Analogy of the Cell Project

**Objective:** Your goal is to create an analogy that relates to a eukaryote cell. Your final product is a story about something that has similarities to a cell’s structure. There are 8 main parts to an animal cell.

Cell Parts Cell Details

1. Cell Membrane: general function, lipid bilayer structure, osmosis

2. Channel Proteins: general function, facilitated diffusion, active transport

3. Receptor Proteins: general function, hormones, secondary messengers

4. Ribosomes: general function, free, bounded

5. Endoplasmic Reticulum: general function, rough, smooth

6. Golgi Apparatus: general function, modifies protein, exocytosis

7. Mitochondria general function, reactants & products, fermentation

8. Nucleus: general function, nucleolus, nuclear envelope

**Definition of Analogy:** A similarity between things that are otherwise unlike. For example, the motor in a car is analogous to a power plant, since both are used to produce power. Synonyms: resemblance, similarity, comparison, and metaphor.

**Topics:** Every group needs to have their own analogy. No two analogies can be the same. To start, your topic needs to be complex. Second, it is easier if it is a place or thing. Example topics: castle, mall, Hogwarts, Bikini Bottom, school, NYC, concert hall, car, football stadium, cruise ship, hospital, USA, restaurant, factory, etc.

**Paragraphs:** Each paragraph should be about one of the eight parts assigned. There should be 6 or more sentences in the paragraph. There will be eight paragraphs total. The teacher may offer advice on how to improve your paragraphs but if you received no advice that does not mean your paragraph cannot be improved.

**Sentence Order:**

Sentence #1: The first sentence should compare the cell part to the analogy. For example, mitochondria are like the engine of a car.

Sentences #2, 3, 4: The second, third, and fourth sentences should describe the details of the cell. Write a definition for each of the cell details using scientific terms.

Sentences #5, 6: The fifth and sixth sentences should describe the comparison of the analogy. Only write about the analogy. Example: The engine of the car generates energy for the car. The engine of the car transfers chemical energy into mechanical energy.

**Flash Cards:** On , your project is due. Both students write up their own presentation flash cards. Write flash card paragraphs in the order listed above. The flash cards will be used as an aide if you forget what to say during your presentation.

*Flash Card Requirements:* Write the comparison sentence first. The second sentence needs to explain what the cell organelle/part does, and the third sentence must explain the specific part of the analogy and how it works.

**Group / Individual Work:** Students will have roughly 20 minutes in class to work with their partner. Paragraphs are due in class. Partners can discuss ideas, concepts, analogies, and supporting evidence. Partners can turn in the same paragraph but each member must write it up individually.

**Grading:** This is a 100-point project. Each paragraph is worth 5 points for a total of 40 points. The flash cards and visual aid are 40 points and are due at the end of your presentation. The mandatory presentation is 20 points. Please see the rubric for more details.

**Going Further:** Students can earn extra points by writing more than eight paragraphs. Class time will be allotted for just eight paragraphs. This means that you either need to work on this outside of class or come to class prepared and work fast during class. The following are the extra paragraph possibilities: 1) Do the analogy on a plant cell instead of an animal cell. There are three new items in plant cells: chloroplasts, cell wall, and central vacuole. 2) Describe the cytoskeleton and its structure, as well as how it aides in cell division. 3) Describe other cell organelles including peroxisomes, lysosomes, and vacuoles.

**Analogy Comparisons:** A eukaryote cell can be compared to a house. The outside walls are like the cell membrane. The front and back doors are like channel proteins. The satellite dish is like a receptor protein. The kitchen is like the ribosomes. The halls and stairs are like the endoplasmic reticulum. The mailbox is like the Golgi apparatus. The food produced by the kitchen is like the proteins. The furnace of the house is like the mitochondria. Last, the people inside the house are like the nucleus.

My Analogy Topic

1. Cell Membrane

2. Channel Protein

3. Receptor Protein

4. Ribosome

5. Endoplasmic Reticulum

6. Golgi Apparatus

7. Mitochondria

8. Nucleus

Name:

Date: Period:

Cell Analogy Rubric

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Below Average | Average | Above Average | Excellent | Grade |
| Flash Cards | Incorrect format or 3+ cards missing or poor English.  5 Points | Correct format and 1-2 cards missing.  6 Points | Correct format, all cards completed, correct English, and detailed sentences.  8 Points | Everything is Proficient. Advanced explanation of cell theory  10 Points |  |
| Visual Aid | Incomplete or visual aid (text and drawings) are too small for the audience to see.  15 Points | Text is small and difficult to read.  20 Points | Visual aid is large, and labels are easy to read.  25 Points | Everything is Proficient. Plus colorful, clear and concise, good looking. You may use a large detailed model.  30 Points |  |
| Presentation | Students are not dressed up. Student reads from their note cards.  10 Points | Students sometimes read from note cards, and sometimes looking at the audience.  12 Points | Student glances at note cards, looks at the audience, and projects their voice. Student may look at the cards while the partner is presenting.  17 Points | Students are dressed up, don’t read from note cards while presenting, share equal parts, looking at the audience, and project their voice.  20 Points |  |
| Paragraph #1 | Vague analogy, not correct format, or no explanation of science.  2 Points | Analogy relates to cell, missing two of the six sentences, or the paragraph format is in wrong order.  3 Points | Good analogy that relates to cell part but is missing one of the six sentences.  4 Points | Creative analogy and has 3+ detailed sentence explanation of science.  5 Points |  |
| Paragraph #2 | Vague analogy, not correct format, or no explanation of science.  2 Points | Analogy relates to cell, missing two of the six sentences, or the paragraph format is in wrong order.  3 Points | Good analogy that relates to cell part but is missing one of the six sentences.  4 Points | Creative analogy and has 3+ detailed sentence explanation of science.  5 Points |  |
| Paragraph #3 | Vague analogy, not correct format, or no explanation of science.  2 Points | Analogy relates to cell, missing two of the six sentences, or the paragraph format is in wrong order.  3 Points | Good analogy that relates to cell part but is missing one of the six sentences.  4 Points | Creative analogy and has 3+ detailed sentence explanation of science.  5 Points |  |
| Paragraph #4 | Vague analogy, not correct format, or no explanation of science.  2 Points | Analogy relates to cell, missing two of the six sentences, or the paragraph format is in wrong order.  3 Points | Good analogy that relates to cell part but is missing one of the six sentences.  4 Points | Creative analogy and has 3+ detailed sentence explanation of science.  5 Points |  |
| Paragraph #5 | Vague analogy, not correct format, or no explanation of science.  2 Points | Analogy relates to cell, missing two of the six sentences, or the paragraph format is in wrong order.  3 Points | Good analogy that relates to cell part but is missing one of the six sentences.  4 Points | Creative analogy and has 3+ detailed sentence explanation of science.  5 Points |  |
| Paragraph #6 | Vague analogy, not correct format, or no explanation of science.  2 Points | Analogy relates to cell, missing two of the six sentences, or the paragraph format is in wrong order.  3 Points | Good analogy that relates to cell part but is missing one of the six sentences.  4 Points | Creative analogy and has 3+ detailed sentence explanation of science.  5 Points |  |
| Paragraph #7 | Vague analogy, not correct format, or no explanation of science.  2 Points | Analogy relates to cell, missing two of the six sentences, or the paragraph format is in wrong order.  3 Points | Good analogy that relates to cell part but is missing one of the six sentences.  4 Points | Creative analogy and has 3+ detailed sentence explanation of science.  5 Points |  |
| Paragraph #8 | Vague analogy, not correct format, or no explanation of science.  2 Points | Analogy relates to cell, missing two of the six sentences, or the paragraph format is in wrong order.  3 Points | Good analogy that relates to cell part but is missing one of the six sentences.  4 Points | Creative analogy and has 3+ detailed sentence explanation of science.  5 Points |  |

Total Points:

References:

Inc., L. P. (2007). *Analogy of the Cell Project*. Retrieved April 23, 2012, from Lesson Plans Inc.: http://www.lessonplansinc.com/lessonplans/cell\_analogy\_project.pdf