LESSON 5:
SECRET ANAGLYPH MESSAGE

Students will understand how the brain interprets colors in order to create their own secret spy messages.

SUPPLIES

FOLDER

- 15 Sheets White Paper
  - (please cut in half, 1-2 per student)
- 15 Sheets of Grid Paper
  - (please cut in half, 1-2 per student)

PENCIL BOX

- Markers
- Pencils

GADGET BOX

- Red transparent paper (15)

REMEMBER

Some supplies (like tape) may need to be replenished if it's late in the semester or you share your bin with another teacher!

MEET SPECIAL AGENT

VISOR

Specialty: Excellent vision and deduction

Agent Visor possesses extraordinary visual capabilities, including enhanced vision and optics. With their exceptional eyesight, Agent Visor can see with remarkable clarity, even in low-light conditions. He has the ability to detect microscopic details, see through disguises, and analyze the tiniest visual clues that others might miss. Let's learn some of her skills

OBJECTIVES

- [x] To explain how we see color
- [x] To explore how colored filters absorb and reflect light waves to change our perception of colors

HOOK

3-5 min

- Give students a piece of transparent red paper each. Have them hold it over their eyes and look around the room. What do they see?
- Is there anything that looks much different using the red filter?
- How are the other colors altered?
- Today, we will learn more about our eye sight and about enhanced vision skills from Agent Luminary

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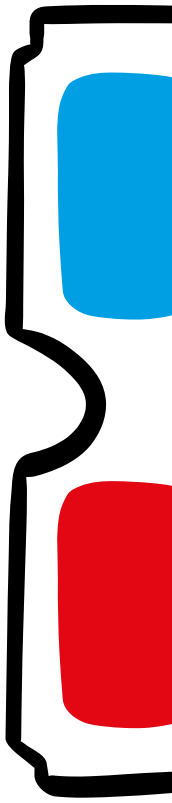
DISCUSSION

5 min

Let's explore the fascinating world of color and how spies can use it to send secret messages. To start, let's think about how we see colors. Can anyone share their thoughts on how we perceive different colors? [Engage students in a brief discussion, allowing them to share their ideas.]

That's right! Colors come from light. Light waves are made up of different colors. In fact, when we see white light, it's actually a combination of all the colors of light waves mixed together. When this white light hits an object, something interesting happens. Most of the light waves are absorbed by the object, but some are reflected back to our eyes.

Let's imagine a brown table. When light hits it, the brown light waves are reflected, and the other light waves are absorbed. Our eyes see these reflected light waves and send the information to our brain, which helps us interpret the colors we see. That's why we perceive the table as brown.



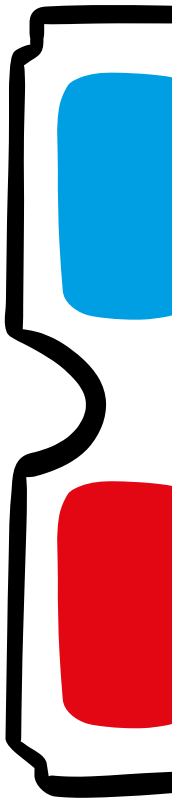
SPIES AND SECRET MESSAGES

Now, let's imagine how spies can use colors to send secret messages. How do you think colors could be used in secret communication? Take a moment to think about it, and then we'll discuss your ideas.[Engage students in a discussion]

ANAGLYPHS

Spies can indeed use colors to send secret messages. One technique they use is called anaglyphs. Anaglyphs are special images that contain hidden messages. They work by applying the principles of light to hide the message within the image.

By understanding how light interacts with different colors and using clever techniques like anaglyphs, spies can communicate covertly, ensuring that their messages remain hidden from prying eyes. Let's learn more by creating examples of this and applying our knowledge!



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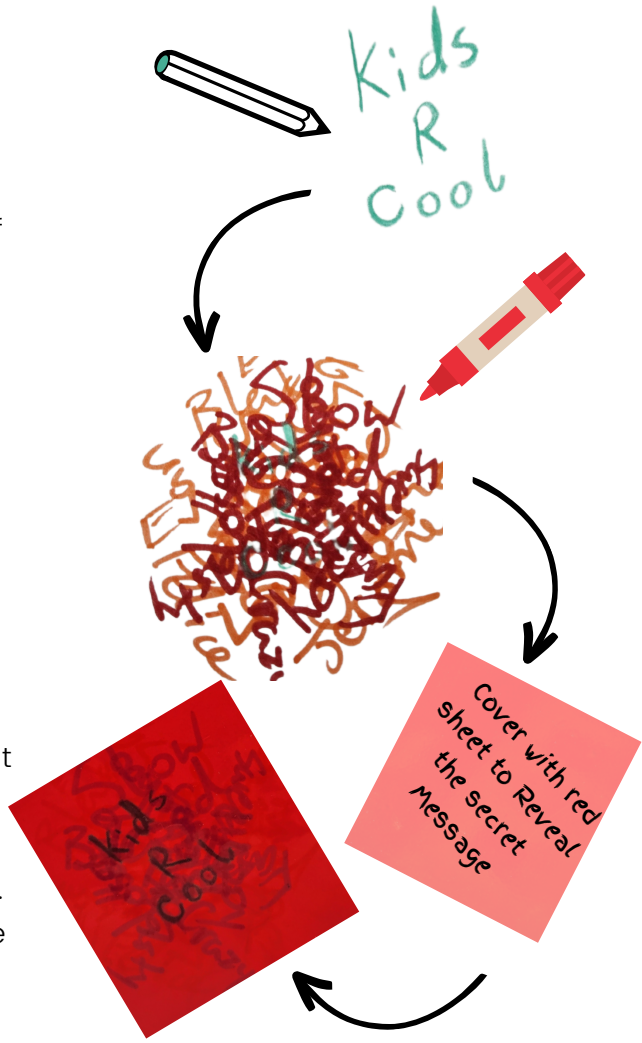
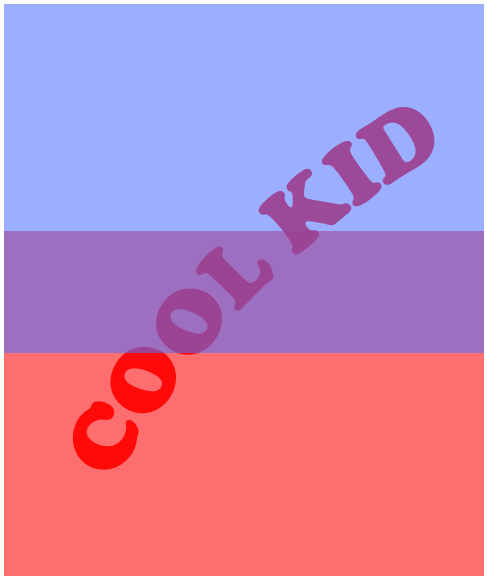
LESSON 5: ANAGLYPH MESSAGES

ACTIVITY PART 1

10-15 min

1. Give each student a white sheet of paper and a BLUE pencil. Have students write a secret message in the colored pencil, on the center of the page.
2. Then, have students create a design of doodles on top of the message using the RED marker.
   - Encourage students to think how they could make this even more secretive by disguising the message in a picture of something, like a red apple or a red heart outline with doodles on the inside.
   - Write a whole bunch of words in the red colors
3. Once students have completed their pictures, have them swap pages with a partner. Ask the students to try and decipher their partner's secret message.
   - If they can, the original artist needs to add more doodles.
4. If the partner can not read the message, tell students that they have achieved their spy goal of writing a secret message!
5. Now, give each student a piece of red transparent paper.
6. Have them lay the red paper over top of the drawing. The secret message should now be visible to everyone.





OBSERVATION & EXPLANATION

5 min

Ask students to explain what happened when the red paper was laid over the top of the drawing. The message was now visible.

Explain that the original image, without the red paper, was on white paper in white light. The light reflected the red and absorbed the other colors. When the red transparent paper was laid on top of the picture, the red transparent paper absorbed the red light waves. Therefore, the marks you made with your red marker were absorbed, and the light waves only reflected back the blue pencil. This allowed your brain to only see the blue color (which now looked darker) and send the message to your brain to read the message.

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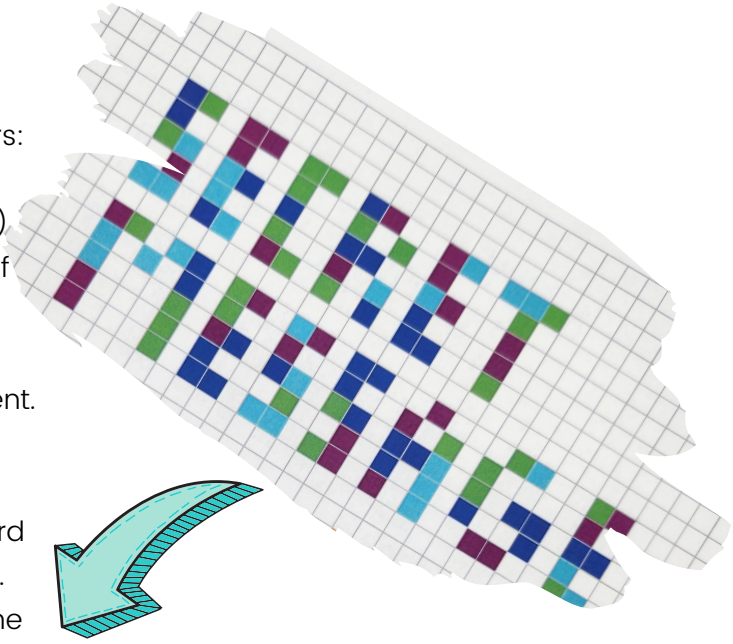
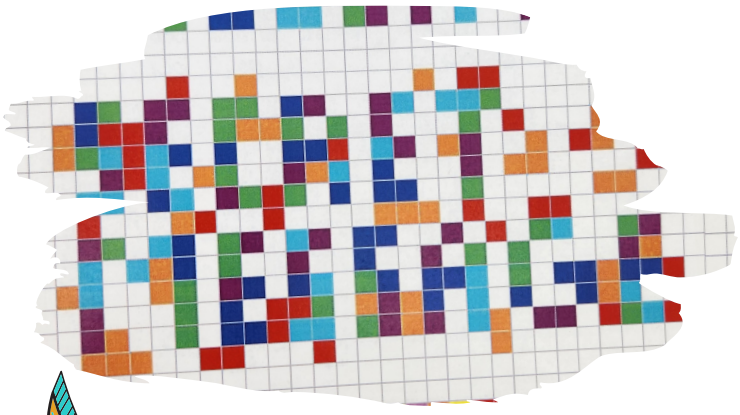
LESSON 5: ANAGLYPH MESSAGES

ACTIVITY PART 2

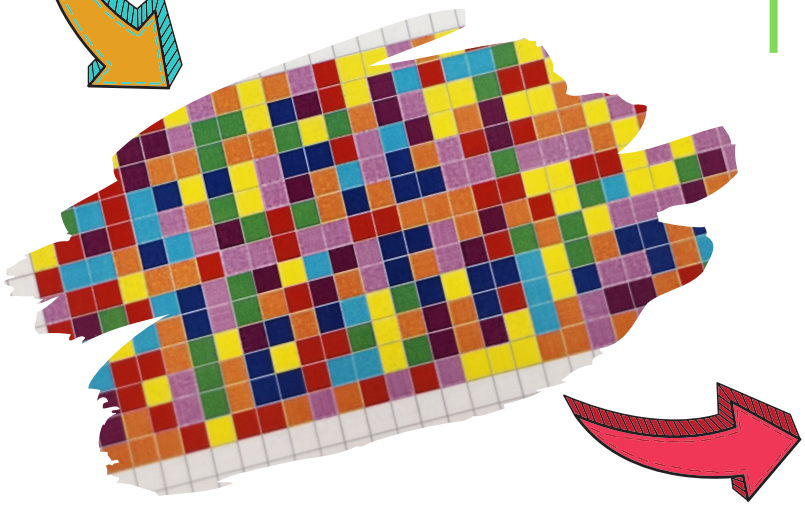
15-20 min

1. Separate the students into groups of 3-4
2. Each table will need a set of these marker colors:
   a. Blue or Green or Purple (Blue tinted)
   b. Red or Orange or Yellow or Pink (Red tinted)
3. This works best if you have 2 of at least some of these colors, so that students don't fight over colors
4. Pass out 1-2 sheets of grid paper to each student.
5. Instruct the students to only use the Blue tinted markers for this first part.
6. They will color in one box a time to create a word or picture they wish to be their hidden message.
   - If it needs to be simpler they can use just one Blue tinted color, but this will make the message too noticeable





1. Now we are going to only use the Red tinted markers to fill in the box spaces surrounding the hidden message
2. Remember, the more colors you use in random patterns, the more hidden the message will be.
   - refer to example for ideas
3. Once all of the message has been hidden, ask the students to swap their pages with their group mates to see if they can see the hidden message.
   - It is okay for them to swap with other groups.
4. The students can then use their transparent red sheets over their designs to reveal their messages!
5. They can repeat this process to make new messages or pictures as many times as they'd like!



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CONCLUSION

5-7 min

Ask students to explain, based on the activity, how anaglyph messages work. Compete Exit Ticket Activity.

Instruct students to clean their stations. Make sure to leave the classroom the way you found it.

Exit Ticket

Ask each student one of the following questions as they walk out the door.

- How do we see color?
  - Light waves are absorbed and reflected on objects. Our eyes see the reflected light waves and our brain interprets this as color
- How does a colored filter work?
  - It absorbs specific colors and reflects other colors
- How does an anaglyph hide a secret message?
  - The filter helps to only reflect the color of the secret message and absorb the colors in the marker on top

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