Optricks at the Day

TACO BELL DISCOVERY SCIENCE CENTER
The **OPTRICKS** Suitcase

*Comes to Southern California*

**Donn M. Silberman**
The Optics Institute of Southern California

---

**Stephen D. Jacobs**
CENTER FOR OPTICS MANUFACTURING (COM)
Laboratory for Laser Energetics (LLE), University of Rochester

---

**Optics is Light Work!!**
http://www.spinmaster.com/docs/comm/StrobeFX.mov
Optical Engineers Work with Materials That Reflect or Transmit Light

Si – polished silicon wafer mirror-like reflector

SiO₂ – clear silica lens focuses light
Have you ever wondered how printing works?

Most modern printers use lots of dots to make up the text & images that you see.

Do you know what color ink they use?

Use the small magnifying lens to look at the Periodic Table. Do you see the Magic Dots??

Small Magnifying Lens
Hold the lens about 1 inch above the paper.
Light is Like a Vibrating Wave

- We can make a slinky vibrate like a wave of light.
- A slinky vibrating in one direction is like “polarized” light.
- Optical engineers use polarizers to make light vibrate in one direction.
- Polarizers have a “secret code.”
Magic Stripes

- Where do the colors come from?

- Make your own polariscope and find the stripes in the plastic spoon & label.

- Geologists, identify minerals with polarized light microscopes.

- Civil engineers examine stresses inside structures with transparent models and a polariscope.

Polariscope show the Magic Strips.
Rainbow Peephole®

- Light from the flashlight is “redirected” in passing through the plastic peephole to the eye.
- Where do the colors come from?
- Do you see a regular pattern?
- Identify the colors. Are they the same in each spot?
- Does the pattern change if the flashlight is close or far from the peephole? How?
- Do you see colors from other people’s flashlights, even those far away from you?
- Do you see colors from the room lights?
- The regular array of bumps on the plastic peephole's surface allows us to see the color in white light through “diffraction.”
Place the patch on your wrist and perform the “vampire test.”

- The “Magic Patch” changes color with the heat from your body. The “living dead” give off no heat!

- Where do the colors come from?
- Does anyone see a vein or artery?

- This is an example of “selective reflection” by liquid crystals, painted onto the black paper.

- Liquid crystal are “ordered,” just like the students across the page.

- Scientists use liquid crystals to build displays for watches and computer games.
Selective Reflection in Cholesteric Liquid Crystals

- Within each layer, molecules (students) align with long axes (bodies) parallel to plane of layer.
- Protruding side groups force molecules in adjacent layers to be displaced, creating a twisted, helical structure.
The Optics Institute’s Teen Optics Bench Kit

- Did you have FUN today??
- Would you like to have more OPTICS FUN??
- The Optics Bench Kit can help you learn
  And prepare you for college!!!
- And it’s LOTS of FUN!!

- Tell your teacher you want to participate in an….

http://oisc.net