OUT OF RANGE
NAME_____   DATE_____

PERIOD_____   Estimating Out of Range Measurements

       There are certain measurements that are out of our range, that we can't easily measure. But we CAN estimate the values by making several assumptions.

       Example: How many leaves are on a tree? First, assume that the tree is a cube, perhaps 10 meters on a side. That means the tree has a volume of 10m X 10mX 10m=1000 meters cubed.
       Now suppose that there are leaves evenly distributed all over the tree and that ten leaves end to end are about 1 meter. That means that each cubic meter has 10 leaves X 10 leaves X 10 leaves=1000 leaves per cubic meter.
       So now the number of leaves on the tree is:
       $1000 \frac{leaves}{m^3} \times 1000 \ m^3 = 1 \times 10^6$ leaves

ESTIMATE answers for the following problems. You need to show and check all your assumptions.

1) Numbers of hairs on your head: (Hint: estimate the number of hairs per square centimeter and the area of your head)

2) Times your heart beats in a lifetime.

3) Time you spend in school total in life:

**4) Weight of the whole earth's atmosphere: (Earth has 6371 km radius, 4 mile high air)

**5) Number of atoms in the earth (made mostly of carbon, 6371 km radius)

6) Thickness of a human hair

7) Grains of sand on a typical beach

8) Number of blades of grass on a soccer/field hockey field

9) Volume of ice cream eaten by the total population of town in a year.

10) Amount of liquid our school can hold:

11) Speed of a butterfly

12) Distance traveled per evening in a rocking chair.

TIME: Using convenient units such as minutes, hours, days, or years, estimate the lifetime of each of the objects below. rank them in order from smallest to largest. Then find the approximate value in SECONDS for each one.

human   baseball game

dog   lightning flash

sea turtle   firefly flash

sun   a road's yellow line

flea   a pencil