

## Another FREE SAMPLE LAB from TOPS LEARNING SYSTEMS!

This **TOPS Idea** is taken from an original series of black-and-white line masters, adapted to stand alone as an independent mini-lesson. Please purchase our original book to get the whole in-depth program.

### water drop microscope

...adapted from **FOCUS POCUS #42**  
by TOPS Learning Systems

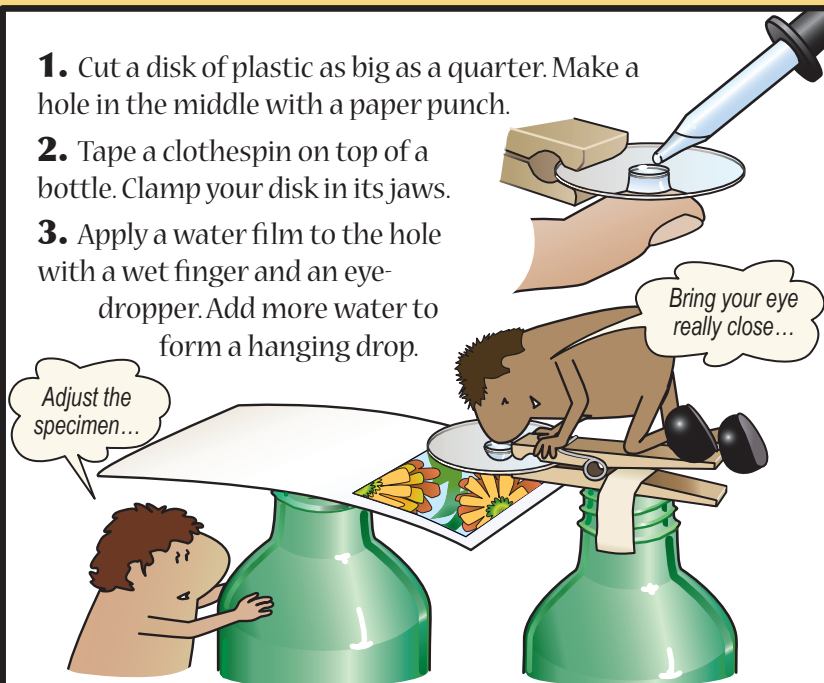
**1.** Cut a disk of plastic as big as a quarter. Make a hole in the middle with a paper punch.

**2.** Tape a clothespin on top of a bottle. Clamp your disk in its jaws.

**3.** Apply a water film to the hole with a wet finger and an eye-dropper. Add more water to form a hanging drop.

**4.** Fix a down-curved index card on another bottle with rolled tape. Mount a sample of a full-color magazine ad near one end.

**5.** Slide the ad under the water lens until you see colored dots in perfect focus.



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#### OBJECTIVES

To build a suspension-drop microscope. To observe 4-color printing as a matrix of yellow, blue, red and black dots.

#### LAB NOTES

Photocopy the lab above for each student or team.

**Step 3.** To create the film, rest a drop on a finger and touch it to the hole from below. To enlarge the lens, touch the film from above with the wet tip of a dropper. To reduce the lens, draw off water with a tissue.

Extra droplets that cling under the disk are no problem unless they connect with the hanging lens and pull it out-of-round. Remove those with a corner of dry tissue.

**Step 5.** Sliding the specimen forward or back effectively moves the print image up and down. The clearest focus will be about 1 cm under the lens. (Our book **Focus Pocus #42** directs students to build this microscope with a more easily aimed vertical focus.)

Experiment with lens sizes and compare magnification. Remove eyeglasses and hold eye as near as possible to the drop. Avoid vibrating the lens: secure hair or jewelry that might bump the system. Illuminate subjects with daylight or other good side lighting.

#### EVALUATION

**Q:** You want to produce an ad incorporating black and grey tones on white paper. How many ink colors will you need? Explain.

**A:** Just black ink will do the job. When printed in dots of various densities on white paper, the eye will see different shades of grey.

#### EXTENSION

Examine pepper, wood shavings, a layer of facial tissue, fabrics, flower petals, moss, feathers, thread and other fibers, fly wings...

#### MATERIALS

- Flat, clear, rigid plastic from deli boxes, cut in sections (warn about sharp edges).
- Scissors and paper punch.
- Water and a tissue.
- A clothespin.
- Masking tape.
- Two beverage bottles of equal height. Glass is preferable; plastic will need to be weighted with sand or water for stability.
- An index card and full-color magazine ad.
- Additional specimens (see Extension).

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