Prokaryote And Eukaryote Cells Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

Which of the following structures is found in eukaryotic cells but not in prokaryotic cells?

Hint: Think about the defining features of eukaryotic cells.

- ◯ Ribosomes
- ◯ **Nucleus ✓**
- ◯ Cell wall
- ◯ Cytoplasm

> Eukaryotic cells have a nucleus, which is not present in prokaryotic cells.

Which of the following are characteristics of prokaryotic cells?

Hint: Consider the basic features that define prokaryotic cells.

- ☐ **Lack of a nucleus ✓**
- ☐ Presence of membrane-bound organelles
- ☐ **Smaller size compared to eukaryotic cells ✓**
- ☐ **Single-celled organisms ✓**

> Prokaryotic cells lack a nucleus, are generally smaller, and are often single-celled.

Describe the primary differences between the genetic material of prokaryotic and eukaryotic cells.

Hint: Consider the structure and organization of DNA in both cell types.

Prokaryotic cells have circular DNA that is not enclosed in a nucleus, while eukaryotic cells have linear DNA organized into chromosomes within a nucleus.

List two examples of organisms that are classified as prokaryotes and two examples of organisms that are classified as eukaryotes.

Hint: Think about common microorganisms and larger organisms.

1. Prokaryote example 1

E. coli

2. Prokaryote example 2

Streptococcus

3. Eukaryote example 1

Humans

4. Eukaryote example 2

Oak tree

> Examples of prokaryotes include bacteria and archaea, while examples of eukaryotes include plants and animals.

Part 2: Comprehension and Application

What is the primary function of the mitochondria in eukaryotic cells?

Hint: Consider the role of mitochondria in energy production.

- ◯ Photosynthesis
- ◯ Protein synthesis
- ◯ **Energy production ✓**
- ◯ DNA replication

> The primary function of mitochondria is to produce energy in the form of ATP through cellular respiration.

Which of the following statements are true about eukaryotic cells?

Hint: Think about the defining features of eukaryotic cells.

- ☐ **They have a defined nucleus. ✓**
- ☐ They reproduce only through binary fission.
- ☐ **They contain multiple linear chromosomes. ✓**
- ☐ **They are generally larger than prokaryotic cells. ✓**

> Eukaryotic cells have a defined nucleus, contain multiple linear chromosomes, and are generally larger than prokaryotic cells.

Explain how the presence of organelles in eukaryotic cells contributes to their complexity compared to prokaryotic cells.

Hint: Consider the functions of different organelles.

> **Organelles allow eukaryotic cells to compartmentalize functions, leading to greater specialization and complexity compared to prokaryotic cells, which lack such structures.**

If a scientist discovers a new single-celled organism with a nucleus, which category does it most likely belong to?

Hint: Consider the defining features of prokaryotes and eukaryotes.

- ◯ Prokaryote
- ◯ **Eukaryote ✓**
- ◯ Virus
- ◯ Archaea

> A single-celled organism with a nucleus is most likely a eukaryote.

In which scenarios would you expect to find prokaryotic cells thriving?

Hint: Think about the environments where prokaryotes are commonly found.

- ☐ **In extreme environments like hot springs ✓**
- ☐ **In the human gut ✓**
- ☐ **In the ocean ✓**
- ☐ **On the surface of leaves ✓**

> Prokaryotic cells thrive in diverse environments, including extreme conditions and various ecosystems.

Part 3: Analysis, Evaluation, and Creation

Which of the following best explains why eukaryotic cells can form multicellular organisms?

Hint: Consider the structural and functional advantages of eukaryotic cells.

- ◯ They have a simpler structure.
- ◯ They can perform photosynthesis.
- ◯ **They have specialized organelles that allow for complex functions. ✓**
- ◯ They reproduce faster than prokaryotic cells.

> Eukaryotic cells can form multicellular organisms due to their specialized organelles that allow for complex functions.

Analyze the following statements and select those that explain the evolutionary advantage of eukaryotic cells over prokaryotic cells.

Hint: Think about the benefits of cellular complexity and organization.

- [x] **Ability to compartmentalize functions ✓**
- [x] **Larger size allows for more complex structures ✓**
- [ ] Faster reproduction rate
- [x] **Greater genetic diversity through sexual reproduction ✓**

> Eukaryotic cells have evolutionary advantages due to their ability to compartmentalize functions and their larger size, which allows for more complex structures.

Compare and contrast the cell wall composition of prokaryotic and eukaryotic cells, and discuss how this affects their environmental interactions.

Hint: Consider the materials that make up the cell walls and their functions.

> **Prokaryotic cell walls are typically made of peptidoglycan, while eukaryotic cell walls (in plants) are made of cellulose, affecting their interactions with the environment.**

Which of the following scenarios would most likely lead to the evolution of a new eukaryotic species?

Hint: Consider the processes that drive speciation.

- ○ A prokaryotic cell acquiring a new plasmid
- ○ A eukaryotic cell undergoing mitosis
- ○ **A eukaryotic cell adapting to a new environment through genetic mutations ✓**
- ○ A prokaryotic cell forming a biofilm

> A eukaryotic cell adapting to a new environment through genetic mutations is most likely to lead to the evolution of a new species.

Evaluate the impact of antibiotics on prokaryotic cells and select the statements that are true.

Hint: Think about how antibiotics function and their targets.

- [x] **Antibiotics can disrupt cell wall synthesis. ✓**
- [x] **Antibiotics can inhibit protein synthesis. ✓**
- [x] **Antibiotics have no effect on eukaryotic cells. ✓**
- [ ] Antibiotics can cause mutations in eukaryotic DNA.

> Antibiotics can disrupt cell wall synthesis and inhibit protein synthesis in prokaryotic cells, but they generally have no effect on eukaryotic cells.

Design an experiment to test the effects of a new antibiotic on both prokaryotic and eukaryotic cells. Describe the steps you would take and the controls you would use.

Hint: Consider the experimental design and necessary controls.

> **An effective experiment would involve culturing both cell types, applying the antibiotic, and measuring growth or survival rates to compare effects.**