

Perspectives: Powers of 10



Scientists look at things using their eyes, but they also use a wide variety of specialized tools that give them extra capabilities. For instance, some objects are so small that scientists must use powerful microscopes to see them. Other objects may be very large but are so far away that scientists have to use a powerful telescope in order to observe them.

Before you begin the activity that follows, imagine what it would be like to be a flea on a dog's back or the giant in ***Jack and the Beanstalk*** walking through a normal-sized village. What would things look like to the Indian in the Cupboard or to the Borrowers who live under the floorboards?

Required Materials

- Science notebook
- Crayons, markers, or pencils
- Assorted objects, such as leaves, notebook paper, or flowers
- Pre-cut butcher paper or bulletin board paper (1 meter square)
- Meter stick, tape measure, or other measuring device
- Hand lens
- Field microscope



Activity Directions

1. With a partner, take your piece of paper that has been cut to measure 1 meter square and trace a person's body outline. If you are too tall, draw a person that goes from top to bottom of the paper.
2. Choose an object for each of you. This could be a large leaf that you bring from home or gather in the schoolyard, an article from a newspaper, a photograph, or a large flower like a sunflower. Trace the object on the same piece of paper, near the body outline. Put as much detail into the drawings as you can.
3. Now, divide your paper into 10 equal parts by moving around the paper and making a mark every 10 centimeters on the edges of the paper. Use your tape measure or other measuring device to do this.
4. Connect the marks so that you have 10 vertical lines on the page and then 10 horizontal lines. You should now have a grid with 100 boxes of equal size.
5. Look at one square of the grid and draw what you see in your science notebook.
6. In your notebook, answer these questions:

How is what you see now different from what you saw at first?

Why are your drawings different?

What would happen if you divided the paper into even smaller boxes?

7. Choose one square that has something drawn on it and cut it out. Draw a person in that square like you did at the very beginning with the large piece of paper.

What do you see now?

Do you have to move away from or closer to something for it to look bigger?

8. Take the small square you cut out and divide it into 10 equal parts by making a mark every centimeter all around the paper.
9. Draw a picture of a person in this little box. You should now have a picture of a person and a piece of the object that you had drawn at the beginning.

Is this what it would be like to be a giant? Or, is this what it would be like to be an ant?

10. It is important to understand and to be able to compare the size of things in our world and the universe. One of the ways that scientists do this is by using **exponential notation**, or powers of ten. Click on the link below for a fun journey through space at the speed of powers of ten.