
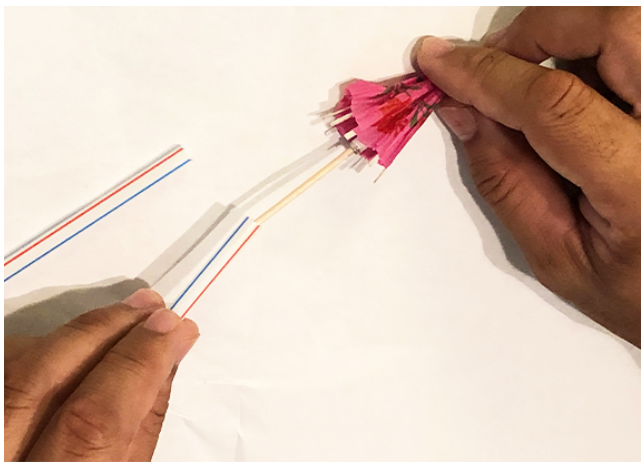
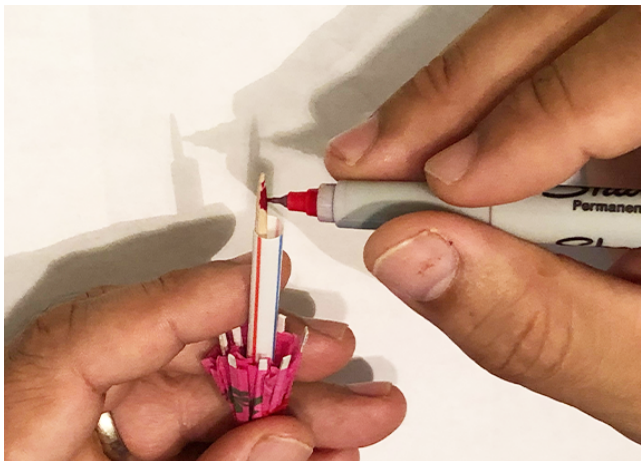


How To Create The Chromatophore Layer

	<p>Step #1</p> <p>Open up the tri-fold, and make red, brown, and yellow dots on the center section. Make as many dots of each color as the number of umbrellas you have of the matching color. For example, 5 red umbrellas mean 5 red dots. Try to space the dots out equally.</p>
	<p>Step #2</p> <p>Prepare one color of umbrellas at a time. Gently open each umbrella. Then, cut a section of straw about 1 inch long, and pass the toothpick end of the umbrella through it.</p>
	<p>Step #3</p> <p>Color the end of the toothpick with the same-colored Sharpie (use the brown sharpie for orange umbrellas).</p>

Resource written by Randy Otaka



Step #4

Place a tiny drop of glue on the runner of the umbrella (the little cuff part that moves up and down). Slide the straw over the glue, and turn it so that the glue evenly coats all sides of the runner. Let the umbrella sit so that the glue can dry.



Step #5

Prop the tri-fold upright. Use the nail to prepare holes on each of the colored dots. Then, pass the toothpick end of each umbrella through the holes.



Step #6

After you have inserted all the umbrellas, then you should have something that looks like this. Have a classmate or two stand behind the trifold. Call out a color ("Red"), and have them gently pull the ends of the same-colored toothpicks to open up the "chromatophores."

NOTE: The umbrellas do not close as easily. You can try to gently push the toothpicks, but if that doesn't work, you can close them directly by hand.

Reflection:

Can you think of any modifications that you can make to speed things up when you change colors on this chromatophore layer model?

Cephalopods can open and close millions of chromatophores instantly. How do you think cephalopods manage to do this?