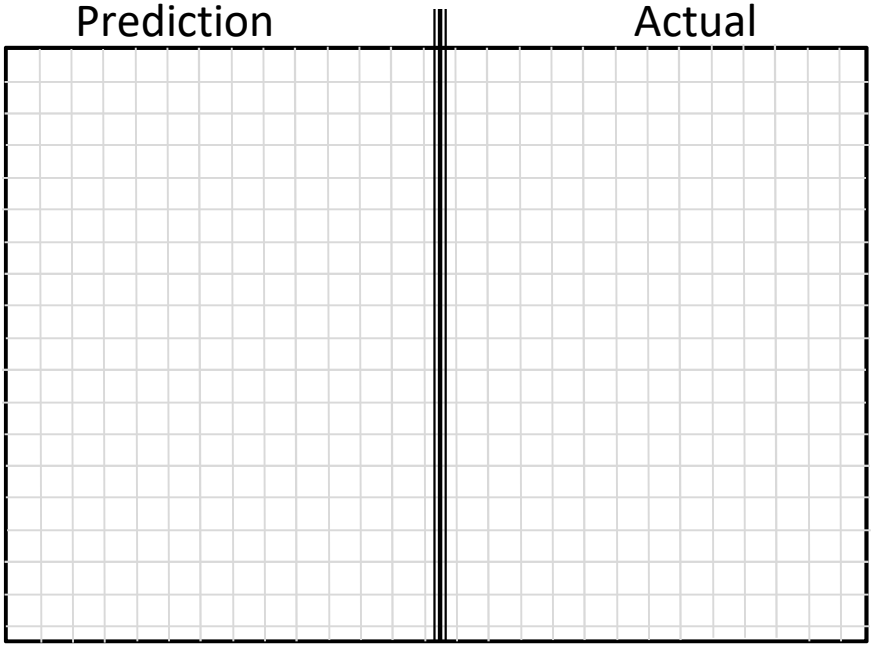
Part 2: Color Subtraction

-ish drawings



Objects Sorted in Blue Light

Prediction | Actual



I notice _____

_____

_____

_____.

I notice _____

_____

_____

_____.

I wonder why…? I wonder if…? I wonder what…?
I wonder how…? I wonder what would happen if…?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

When sorting in red light, I couldn't tell _____ from _____ because _____

_____

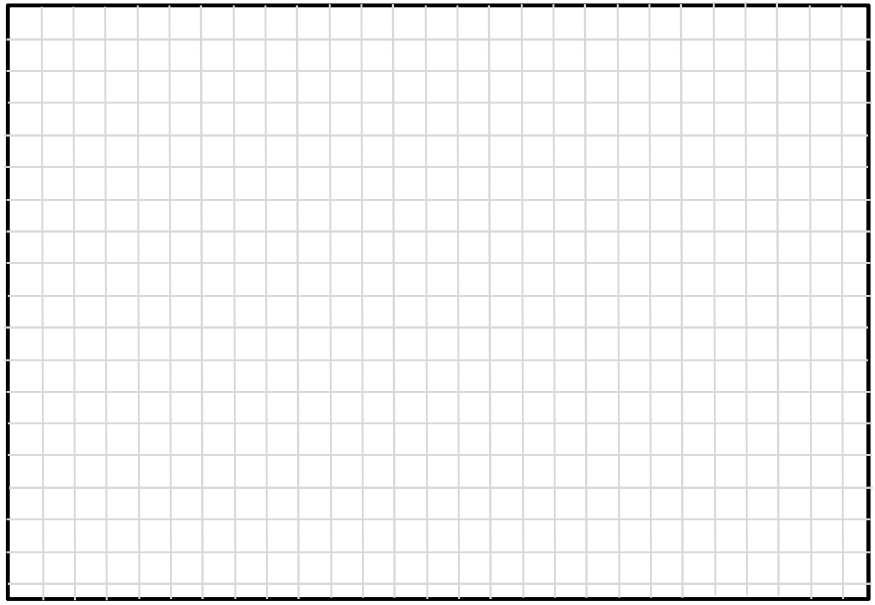
_____.

When sorting in blue light, I couldn't tell _____ from _____ because _____

_____

_____.

Draw and label a model of the eye seeing a red apple.



Apple in the Dark

Imagine you are sitting at a table with a red apple in front of you. Your friend closes the door and turns off all the lights. It is totally dark in the room. There are no windows in the room or cracks around the door. No light can enter the room.

Circle the statement you believe best describes how you would see the apple in the dark:

D. You will not see the red apple, regardless of how long you are in the room.

E. You will see the red apple after your eyes have had time to adjust to the darkness.

F. You will see the apple after your eyes have had time to adjust to the darkness, but you will not see the red color.

Describe your thinking. Provide an explanation for your answer.

_____

_____

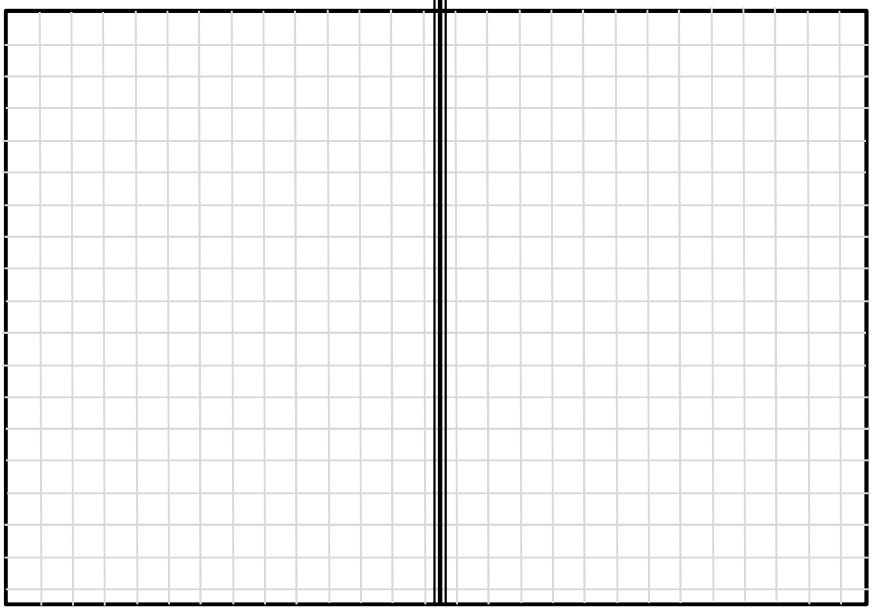
_____

_____

_____

Objects Sorted in _____ Light

Prediction | Actual



I notice _____

_____

_____

_____.

I notice _____

_____

_____

_____.

I wonder why…? I wonder if…? I wonder what…?
I wonder how…? I wonder what would happen if…?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

_____

_____?

I wonder _____

_____

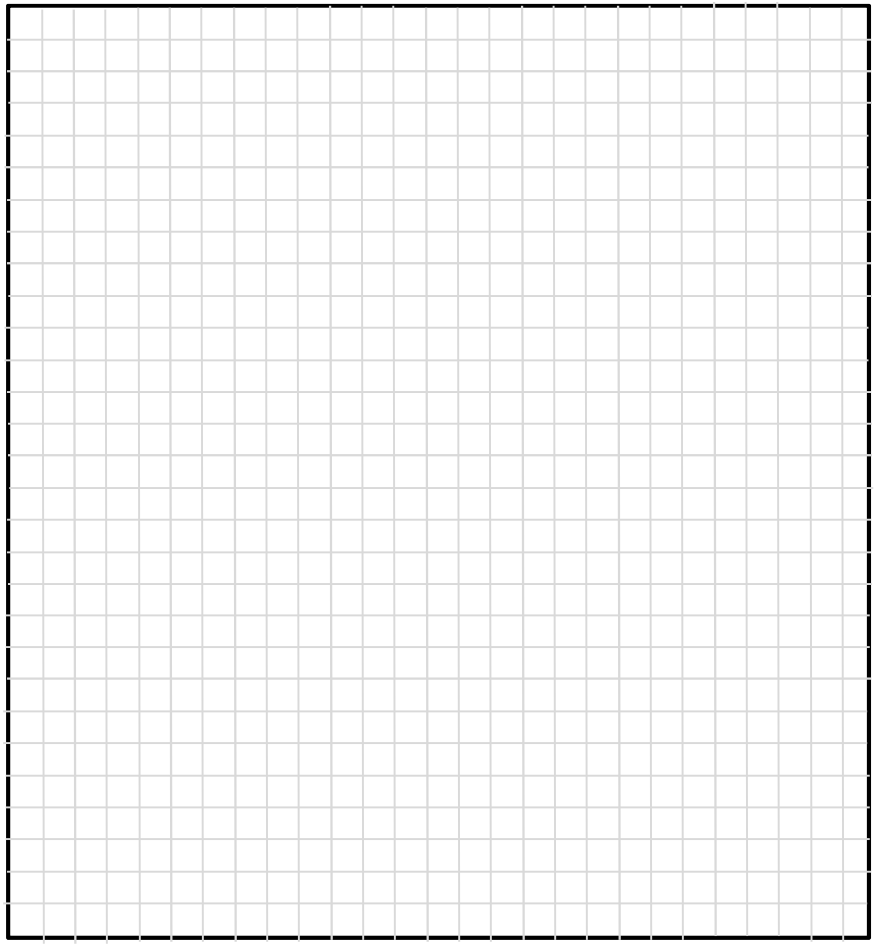
_____

_____?

The primary colors are:

Light	Paint
⇨ _____	❍ _____
⇨ _____	❍ _____
⇨ _____	❍ _____

Draw and label a model of the eye seeing a red apple.



Compare the diagram on page 27 to what you did on page 22.
I notice _____
_____
_____
_____
_____
_____.

I think cyan, yellow, and magenta are the primary colors of paint because _____
_____
_____
_____
_____
_____
_____.

Research Investigation: Mixing Lights

R = red, G = green, B = blue

Cause Combination of Lights and Setup	**Effect** Color Observed
	_____
	_____
	_____
	_____
	_____
	_____
	_____
	_____

Research Investigation: Mixing Lights

R = red, G = green, B = blue

Cause Combination of Lights and Setup	**Effect** Color Observed
	_____
	_____
	_____

I notice _____

_____

_____

_____.

I wonder _____

_____

_____

_____?

Look at the diagram on page 27 and write down what you notice.

I notice _____

_____

_____.

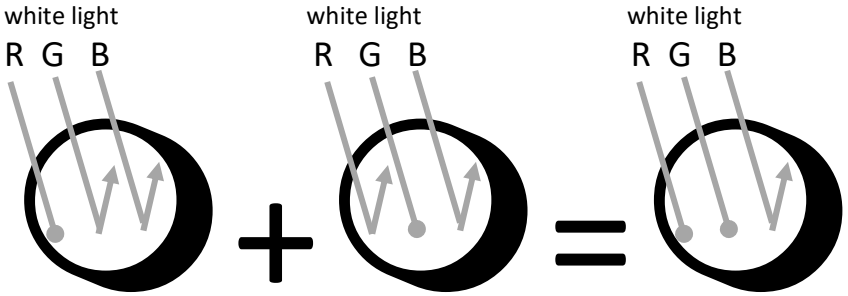
If you mix yellow and magenta paint, the **yellow absorbs** _____ light from the white light and the **magenta absorbs** _____ light from the white light. The only color left from the original white light is _____ light. So, when you mix yellow paint with magenta paint, the resulting color is _____ paint.

If you mix yellow and cyan paint, the **yellow absorbs** _____ light from the white light and the **cyan absorbs** _____ light from the white light. The only color left from the original white light is _____ light. So, when you mix yellow paint with cyan paint, the resulting color is _____ paint.

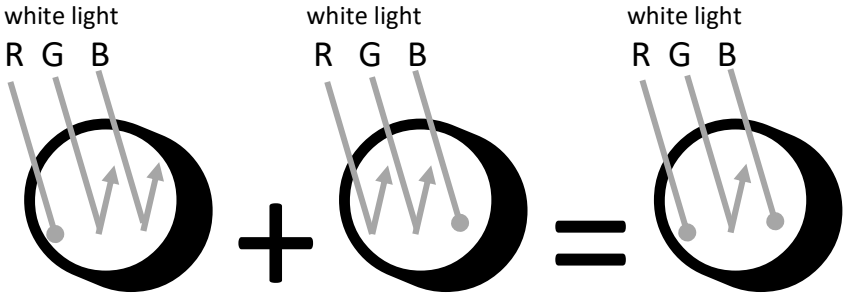
If you mix magenta and cyan paint, the **magenta absorbs** _____ light from the white light and the **cyan absorbs** _____ light from the white light. The only color left from the original white light is _____ light. So, when you mix magenta paint with cyan paint, the resulting color is _____ paint.

Color Subtraction with Paint

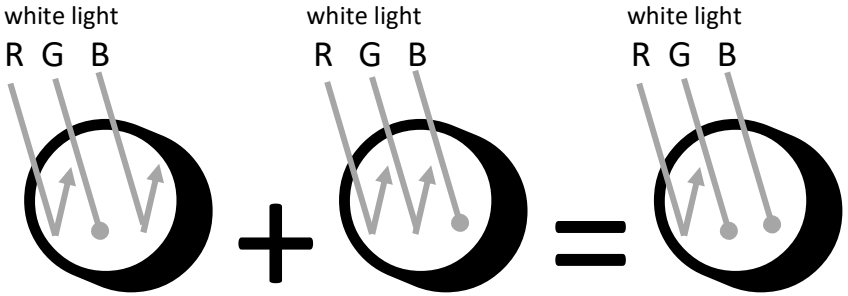
(Remember, white light can be simplified to red (R), green (G), and blue (B) light based on how the human eye works.)



cyan + magenta = _____



cyan + yellow = _____



magenta + yellow = _____

Research Investigation

Materials List

_____ _____

_____ _____

_____ _____

_____ _____

Draw and label a diagram of the investigation setup.

Color Addition with Light

Which lights (red, green, and/or blue) did you use to create these colors on the reflection box?

___ Black = _____ light

___ Red = _____ light

___ Blue = _____ light

___ Green = _____ light

___ Cyan = _____ lights

___ Yellow = _____ lights

___ Magenta = _____ lights

___ White = _____ lights

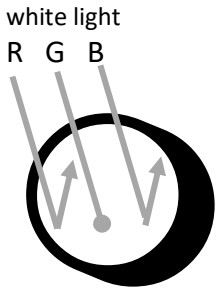
Place 1st next to the THREE primary colors of light.

Place 2nd next to the THREE secondary colors of light.

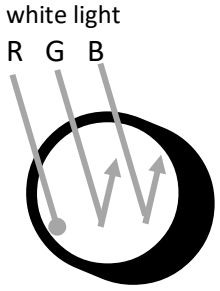
The Primary Colors of Paint and Their **Minus Names**

Watch the MinutePhysics Video: http://bit.ly/MinusGreen

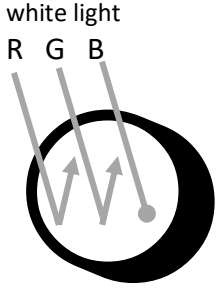
Each primary color of paint (cyan, yellow, and magenta) absorbs just one color of light from white light. Do you see the pattern for figuring out what the Minus Name is for each primary color?



magenta = minus _____



cyan = minus _____



yellow = minus _____

From The Reading

How many colors does the visible spectrum, and therefore rainbows, really have?

_____

Because cones in your eye are sensitive to three colors, instead of thinking of white light as all the colors in the spectrum, we can think of it as just being _____, _____, and _____ light added together.

The primary colors of LIGHT are _____, _____, and _____.

The primary colors of paints are _____, _____, and _____.

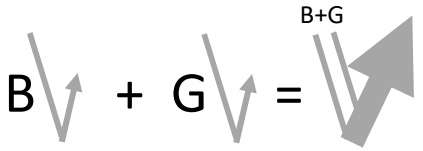
The primary colors of light are:

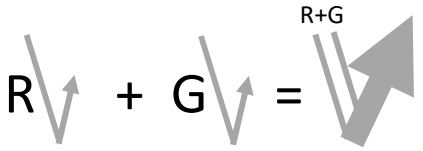
⇨ _____

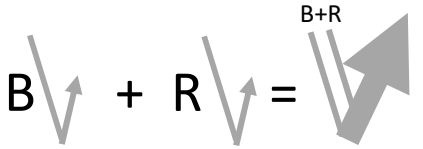
⇨ _____

⇨ _____

In a completely dark room, a white screen will appear the same color as the primary light source shining on it. When primary colors of light are combined in pairs of two, the screen will appear to be one of the secondary colors of light.







The secondary colors of light are:

⇨ _____

⇨ _____

⇨ _____

PhET Color Vision Simulation

(http://bit.ly/PHETcolorvision)

Double click on the RGB Bulbs. Then, play to learn.

Investigate how this simulation confirms what you observed with your RGB light show with the LEDs.

I notice _____

_____

_____

_____

_____

_____.

Investigate how this simulation is different from the RGB light show with the LEDs. What can this simulation do that your light show could not do?

I notice _____

_____

_____

_____

_____

_____.

From The Reading

Cyan paint reflects _____ and _____ light.
Cyan paint absorbs _____ light.

Yellow paint reflects _____ and _____ light.
Yellow paint absorbs _____ light.

Magenta paint reflects _____ and _____ light.
Magenta paint absorbs _____ light.