

Cell Dimensions

Cells vary greatly in size, ranging from nerve cells over one meter long to a bacterium just 1 μm in diameter. Average sizes are given in this exercise to help you visualize various organelles in a cell.

Each lab group will complete the following problems:

Problem #1: A cell model is a piece of paper. Calculate the model sizes and draw a scaled diagram (colors would be nice too!) of a eukaryotic cell on the graph paper provided (each square is 1 cm and should represent 5.0 μm). Include as many of the organelles as would be expected for an **animal or plant** cell. If the cell structure is too small to be drawn effectively, **draw** it in the diagram as best as you can and **label** it on the page. Finally, pick a representative object that is commonly found and has the same size as that of your model. **Include all of the organelles from the list regardless of whether they are found in an animal or plant cell.**

Organelle	Actual Size (μm)	Model Size (note units)	Representative object
cell	100		
nucleus	10		
nucleolus	1-2		
chloroplast	5		
mitochondria	1		
Golgi apparatus	2		
lysosome	0.5		
centriole	0.2		
ribosome	0.025		
Membrane (thickness)	0.008		
Cell wall (thickness)	1		

Problem #2: A cell model is the size of this classroom (approximately 10 m in length). Calculate the model sizes and **draw and label** a scaled diagram of the organelles of the cell that will fit on another sheet of graph paper and can be drawn with some detail (*i.e.* chloroplasts, mitochondria, Golgi apparatus). Pick a representative object that is commonly found and has the same size as that of your model.

Organelle	Actual Size (µm)	Model Size (note units)	Representative object
cell	100		
nucleus	10		
nucleolus	1-2		
chloroplast	2-5		
mitochondria	1		
Golgi apparatus	2		
lysosome	0.5		
centriole	0.2		
ribosome	0.025		
Membrane (thickness)	0.010		
Cell wall (thickness)	1		

Problem #3: A cell model is the size of 10 football fields (approximately 1000 m in length). Calculate the model sizes and draw label a scaled diagram of the cell membrane in detail. Pick a representative object that is commonly found and has the same size as that of your model.

Organelle	Actual Size (µm)	Model Size (note units)	Representative object
cell	100		
nucleus	10		
nucleolus	1-2		
chloroplast	2-5		
mitochondria	1		
Golgi apparatus	2		
lysosome	0.5		
centriole	0.2		
ribosome	0.025		
Membrane (thickness)	0.010		
Cell wall (thickness)	1		

Discussion:

Include in diagrams or in words a description of the major features and relative sizes of the following:

Bacterial cells

Viruses

Due Thursday November 10, 2011

