

## Touch and See Square

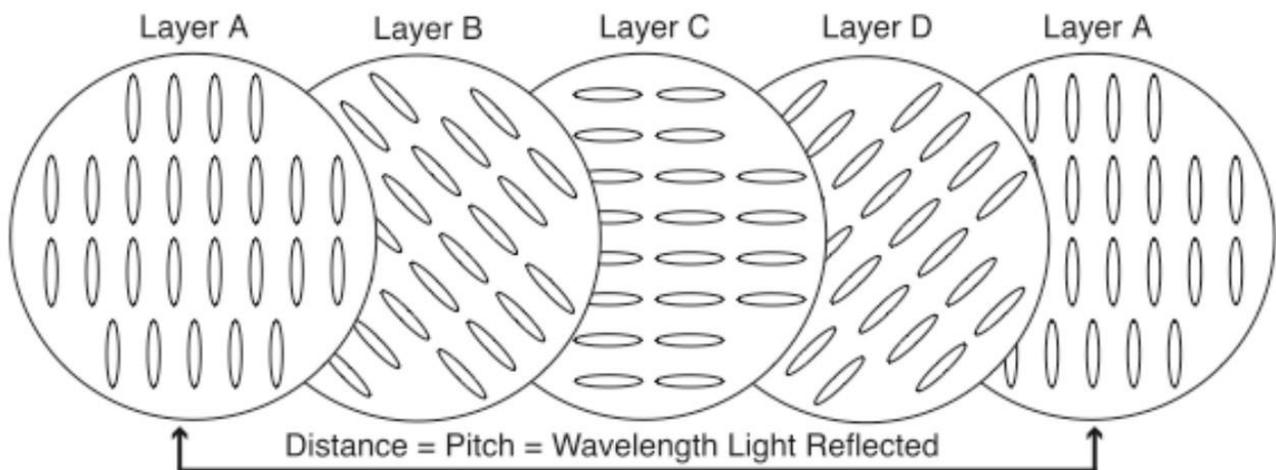
SS-900

### Why do liquid crystals change color with temperature?

The long, cigar-shaped molecules of a liquid crystal align themselves into orderly flat planes. The molecules in each flat plane are oriented at a slight angle from the molecules in the plane below it. Eventually, as the stack builds up and each layer is offset by a slight twisting from the one below it, two layers will have the same orientation. The distance between these two aligned layers is called the **pitch**.

When white light is directed at this stack of molecules, the wavelength of light equal to this pitch distance is reflected back. At cold temperatures, the pitch is far apart—red light is reflected back. At higher temperatures, the molecules move faster and the layers twist more, causing the pitch to become shorter—reflecting blue light.

Each liquid crystal has only a few degrees of temperature where the organization is such that light is reflected back. On either side of this temperature range, all light is absorbed and the liquid crystal appears black.



# Take Your Lesson Further

As science teachers ourselves, we know how much effort goes into preparing lessons. For us, “*Teachers Serving Teachers*” isn’t just a slogan—it’s our promise to you!

Please visit our website  
for more lesson ideas:

[TeacherSource.com/lessons](http://www.TeacherSource.com/lessons)

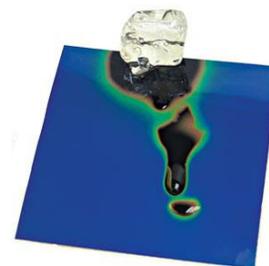
Check our blog for classroom-tested  
teaching plans on dozens of topics:

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To extend your lesson, consider these Educational Innovations products:

## Liquid Crystal Sample Assortment (LC-ASTX)

Our sample assortment includes three 4 x 4 in. samples of liquid crystal, one 20-25°C, one 25-30°C, and one 30-35°C. Each sample has an adhesive backing and can be easily cut on a standard paper cutter.

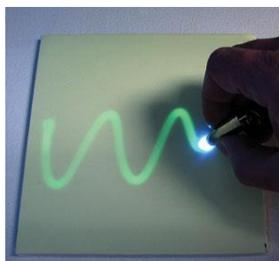


## Heat Sensitive Paper (HEA-200)

Our thermochromic paper changes color within the temperature range of 31°C (88°F) to 37°C (98°F). As the paper is held in your warm hands, the color will begin to change or disappear. As it cools, it changes back. The cycle repeats itself indefinitely.

## Heat Sensitive Pencils (MO-7)

These unique pencils will tell you that 'you're getting warmer' as you make your point. These thermochromic pencils will actually change color with the heat from your hand! Excellent motivational prizes or a sure-fire way to guarantee your students won't lose their pencils. 25 pencils in assorted colors.



## Write & See Squares (SS-910)

Move the violet light on the yellow vinyl square and observe the brightly glowing trail. Blue light has enough energy to excite the phosphorescent pigment in the vinyl. The excited pigment then slowly releases energy as green light. Red Light does not have enough energy to affect the pigment. Contains a mounted sheet of phosphorescent vinyl (~15 cm x 15 cm) and an incredible violet PhotonLight LED flashlight on a key-chain ring.