**EOC Review Molecules and Cells**

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

\_\_\_\_ 1. (eoc) The presence of which cell structure can be used to differentiate between Bacteria and Eukarya?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | nucleus | c. | ribosome |
| b. | cell wall | d. | plasma membrane |

\_\_\_\_ 2. (eoc) Which set of organelles would be found in both human cells and plant cells?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | chloroplast, nucleus, and cell wall | c. | mitochondria, nucleus, and endoplasmic reticulum |
| b. | nucleus, endoplasmic reticulum, and cell wall | d. | mitochondria, chloroplasts, endoplasmic reticulum, and centrioles |

\_\_\_\_ 3. (eoc) An amoeba can taken in a large food particle by surrounding it and creating a vacuole. What is this method of feeding called?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | lysis | c. | exocytosis |
| b. | osmosis | d. | phagocytosis |

\_\_\_\_ 4. (eoc) Which structure can be used to differentiate eukaryotic cells from prokaryotic cells?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | nucleus | c. | nucleic acid |
| b. | ribosome | d. | plasma membrane |

\_\_\_\_ 5. (eoc)Which process would be directly affected if all of a cell’s ribosomes were weakened?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | replicating DNA | c. | metabolizing glucose to produce ATP |
| b. | producing new protein | d. | tranporting nutrients across the cell membrane |

\_\_\_\_ 6. (eoc) Which best distinguishes between a plant cell and an animal cell?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Plant cells have cell membranes, while animal cells have cell walls. | c. | Plant cells contain chloroplasts, while animal cells contain centrioles. |
| b. | Plant cells contain centrioles, while animal cells contain chlorplasts. | d. | Plant cells have small vacuoles, while animal cells have large vacuoles. |

\_\_\_\_ 7. (eoc) What is the primary difference between diffusion and osmosis?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Diffusion requires energy input but osmosis does not. | c. | Diffusion is the movement of water from high to low concentration, while osmosis is the movement of any substance from high to low concentration. |
| b. | Diffusion does not require energy input but osmosis does. | d. | Diffusion is the movement of any substance from high to low concentration, while osmosis is the movement of water from high to low concentration. |

\_\_\_\_ 8. (eoc) Some animals use large amounts of energy while performing normal activities. What organelles do these animals most likely have large numbers of in the muscle cells?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | nuclei | c. | Golgi bodies |
| b. | chloroplasts | d. | mitochondria |

\_\_\_\_ 9. (eoc) Plant cells have an additional structure beyond their plasma membranes that animal cells lack. One function of this additional structure is to

|  |  |  |  |
| --- | --- | --- | --- |
| a. | perform active transport. | c. | enable the cell to undergo phagocytosis. |
| b. | provide structure and protection. | d. | trap sunlight in order to convert it to energy. |

\_\_\_\_ 10. (eoc) What is one way in which all eukaryotic cells and all prokaryotic cells are similar?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | They reproduce sexually. | c. | They are contained in a cell membrane. |
| b. | They are roughly the same size. | d. | They share the same kinds of organelles. |

\_\_\_\_ 11. (eoc) A cell nucleus sends out molecules that carry instructions for protein synthesis. What is the destination of these molecules?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | enzymes | c. | cytoskeleton |
| b. | ribosomes | d. | cell membrane |

\_\_\_\_ 12. (eoc) What is the smallest biological unit?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cell | c. | molecule |
| b. | organ | d. | organism |

\_\_\_\_ 13. (eoc) In the 19th century, scientists observed that plants and animals were composed of cells, and from this derived the cell theory. Today, cell biologists are making many new discoveries about cells at the molecular level. What technology do both groups have in common?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the telescope | c. | the microscope |
| b. | sonic imaging | d. | x-ray photography |

\_\_\_\_ 14. (eoc) What do the cell wall of a plant cell and the plasma membrane of an animal cell have in common?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | They both are strong and rigid. | c. | They both consist of double layers of lipids. |
| b. | The both perform active transport. | d. | They both allow particles to enter and exit the cell. |

\_\_\_\_ 15.

(EOC) Which of these is converted in both the mitochondria and the chloroplasts?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | DNA | c. | Protein |
| b. | Energy | d. | Nutrients |

\_\_\_\_ 16. (eoc)Yeast, a common fungus, is economically important to the beverage industry because when placed in grape juice, it

|  |  |  |  |
| --- | --- | --- | --- |
| a. | releases sugars that react with alcohol in the juice | c. | ferments carbohydrates in the juice and releases alcohol |
| b. | acts as an enzyme to break down juice into alcohol | d. | produces starch that bonds with juice sugars to form alcohol |

\_\_\_\_ 17.

(EOC) When an animal has to survive without food for a long time, it will eventually break down proteins for energy. However, this process occurs only after exhausting the animal’s reserves of

|  |  |  |  |
| --- | --- | --- | --- |
| a. | DNA and RNA | c. | carbon dioxide and water |
| b. | carbohydrates and lipids | d. | enzymes and nucleic acids |

\_\_\_\_ 18.

(eoc) How are photosynthesis and cellular respiration similar?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | They occur in animal cells. | c. | They involve the conversion of energy. |
| b. | They take place in the same organelle. | d. | They produce the same complex carbohydrate. |

\_\_\_\_ 19.

(eoc) What is the correct hierarchy of life from simple to complex?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cell > tissue > organ > organ system > organism | c. | organism > organ system > organ > tissue> cell |
| b. | DNA > cell > organ > organ system > organism | d. | bacteria > cell > tissue > organ > organ system |

\_\_\_\_ 20. (eoc) A certain microscopic single-celled organism is important to the dairy industry because when placed in milk, it consumes sugars in the milk and releases substances that react with the milk, adding flavor and thickening it. What kind of organism is this?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Virus | c. | Archae |
| b. | Fungus | d. | Bacteria |

\_\_\_\_ 21. (eoc) What do glycolysis, the citric acid cycle, and the electron transport chain have in common?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the production of ATP | c. | the occurrence of each within mitochondria |
| b. | the process of trapping solar energy | d. | the process of breaking down sugar molecules |

\_\_\_\_ 22.

(eoc) What is formed during photosynthesis and broken down during cellular respiration?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Water | c. | lactic acid |
| b. | glucose | d. | carbon dioxide |

\_\_\_\_ 23. (eoc) Some animals use large amounts of energy while performing normal activities. What organelles do these animals most likely have large numbers of in the muscle cells?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | nuclei | c. | golgi bodies |
| b. | chloroplasts | d. | mitochondria |

\_\_\_\_ 24. (eoc) During aerobic exercise, muscles may not receive enough oxygen and therefore switch to lactic acid fermentation. What is a reason for the cells to use lactic acid fermentation instead of waiting for more oxygen?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | The cells still need to produce water. | c. | The cells still need to generate usable energy. |
| b. | The cells no longer need to use oxygen. | d. | The cells need to build up lactic acid in order to slow the muscles. |

\_\_\_\_ 25. (eoc) The alcohol in champagne and beer is the result of

|  |  |  |  |
| --- | --- | --- | --- |
| a. | fermentation performed by fungi | c. | protein synthesis performed in ribosomes |
| b. | photosynthesis performed by algae | d. | cellular respiration performed in mitochondria |

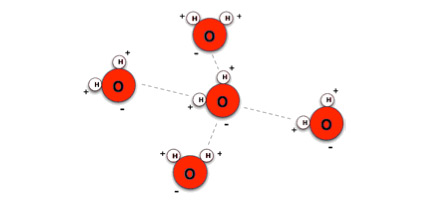
\_\_\_\_ 26.

(eoc) During photosynthesis, low-energy electrons from water molecules are converted to high-energy electrons that are used to produce ATP. What causes the energy conversion?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | oxygen | c. | simple sugars |
| b. | sunlight | d. | carbon dioxide |

\_\_\_\_ 27. (eoc) What property of water is shown below?

**Attraction Between Water Molecules**



|  |  |  |  |
| --- | --- | --- | --- |
| a. | pH | c. | adhesion |
| b. | polarity | d. | solubility |

\_\_\_\_ 28. (eoc) Complex molecules are broken down during cellular respiration and converted into smaller molecules containing energy. What are these complex molecules called?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | proteins | c. | nucleic acids |
| b. | enzymes | d. | carbohydrates |

\_\_\_\_ 29. (eoc) A person sweating on a hot day would **most** likely be an example of what biological

process?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | digestion | c. | homeostasis |
| b. | respiration | d. | gametogenesis |

\_\_\_\_ 30. (eoc) A person fills a drinking glass with water until the water is bulging slightly over the glass rim. The property of water that prevents the water from spilling is

|  |  |  |  |
| --- | --- | --- | --- |
| a. | pH | c. | cohesion |
| b. | osmosis | d. | solubility |

\_\_\_\_ 31. (eoc) Which lists the mitosis phases in the **correct** order?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | prophase, metaphase, anaphase,  telophase | c. | telophase, metaphase, anaphase,  prophase |
| b. | prophase, anaphase, metaphase,  telophase | d. | telophase, anaphase, metaphase,  prophase |

\_\_\_\_ 32. (eoc) Which two transport mechanisms are considered to be passive?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | diffusion and osmosis | c. | endocytosis and osmosis |
| b. | diffusion and exocytosis | d. | exocytosis and endocytosis |

\_\_\_\_ 33. (eoc) Which is the **best** way to describe the fit between an enzyme and its substrate?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | The fit between them varies with the  cell. | c. | The enzyme loosely fits inside the  substrate. |
| b. | The enzyme fits tightly with the  substrate. | d. | The substrate loosely fits inside the  enzyme. |

\_\_\_\_ 34. (eoc) When water dissolves a substance, weak charges carried by water molecules attract the substance’s oppositely charged atoms and pull them away from their molecules. This is a function of which property of water?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | pH | c. | cohesion |
| b. | polarity | d. | surface tension |

\_\_\_\_ 35. (eoc) The epidermis of plants often has tiny holes called stomata. The holes are bordered by guard cells that control the size of each stoma’s opening. Stomata are crucial for

|  |  |  |  |
| --- | --- | --- | --- |
| a. | absorbing water that exists underground. | c. | trapping sunlight in the chloroplasts of cells. |
| b. | transporting nutrients throughout the plant. | d. | providing carbon dioxide for photosynthesis. |

\_\_\_\_ 36. (eoc) Which organic molecule is part of an enzyme?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | fatty acid | c. | amino acid |
| b. | nucleotid | d. | monosaccharide |

\_\_\_\_ 37. (eoc) When a cell with half the normal number of chromosomes is generated during meiosis,

how can it eventually produce cells with the normal number of chromosomes?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | by undergoing the six phases of mitosis | c. | by releasing young normal cells through exocytosis |
| b. | by forming two nuclei during cell  division | d. | by combining with a gamete from  another organism |

\_\_\_\_ 38. (eoc) The body cells of one plant contain 40 chromosomes. How many chromosomes

are found in the gametes of this plant?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 20 | c. | 60 |
| b. | 40 | d. | 80 |

\_\_\_\_ 39. (eoc) Which would one examine in order to find organic molecules that speed up or slow down certain chemical reactions?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | lipids | c. | nucleic acids |
| b. | enzymes | d. | carbohydrates |

\_\_\_\_ 40. (eoc) Yeasts ferment when they undergo anaerobic respiration. Which industry relies **most** on a by-product of yeast metabolism?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | dairy | c. | soft drink |
| b. | bread | d. | biomedical |

\_\_\_\_ 41. (eoc) What happens to chromatids when they separate during mitosis?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | They become chromosomes. | c. | They are destroyed. |
| b. | They reattach quickly. | d. | They leave the cell. |

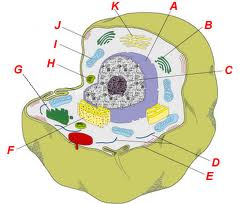
\_\_\_\_ 42. (eoc) Which is a true statement about mitochondria and chloroplasts?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | They contain chlorophyll. | c. | They are found in animal cells. |
| b. | They capture light energy. | d. | They have a double membrane. |

\_\_\_\_ 43. (eoc) What do the structure and function of a cell membrane **most** resemble?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | water permeating a tea bag | c. | grains of tea that break through a tea bag and float into the cup of water |
| b. | a tea bag that does not allow water to permeate | d. | a tea bag that is permeated by water but does not allow grains of tea to be released |

\_\_\_\_ 44. (eoc) The figure below shows an animal cell



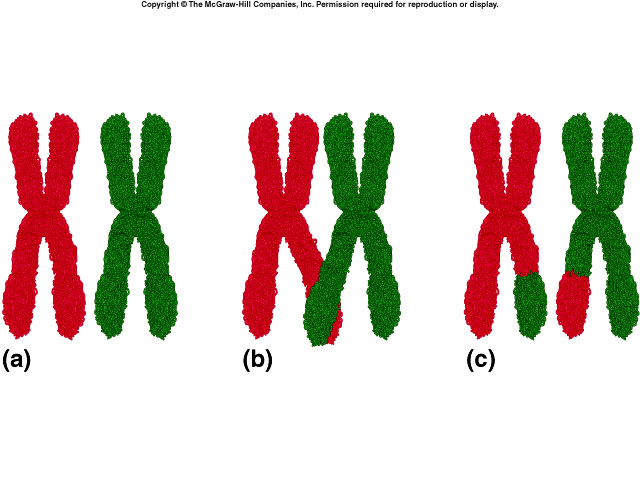
Which letter responds to the organelle that produces cellular energy?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | I | c. | E |
| b. | C | d. | B |

\_\_\_\_ 45. (eoc) Why is it important that the number of chromosomes be reduced during meiosis?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | The cell can grow without the DNA  content increasing. | c. | The chromosome number will stay  constant from one generation to the next. |
| b. | The amount of DNA in the cell can  remain at its lowest number. | d. | The nucleus of the cell will not be  allowed to become larger due to cell  growth. |

\_\_\_\_ 46. (eoc) What is true of the mode of inheritance shown below?



|  |  |  |  |
| --- | --- | --- | --- |
| a. | Genetic information is exchanged. | c. | The gene is always inherited from the same sex. |
| b. | Neither of the two genes masks each other. | d. | The offspring have a different and intermediate form of the parents’ genes. |

\_\_\_\_ 47. (eoc) What is an example of the human body achieving homeostasis through thermoregulation?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Sweat is produced when exercising to  expel excess water. | c. | In order to lower body temperature,  extra melanin is produced in the skin. |
| b. | Sweat is produced when exercising to  keep the body cool. | d. | In order to keep the body warm in the winter, extra blood flows out to the fingers and toes. |

\_\_\_\_ 48. (eoc) What breaks down to form carbon dioxide when bread dough is rising?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | fat | c. | protein |
| b. | fiber | d. | glucose |

\_\_\_\_ 49. (eoc) How are mitochondria and chloroplasts **different**?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Mitochondria do not contain chlorophyll, and chloroplasts do. | c. | Mitochondria capture light energy, and chloroplasts transform energy. |
| b. | Mitochondria only have one membrane, and chloroplasts have two. | d. | Mitochondria are found only in plant  cells, and chloroplasts are found in both plant and animal cells. |

\_\_\_\_ 50. (eoc) Which subunit makes up a protein molecule?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | fatty acids | c. | amino acids |
| b. | nucleotides | d. | monosaccharides |

\_\_\_\_ 51. (eoc)What is an advantage of crossing over during meiosis?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | It increases genetic variations. | c. | It keeps maternal and paternal  chromosomes intact. |
| b. | It decreases genetic mutaitons. | d. | It allows dominant genes to be expressed more often. |

\_\_\_\_ 52. (eoc) What would be the result if the number of chromosomes in sex cells were **not** reduced by half through meiosis?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Offspring would only receive  chromosomes from the male parent. | c. | Offspring would receive one copy of the chromosomes from each parent. |
| b. | Offspring would only receive  chromosomes from the female parent. | d. | O ffspring would receive two copies of the chromosomes from each parent. |

\_\_\_\_ 53. (eoc) Which property of an enzyme and its substrate is complementary?

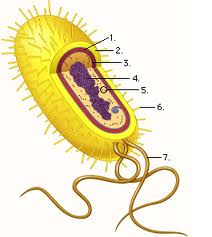
|  |  |  |  |
| --- | --- | --- | --- |
| a. | pH | c. | shape |
| b. | color | d. | temperature |

\_\_\_\_ 54. (eoc) How do exergonic reactions differ from endergonic reactions?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Exergonic reactions absorb energy, while endergonic reactions release energy. | c. | Exergonic reactions occur only in plants, while endergonic reactions occur only in animals. |
| b. | Exergonic reactions release energy,  while endergonic reactions absorb  energy. | d. | Exergonic reactions produce carbon  dioxide, while endergonic reactions  require carbon dioxide. |

**Essay**

55. The graphic below show drawing of what two different types of cells may look like.



Prokaryotic Cell

1. Describe two structural similarities between a eukaryotic cell and a prokaryotic cell.

2. Other than size or shape, describe two structural differences between a eukaryotic cell and a prokaryotic cell.

In your response, be sure to use appropriate scientific names for cellular structures.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

56.

Active and passive transport are very important to cell homeostasis.

1) Identify one type of passive transport and explain in detail how it occurs.

2) Identify one type of active transport and explain in detail how it occurs.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2

**EOC Review Molecules and Cells**

**Answer Section**

**MULTIPLE CHOICE**

1. ANS: A PTS: 1

2. ANS: C PTS: 1

3. ANS: D PTS: 1

4. ANS: A PTS: 1

5. ANS: B PTS: 1

6. ANS: C PTS: 1

7. ANS: D PTS: 1

8. ANS: D PTS: 1

9. ANS: B PTS: 1

10. ANS: C PTS: 1

11. ANS: B PTS: 1

12. ANS: A PTS: 1

13. ANS: C PTS: 1

14. ANS: D PTS: 1

15. ANS: B PTS: 1

16. ANS: C PTS: 1

17. ANS: B PTS: 1

18. ANS: C PTS: 1

19. ANS: A PTS: 1

20. ANS: D PTS: 1

21. ANS: A PTS: 1

22. ANS: B PTS: 1

23. ANS: D PTS: 1

24. ANS: C PTS: 1

25. ANS: A PTS: 1

26. ANS: B PTS: 1

27. ANS: B PTS: 1

28. ANS: D PTS: 1

29. ANS: C PTS: 1

30. ANS: C PTS: 1

31. ANS: A PTS: 1

32. ANS: A PTS: 1

33. ANS: B PTS: 1

34. ANS: B PTS: 1

35. ANS: D PTS: 1

36. ANS: C PTS: 1

37. ANS: D PTS: 1

38. ANS: A PTS: 1

39. ANS: B PTS: 1

40. ANS: B PTS: 1

41. ANS: A PTS: 1

42. ANS: D PTS: 1

43. ANS: D PTS: 1

44. ANS: A PTS: 1

45. ANS: C PTS: 1

46. ANS: A PTS: 1

47. ANS: B PTS: 1

48. ANS: D PTS: 1

49. ANS: A PTS: 1

50. ANS: C PTS: 1

51. ANS: A PTS: 1

52. ANS: D PTS: 1

53. ANS: C PTS: 1

54. ANS: B PTS: 1

**ESSAY**

55. ANS:

Part 1

2 points total, 1 point each

Structural Similarities-

Eukaryotic and prokaryotic cell both have: DNA and/or RNA (genetic material), ribosomes, cytoplasm (cytosol), cytoskeleton, plasma membrane

Part 2

2 points total, 1 point each

Structural Differences-

Eukaryotic cells have membrane bound organelles and prokaryotic cells do not (nucleus, mitochondria, Golgi body, chloroplast, lysosome, endoplasmic reticulum, vacuole)

The cell wall composition differes between eukaryotes and prokaryotes.

Eubacteria-peptidoglycan

Archae-proteins, glycoproteins and polysaccharides

Plants-cellulose

Fungi-chitin

Animals-do not have a cell wall

Unlike eukaryotic DNA, there are not histone proteins associated with prokaryotic DNA.

Prokaryotic DNA is usually circular while eukaryotic DNA is usually linear.

The ribosomes of eukaryotic cells are larger and more complex (contain more types of rRNA and proteins) than prokaryotic ribosomes.

PTS: 1

56. ANS:

Part 1

**2 possible points**

1 point: **Correct answer:**  Diffusion of facilitated diffusion

AND

1 point: Correct and complete explanation: Substances moving from areas of higher concentration to areas of lower concentration.

Or

Substances moving with no input of energy needed

OR

1 point: Correct and complete explanation with no type of passive transport identified:

Substances moving from arease of higher concentration to areas of lower concentration.

AND

Substances moving with no input of energy needed.

OR

.5 point: Incomplete explanation with no type of passive transport identified:

Substances moving from areas of higher concentration to areas of lower concentration.

OR

Substances moving with no input of energy needed.

OR

1 point Correct answer:

Osmosis

AND

1 point Correct and complete explanation:

Water moves through a selectively permeable membrane (cell membrane) from higher to lower concentration

Or

Water moves through a selectively permeable membrane (cell membrane) with no input of energy needed.

Or

1 point Correct and complete explanation with no type of passive transport identified:

Water moves through a selectively permeable membrane (cell membrane) from areas of higher concentration to areas of lower concentration, and water moves with no input of energy needed.

Or

.5 point Incomplete explanation with no type of passive transport identified:

Water moves through a selectively permeable membrane (cell membrane)

Or

Water moves from areas of higher concentration to areas of lower concentration.

Or

Water moving with no input energy needed

Part II

2 points possible

1 point Correct answer:

The student must list one of the following: endocytosis, exocytosis, phagocytosis, pinocytosis, ion pump/ion trasporter (or gives an example of an ion pump), or carrier protein

And

1 point: Correct and complete explanation:

Endocytosis- cell membrane formas a pocket around the substance it want to take in, pinches off to form a vesicle within the cell, or (engulfs/surround it) with an input of energy needed to take place.

OR

Exocytosis- cell membrane forms a pocket around substance to be released from the cell, pinches off to form a vesicle on the outside of a cell with an input of energy needed to take place.

Or

Phagocytosis- cell membrane forms a pockets around food particles it wants to take in, pinches off to form a vesicle within the cell (or engulfs/surrounds it) with an input of energy needed to take place.

Or

Pinocytosis- cell membrane forms a pocket around water it want to take in, pinches off to form a vesicle within the cell, (or engulfs/surrounds it) with an input of energy needed to take place.

Or

Ion Pump/Ion trasnporter (or an example of an ion pump), carrier protein, or protein pump- (the student must list two of the following three facts): protein that moves ions across cell membrane, protein that moves against their concentration gradient, or protein that moves with an input of energy needed to take place.

Or

.5 point Incomplete explanation:

Student noes only one fact for any one type of active transport.

Ex: The student lists one of the following: engulfs particle, uses energy, protein that moves ions, cell eating (for phagocytosis), or cell drinking (for pinocytosis)

PTS: 1