

I. History of the cell theory

A. Anton van Leeuwenhoek (1600s)

- _____ could see things with his lenses that were invisible to the naked eye
- developed the _____

B. Robert Hooke (1665)

- developed the _____
- Proposed the theory that _____

C. Schleiden and Schwann (1830)

- _____
- developed the idea of the Cell Theory to state that cells _____

D. Cell Theory

- Rudolf Virchow (1855)
- expanded the cell theory to include that all cells _____

E. Types of Microscopes

1. Compound Light Microscope

- a. _____ to illuminate the object
- _____
- c. uses more than one lens to magnify an object

2. Transmission Electron Microscope (TEM)

- a. aims a _____
- b. shows _____

3. Scanning Electron Microscope (SEM)

- a. moves _____
- b. shows _____
- c. gives a _____

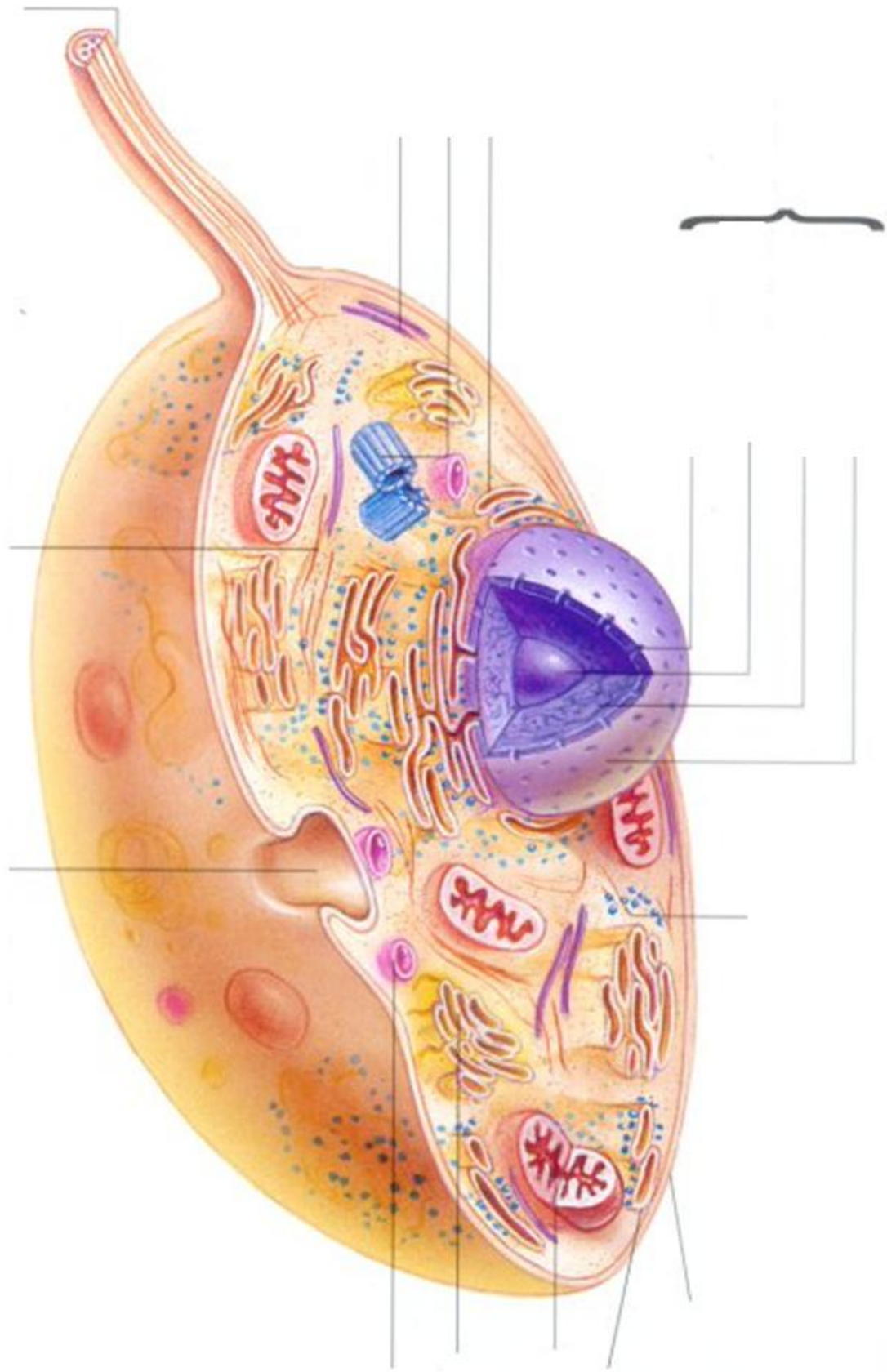
F. Two basic cell types

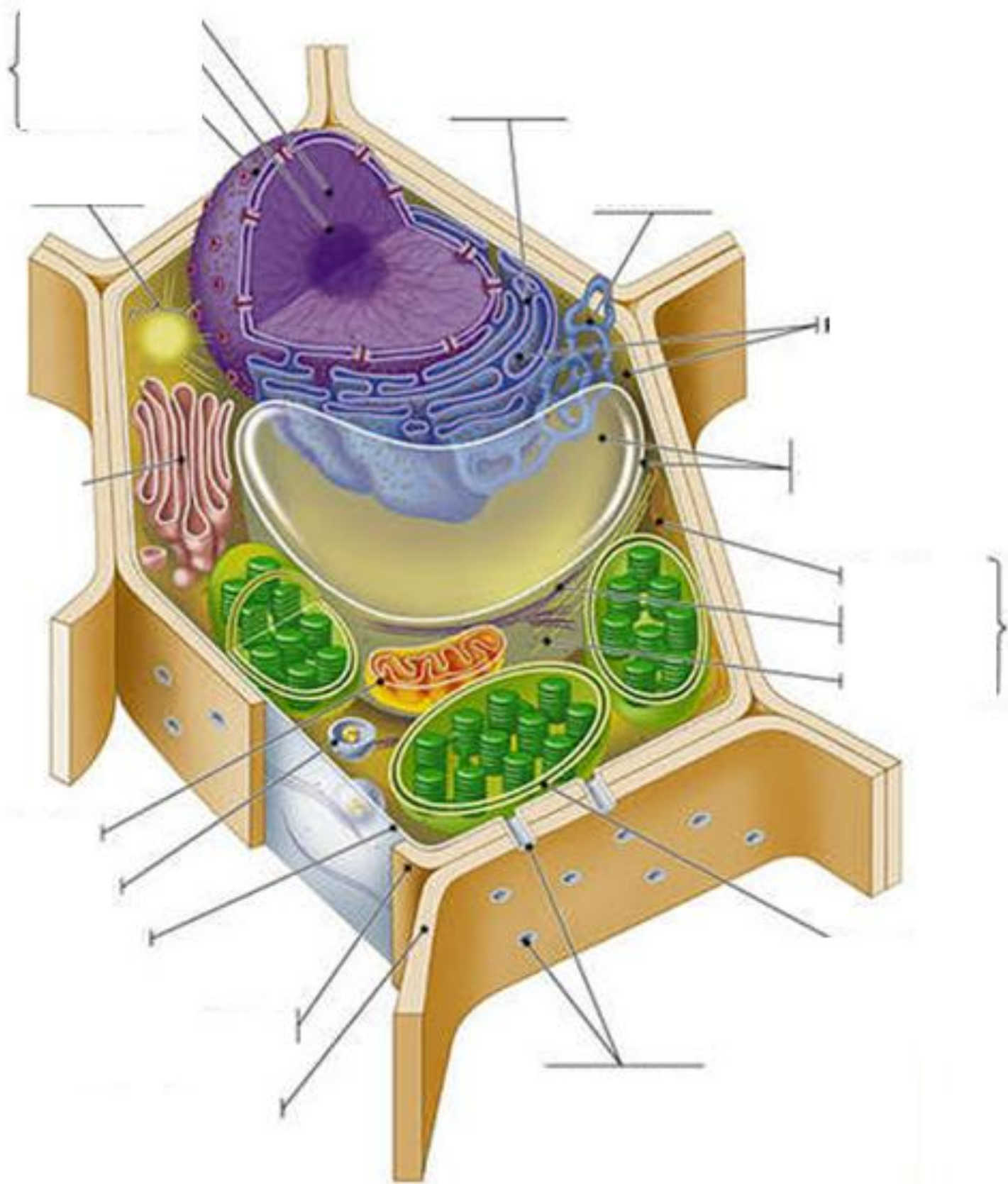
1. Prokaryotic cells

- _____
- lack _____

2. Eukaryotic cells

- _____
- _____





II. Eukaryotic Cell Structure

A. Boundaries

1. plasma membrane

a. serves as a _____

b. _____ that enter and leave the cell (i.e. Oxygen, excess water, nutrients, wastes)

c. helps control _____

2. cell wall

a. relatively _____

b. _____ in cells of plants, fungi and some bacteria and some protists

c. bacteria, protists, and plants have cell walls composed of _____

d. fungi have cell walls composed of _____

B. Organelles

1. Nucleus

a. _____ in eukaryotic cells

b. nuclear envelope

- _____ layers thick

- _____

of the nucleus from the rest of the cell

c. chromatin

- _____

d. DNA (DeoxyriboNucleic Acid)

- a nucleic acid

- _____ of the cell

- makes master plans for _____, including enzymes

e. nucleolus

- produces _____ which are used in

_____ (making proteins)

2. Assembly, transport, and storage

a. cytoplasm

- clear fluid that lies _____
- surrounds organelles

b. endoplasmic reticulum (ER)

- folded membrane
- forms a network of interconnected compartments which provides a _____

- ER connects _____ and is involved in the _____

- smooth ER _____

- rough ER _____

c. Golgi apparatus/complex

- a series of closely stacked, flattened membrane sacs
- receive newly _____ from the ER
- package the proteins and _____ of the cell or to another part of the cell

d. Vacuoles

- _____
- _____ of food, enzymes, wastes, water, and other materials
- some vacuoles store _____
- plant cells have a _____ that stores water and other substances (central vacuole)

e. Lysosomes

- contain _____, food particles, and invading bacteria or viruses

3. Energy Transformers

a. Mitochondria (pl. mitochondrion)

- _____

- Cristae = the highly folded

- most _____
take place here

- _____ are produced here

b. _____ is the breakdown of food
which _____ stored within

c. Plastids

1. chloroplasts (plants)

- contain _____

- trap the _____

- NRG is stored as

2. plastids (general)

- store _____

- _____, are named according
to their color or pigment they contain (i.e.
chlorophyll = green, fucoxanthin = brown)

4. Structures for support and locomotion

a. cytoskeleton

- thin, hollow tubes and fibers that support
organelles

- microtubules = _____ cylinders made
of protein

- microfilaments = _____ protein fibers

b. cilia

- short hair-like projections from the plasma
membrane used for _____

c. flagella

- _____

- move with a whip like motion

- cells may have one or two

5. Cellular Organization

a. Unicellular

- made of only _____

- i.e. bacteria & protists

b. Multicellular

- composed of _____

- i.e. plants & animals

c. Tissues - _____ to
perform an activity

d. Organs - groups of _____ that
function together

e. Organ System - group of _____ to
carry out _____

f. Organism - all of the _____

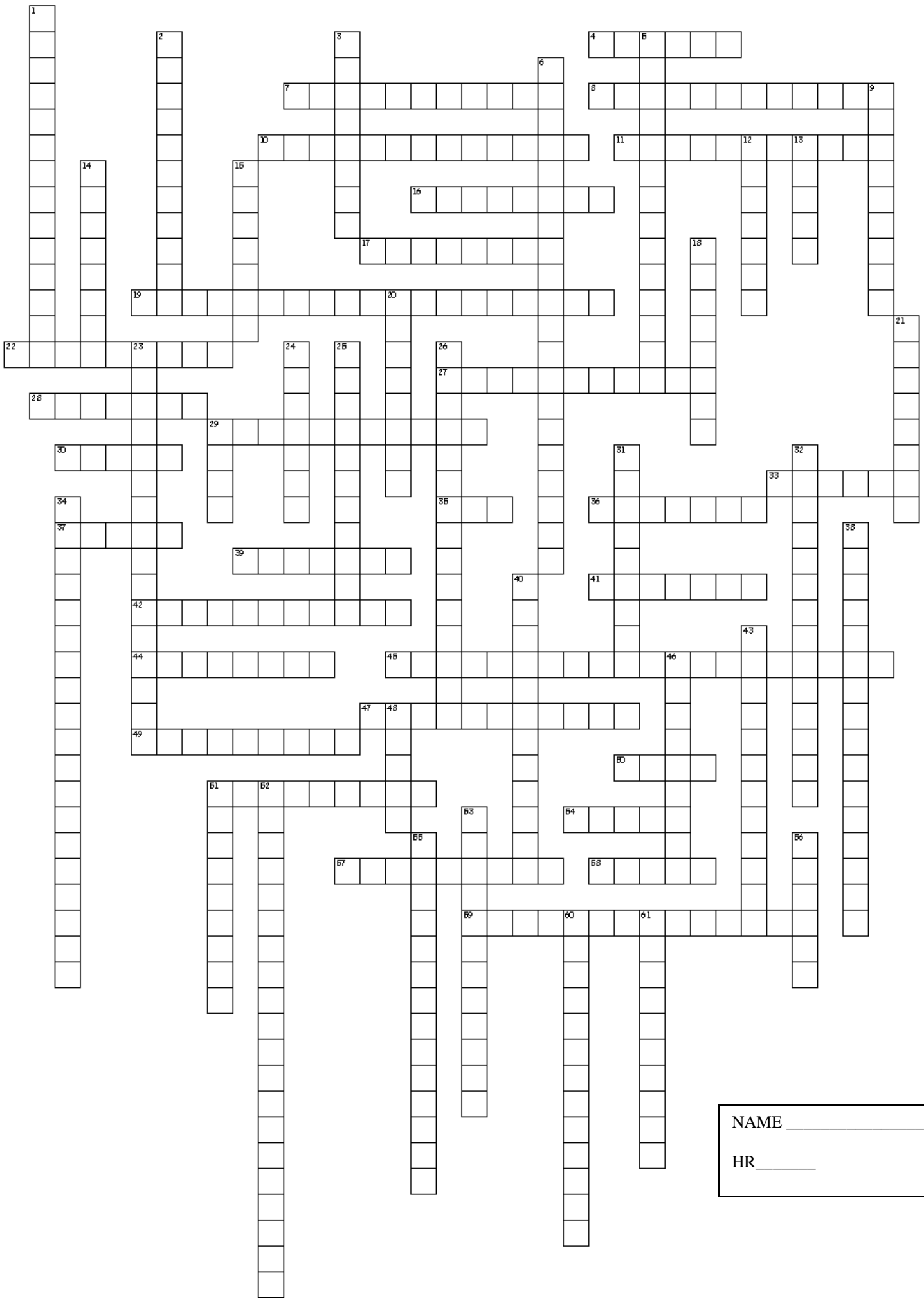
Across

4. compound found in cell walls of fungi
7. this is the brown pigment
8. made of thin hollow and solid protein fibers that support the organelles of the cell
10. contributed to the cell theory in 1855
11. cell type that is primitive, lacks internal membrane bound organelles
16. whip-like tail, cell may have 1 or 2
17. store energy in the form of starches or lipids and are named after the pigment they contain
19. breakdown of food which releases the chemical energy stored within
22. most of the energy-_____ processes take place on the cristae
27. composed of only one cell
28. lysosomes contain digestive _____ to help fight off invading bacteria
29. this is the pigment found in plants that traps the sun's energy and transforms it into useable chemical energy
30. Hooke stated that all living things are made of one or more _____
33. groups of cells functioning together to perform an activity
35. phycoerythrin shows up as the color ____
36. highly folded inner membrane of the mitochondria
37. short numerous hair-like structures
39. a scanning electron microscope shows _____ detail
41. a compound light microscope only uses light to _____ the object.
42. group of organs working together to perform a major life function
44. relatively inflexible structure that surrounds the plasma membrane
45. genetic code of the cell
47. the plasma membrane helps control _____
49. SEM and TEM use a beam of _____ instead of light to show the object
50. the nuclear envelope is _____ layers thick
51. digest excess or worn-out cell parts
54. _____ is the latin term for nucleus
57. clear fluid that lies outside the nucleus and surrounds the organelles
58. chlorophyll shows up as the color _____
59. cilia and flagella are not separate structures, rather they're extensions of the _____

Down

1. single large storage structure of plants
2. developed the first compound microscope in 1665
3. sac of fluid surrounded by a membrane used for storage
5. a transmission electron microscope shows fine _____
6. network of interconnected compartments that is involved in the assembly of proteins
9. produces ribosomes
12. folded membrane extending from the nuclear envelope to the plasma membrane that contains ribosomes
13. group of 2 or more tissues that function together
14. responsible for protein synthesis

15. manages cell functions in eukaryotic cells
18. this is the only type of organism that is a prokaryote
20. folded membrane extending from the nuclear envelope to the plasma membrane that does not contain ribosomes
21. the golgi body _____ newly produced proteins
23. Anton van Leeuwenhoek developed the _____ in the 1600s
24. TEM aims a beam of electrons _____ the object
25. this type of plastid contains chlorophyll
26. regulates movement of materials into and out of the nucleus from the rest of the cell
29. Hooke proposed the idea of cells by looking at the _____ of his wine bottle
31. long, tangled strand of DNA
32. thin, solid protein fibers that support organelles of the cell
34. contributed to the cell theory in 1830
38. Rudolf Virchow stated that all cells come from _____
40. thin, hollow protein fibers that support organelles of the cell
43. location where energy-storing compounds are produced
46. compound found in the cell walls of plants
48. mitochondria actually has an inner and an _____ membrane
51. van Leeuwenhoek was a Dutch _____ who could see things with his lenses that were invisible to the naked eye
52. Schleiden and Schwann expanded the cell theory to state that cells are the basis of _____ of all living things
53. DNA is the master plan for building _____, including enzymes
55. series of closely stacked, flattened membrane stacks
56. a scanning electron microscope gives a _____ effect
60. composed of many cells
61. cell type that has internal membrane bound organelles



NAME _____
HR _____