"How Big is It?" Activity

Introduction

Size and scale are two interrelated terms. Size represents the numerical value of how big an object is such as the diameter of a baseball is 10 centimeters. Scale, on the other hand, is the ratio between the sizes of two objects. An example of this would be like saying an ant is 1000 times smaller than the average person. In order to gain a better understanding of how big objects are, it can be more helpful to compare the sizes of objects to other known objects.

Our world is made up of multiple scales or 'worlds': macroscale, microscale, nanoscale and atomic scale. The macroscale is what can be seen with the naked eye. The microscale is too small to see without a light microscope (usually measured in micrometers or microns). The nanoscale is typically smaller than a cell but bigger than an atom (approximately 1-100 nm) and the atomic scale is approximately the size of an atom. The limits of these scales can be fluid.

In this activity you will compare the sizes of different objects and place them on a scale from smallest to largest.

Procedure

Your group will be given cards with pictures of different objects on them. Your job is to correctly place these objects from smallest to largest. Place the items according to the logarithmic scale provided.

Think about if you are placing objects in the macroscale, microscale, nanoscale or atomic scale.

Questions to Consider

1. Which objects did you have the hardest time placing? Why?

2. Did the correct placement of any objects surprise you? Why?

3. What difficulties do you think your students will have with the concept of size and scale?

    a. What misconceptions do you think your students will have with this concept?

4. How can you help your students understand size and scale, especially at the nanoscale?

References

http://nanosense.sri.com/activities/sizematters/sizeandscale/SM_Lesson2Student.pdf (activity)

http://teachers.standford.edu/activities