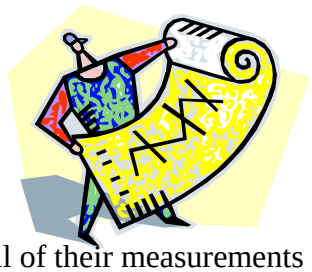
# Powers of Ten!



*Suggested Age: 6-8*
*Time: 15 minutes*

The metric system is a base ten system. This means that all of their measurements are based on being $1/10^{th}$ of the next larger thing. To see how much of a difference this is, you will divide a unit of measurement into ten equal pieces and continue doing so until you have a range of scaled measurements.

**In this activity we will:**

- Divide a large metric unit into smaller ones using powers of ten and observe the size differences at each point.

**Materials**

- Large piece of paper, one meter by one meter
- Scissors
- Meter stick
- Ruler with centimeters and millimeters marked
- Pen or pencil

**Safety**

Be careful not to cut yourself when using the scissors. They can be very sharp.

**Preparation**

To prepare for this activity, you will need to locate a very large piece of paper. Butcher's paper or tablecloth paper should work well.

**Pre-Activity**

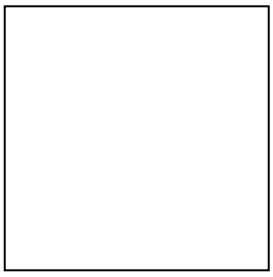
Discuss with the children what they think the largest differences are in size. If we make something ten times smaller, is it really that much smaller? How about ten times smaller than that? Discuss with them differences in size. For example, many young children are approximately one meter tall. What do they think is one tenth of their size?

**Activity**

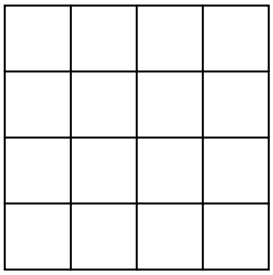
As children, many people had toy blocks that they played with. Many times, children stack these blocks as high as they can or make squares out of more and more

blocks. Here we will do the opposite; we will cut down a large piece into much smaller blocks.

- Using the meter stick, measure a square on your large paper that has dimensions of one meter by one meter. Does this seem big or small to you?



- Now, using your meter stick or ruler, measure out every ten centimeters (one decimeter) and make a mark on all sides. You should end up with nine marks per side. Connect the marks using the meter stick so that you have a grid.



- Cut out one of the corner squares and place it next to the larger block. Is this a big difference in size? Why or why not? What objects can you find that are one decimeter in size?
- On the smaller block, using your ruler, measure out every centimeter and make a small mark on each of the four sides. Connect them as before to make a smaller grid.
- Cut out one of the corner squares and place all three blocks next to each other. Now what do you notice about the difference in size between the two smallest blocks? How about the one-meter block and the one-centimeter block?
- On the one-centimeter square block, make a mark every millimeter using your ruler and once again connect these to make a grid. Can you differentiate between your lines now or do they seem to almost run together?
- If you can, cut out one of the corner blocks and compare to the other three sizes.
- Discuss with the children the difference in sizes due to powers of ten. For example, a decimeter is one tenth of a meter, a centimeter is one tenth of a decimeter or one hundredth of a meter, and a millimeter is one tenth of a centimeter or one thousandth of a meter. Therefore, the meter block is one thousand times bigger than the millimeter block!

**Extension Activity**

1. Have the student look for objects either inside or outside that are about the same size as a meter, decimeter, centimeter, and millimeter. How many different sized objects can they find? What might be the reasons for the different sizes?
2. Research food chains and look at the difference in sizes between the predators and prey. In different food chains, is the size difference consistent?

**References**

http://lamar.colostate.edu/~hillger/?gclid=CJjJ-6vKvoYCFRwxSQodoy09BQ#metric