

WHAT IS MISSING?

You have seen that some colors of light photons are absorbed when passing through substances of certain colors. In this activity you will investigate white light passing through colored solutions. Recall white light contains all colors of the spectrum. Focus on what passes through and what does not pass through. Record your predictions in your notebook.

Prediction 1: What light color(s) will be absorbed by the red solution?

Prediction 2: What light color(s) will be absorbed by the blue solution?

Prediction 3: What light color(s) will be absorbed by the green solution?

Prediction 4: What light color(s) will be absorbed by the yellow solution?

Safety: DO NOT stare directly into the light source.

Materials:

- Test tube rack
- 5 test tubes
- Water (25 ml)
- Food dye (red, blue, green, yellow)
- 10 ml graduated cylinder
- Light source
- Diffraction plastic (C-spectra) slide or spectroscope
- Ruler

Procedures:

1. Place 5 test tubes in a rack.
2. Use the graduated cylinder to add about 5 ml of water to each tube.
3. Add 1 drop of red dye to the second test tube, 1 drop of blue dye to the third test tube, 1 drop of green dye to the fourth test tube, and 1 drop of yellow dye to the fifth test tube.
4. Turn on your cell phone flashlight, or use the provided light source, and prop it on its side against the wall or a book with the light closest to the table top and pointing towards you.
5. Hold your C-spectra slide about 30 cm in front of and slightly to the left side of the light source. Adjust the position of the slide until you can see a continuous spectrum. (The slide should be slightly to the left of the light source, so you are not staring directly into the light source.) Focus on the spectrum, not on the light source.
6. Have your partner hold the clear test tube in front of the light. Record the effect of the water on the spectrum. Are some of the colors missing? You may want to move the water back and forth from in front of the light, so you can see the spectrum with and without the water in front of the light several times.
7. Record the colors you see and the colors that are absorbed or missing in your notebook.
8. Repeat steps 4-6 with the red, blue, green, and yellow solutions.
9. Switch roles with your partner and repeat steps 4-7.
10. Rinse out your test tubes. Return other materials to the same place.