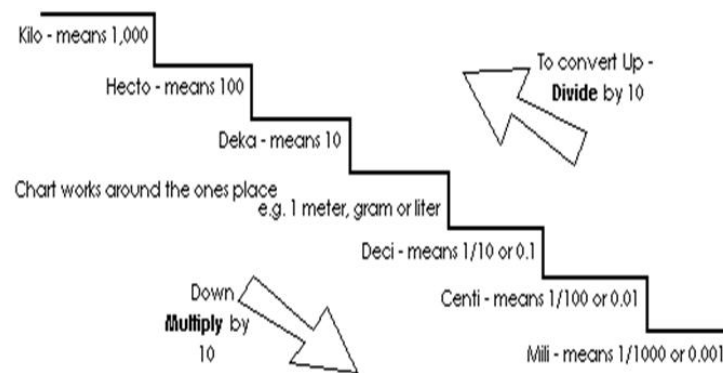


1. Navigate to <http://learn.genetics.utah.edu/content/begin/cells/scale>

OR 1) google utah learn genetics, 2) click on the first link and 3) choose cell size & scale to the right of the screen.

2. You can refer to the following metric unit scale to help you during this exercise.



Elk Island Public Schools. <http://www.glenallanelementary.ca/eteachers.php?teacher=1026&page=4188>

Extremely small units

*Micrometers, or microns, (μm) are 1/1,000,000 of a meter, or 0.000001 meters.

*Nanometers (nm) are 1/1,000,000,000 of a meter, or 0.000000001 meters.

*Angstroms (\AA) are 1/10,000,000,000 of a meter, or 0.0000000001 meters.

*Picometers (pm) are 1/1,000,000,000,000 of a meter, or 0.000000000001 meters.

3. Use the scroll bar to increase the size of the view. Record sizes of objects below, from smallest to largest.

Size—Make sure you use units!!! These are NOT in order of size, you will put them in order in the next step.

_____ *Amoeba proteus* (A single-celled organism in the kingdom **Protista**)

_____ Adenine (a **nucleotide**, or a building block of **DNA & RNA** or **nucleic acids**).

_____ Human egg (the female **reproductive cell**, or **gamete**)

_____ Human sperm cell (the male reproductive cell, or **gamete**)

_____ X **chromosome** (Females have 2 X chromosomes (**XX**), males have

one X chromosome and one Y chromosome, **XY**). A chromosome is a tightly coiled DNA strand. DNA contains genetic instructions. DNA has to be tightly coiled to fit in the nucleus of the cell. A cell is so small you cannot see it with your naked eye. DNA is extremely long! One DNA strand is about 5 centimeters long, but if you took all of the DNA from all of the cells of your body and lined them up end to end, it would be about 2.0×10^{13} meters. This is equivalent to about 70 trips from the earth to the sun and back.

_____ *Paramecium* (A single-celled organism in the **kingdom Protista**)

_____ Methionine (an **amino acid**, or a building block of a **protein**).

_____ Baker's yeast (Did you know the yeast you use to make bread rise is a living organism? This is why it is called "live active yeast" on the packet. Yeast is a single-celled, or **unicellular** organism in the kingdom Fungi).

_____ *E. coli* bacterium (*E. coli* is a **unicellular** organism in the kingdom **Eubacteria**).

_____ Glucose (A simple sugar molecule). This is the food molecule that plants produce in **photosynthesis**.

_____ Red blood cell (These types of cells help to transport **oxygen** throughout the human body). There are many types of specialized cells in multicellular organisms which have different functions. Cells are the basic unit of **life**.

_____ Carbon atom (atoms are the basic unit of matter). Carbon atoms are sometimes called the backbone of life, because it is contained in every organic molecule. Organic molecules are made-up **living** or once **living** tissue.

_____ Mitochondrion (the cell organelle where cellular respiration takes place, and **energy(or ATP, the energy storage molecule)** is released). An organelle is a structure that makes up a cell. **Eukaryotic** cells contain membrane-bound **organelles**, and **prokaryotic** cells do not.

_____ HIV virus and Influenza Virus (We know influenza as the **flu**). Viruses are not considered living things because they cannot reproduce independently of another cell, and are not composed of cells.

_____ Ribosome (the organelle where **proteins** are assembled).

4. Place the above structures in order using the units & sizes.

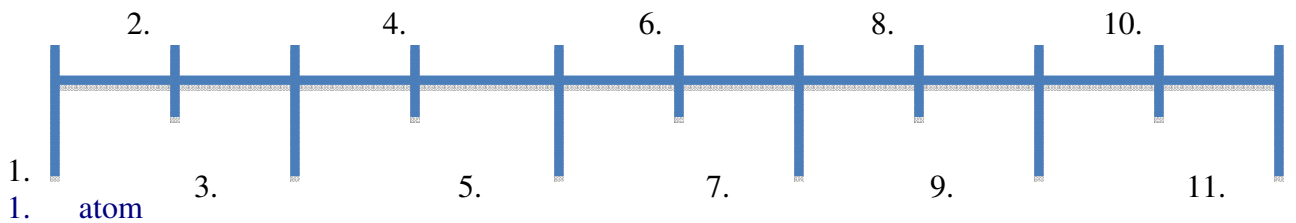
Amoeba	Bacterium	Units, smallest to largest Picometer Angstrom Nanometer Micrometer Millimeter Centimeter Meter Kilometer
Adenine (nucleotide)	Ribosome	
Human egg	Virus	
Human sperm cell	Carbon Atom	
Chromosome	Red blood cell	
Paramecium	Glucose-sugar molecule	
Amino Acid	Mitochondrion	
Yeast		

- | | |
|--|--|
| 1. carbon atom | 9. baker's yeast (8 & 9 can be switched) |
| 2. glucose | 10. chromosome |
| 3. methionine (amino acid) | 11. red blood cell |
| 4. adenine | 12. sperm cell |
| 5. ribosome | 13. egg cell |
| 6. virus | 14. Paramecium |
| 7. bacterium | 15. Amoeba |
| 8. mitochondrion (8 & 9 can be switched) | |

5. Based on the information above information, put in the following terms in order from smallest to largest.

Blood Cell
 Protist (Paramecium or Amoeba)
 Virus
 Organelle
 Atom
 Bacterium

Yeast Cell
 Egg Cell
 Sperm Cell
 Chromosome (DNA)
 Molecule (glucose)



2. molecule
(organelle—ribosome)
3. virus
4. bacterium
5. organelle (mitochondria)
6. yeast
7. chromosome
8. blood cell
9. sperm cell
10. egg cell
11. Protist

6. Answer the following questions

a. Is the human egg or sperm cell *larger*?

The egg cell

b. What is a gamete?

A reproductive cell (2 gametes fuse during fertilization to form a zygote, or the first cell of a new organism)

c. Someone with 2 X chromosomes would be what sex (male or female)?

XX → female (XY → male)

d. What is a term we use for an organism composed of only one cell?

unicellular

e. What do eukaryotic (“YOU CARRY a nucleus, humans, plants, Protists, Fungus) cells contain that prokaryotic (Pro rhymes with NO nucleus or organelles, bacteria are prokaryotic) cells do not?

A membrane-bound nucleus & other membrane bound organelles

f. Influenza is another word for what?

The flu

g. Amino acids are building blocks of what type of molecule?

Proteins

h. Nucleotides are building blocks of what kinds of molecules?

Nucleic acids (DNA & RNA)

i. Paramecia and Amoebas are classified into which kingdom?

Protista

j. What kingdom are yeast classified into?

Fungi