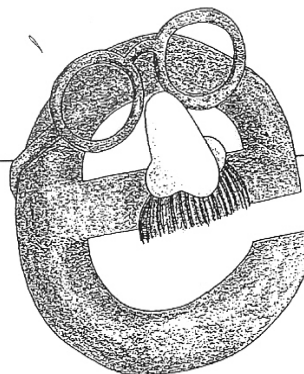


# Give Me an e

*If you think you know what the letter e looks like, think again. You'll be very surprised to discover the changes that lenses can make to the printed letter.*



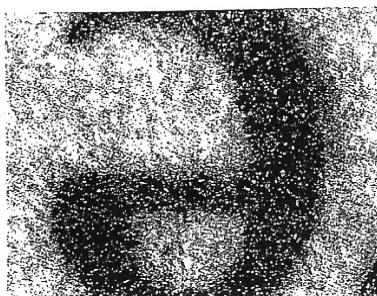
## You Will Need

- a page of newspaper
- ruler and microscope

## What to Do

1. Find a section of print on the newspaper that contains a small letter e. Tear out a 2 inch  $\times$  3 inch (5 cm  $\times$  7.5 cm) piece of newspaper.
2. Make sure your microscope is in a brightly lit area, or use a table lamp to shine light onto the top of the newspaper.
3. Place the strip of paper on the stage of your microscope. Move it so that the letter e is in position under the low-power objective and secure it with the stage clips.
4. Carefully focus the microscope so that you can clearly see the letter e. Compare the e you see with your naked eye to the e you see with the microscope.
5. Look through the eyepiece while moving the paper in different directions—back and forth, side to side. Notice which way the magnified image moves.
6. Try the experiment with the letters a, f, h, and r.

7. Move the newspaper so that its torn edge is directly under the low-power objective lens. Refocus the microscope if necessary. Look at the fibres that make up the paper.



**Photomicrograph of the letter e**  
(photographed at 250  $\times$  and enlarged).



**Photomicrograph of the edge of a torn paper**  
(photographed at 250  $\times$  and enlarged).

## What Happened

When you looked at them through the microscope, the letters were bigger, but they also were upside down. Another strange thing: not only was the image upside down and backwards, but its movement also was backwards. When you moved the paper to the right, the image in the microscope moved to the left. When you moved the paper towards you, the image in the microscope moved away from you. The lenses inside the microscope bend the light so that the image you see is the reverse of the object you are looking at. When you focused on the edges of the paper, you could see the wood fibres from which the paper was made. The fibres even faced the same direction. This is called the grain of the paper; it is what holds the paper together.