

Interactive Notes-“Why Is The Sky Blue?”

Materials (per group of 4 students):

1-glass beaker $\frac{3}{4}$ full of water (400 or 600 mL ideal)
1-dropper
1-flashlight
10mL-milk
1-small cup to hold milk
1-stirring rod or popsicle stick
4 Student Note sheets

If you don't have a class set of flashlights (as few as 8), these are worth buying at about a dollar apiece. You'll likely use them 3-4 times a year anyway if they're around.

Additionally- PowerPoint

Beforehand:

- Darken the room by closing blinds and turning off classroom lights, if possible.
- Set out all materials *the day before*. Leave yourself time to realize you're missing something, and to practice a new demonstration, research something or even make a change. In the morning, read through the slides and notes one last time. Relax and have fun along with your students. Remember- you're only as effective as your plan.
- Insert page and paragraph numbers from relevant pages in your textbook at the bottom of slides 1 and 2 if you choose to have the class read from it together. This is a good way to connect with your textbook as well as transition into the next demo. You can also delete these page inserts, or Copy and Paste them onto later slides if needed.
- As with any other demonstration, try these out ahead of time for yourself so you know how they work best and so you know what to expect.
- Print extra copies of the notes pages on paper for yourself, students that are slow writers or can't see well, and for absentees. Click “File” → “Print” → then where it says “Print what:” select “Handouts” → and then “OK”.

You've probably seen other “Blue Sky” activities that use other methods and chemicals, and some do a better job than milk in their effect. But the milk method has its advantages- 1. it's convenient, safe, and cheap, and 2. it reliably does a good enough job demonstrating the main principles, and with a well-worded explanation still bring the student to a full understanding.

At the very beginning of class review basic light and colors- “If there was no light at all in here what colors would you see? (none).

So colors come from light. What color is sunlight? (white/colorless).

And that's where all colors come from?! How do you know all colors are in white light? (rainbows, prisms, colors in this room).

Ok- if there's a flashlight near you, shine the light on your shirt. See how it's red or purple or green or yellow? The light leaving your flashlight has every color in it. When it hits your shirt, the red or purple reflects and all the others go inside.”

Interactive Notes: Why Is The Sky Blue?



Do: Shined flashlight through clear water.

See: Light cuts directly through.



What's Happening: Without an atmosphere the sky would be black and we'd be exposed to unfiltered sunlight.

Read p. 1 together

Interactive Science Teacher

1.

Have student #1 (of the 4) get the flashlight and shine it through the beaker of clear water and see what it looks like after it's passed through.

To help students better understand this topic, begin a story that will continue and change later on- "Students, you've just seen light pass through water mostly undisturbed. Imagine this classroom with no tables and chairs. Empty. Nothing but the walls. Then I ask all of you students to line up against one wall shoulder-to-shoulder and walk across the room. You'd all make it, because there are no obstructions. This is what your light is doing in this water- it enters, moves through the water, and out with almost no trouble. There is a little of what we'll call 'refraction'."

(end of Teacher Notes preview)

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Interactive Notes: Why Is The Sky Blue?



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Do: Added 2 drops of milk to the water.

See: The light was not as intense and focused. Saw a tinge of blue.

What's Happening: The light starts to scatter as it collides with milk. Sunlight contains all colors. As it collides with nitrogen and oxygen, the blue in it (having the highest frequency) scatters out first.





Read p. 1 together

Do: Added 10 more drops of milk to the water

See: Light scatters more.

What's Happening: The milk thickens the water. The more it thickens the more the light scatters. After the blue scatters out, then red begins to.






Read p. 1 together

Do: Poured the rest of the milk in the water.

See: The whole beaker glows. Orange is coming out of the light.

What's Happening: The water is so thick that light cannot pass directly through. The light appears to come from everywhere at once.

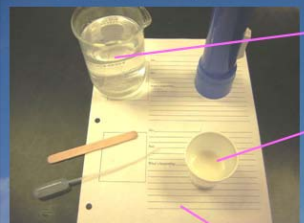



The gray background is a photo of an overcast sky. In the sun is behind these clouds or on the other side of the sky.

Read p. 1 together



Clean Up- this is what your box needs to look like in 3 minutes.



Person 1
•Empty and rinse the large beaker. Fill it 3/4 full again.

Person 2
•Pour 10ml of milk into small cup

Person 3
•Count 4 new note sheets

Person 4
•Check-do your materials look just like they did at the beginning of class?

◆ Student Handout

Name: _____ Date: ____/____/____

Do: _____

See: _____

What's happening: _____

Do: _____

See: _____

What's happening: _____

◆ Drawings & Pictures

 Blue Sky And Sun	 Drawing-1 Light	 Drawing-2 Medium	 Drawing-3 Medium Heavy
 Drawing-4 Heavy	 Heavy Cloud Cover	 Orange And Blue-Storm Moving In	 Orange Sky-Storm Moving In
 c- Light-No Atmosphere	 Pic-Medium Thick	 Pic-Thin Atmosphere (Earth-Like)	 pic-very thick
 ppt background	 Student Materials	 sunrise	 sunset

◆ Homework- unscramble the explanation

Instructions- The explanation of what happens to sunlight as it encounters different atmospheres has been broken into pieces. Rewrite them in the correct order.

red, orange, and pink.

So the sky appears blue and the sun is yellow but not perfectly round.

Things get interesting when it collides with particles, more colors are scattered out-

When sunlight strikes a moon or planet without an atmosphere from red to blue, and green to yellow.

the sky is black and the sun looks white and perfectly round.

When sunlight enters an atmosphere composed of nitrogen and oxygen so much colliding and scattering occur that light appears to come from everywhere at once.

When sunlight enters a very thick atmosphere

When sunlight travels long ways through the same atmosphere

Sunlight contains all the colors- the blue in it scatters out.