Salt Marsh Survivors

Cell functions, inherited traits, and adaptation in a coastal ecosystem

8.13 "Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to: identify the function of the cell membrane, cell wall..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each named cell structure and the words that tell its function. Circle genes and chromosomes, then write S, B, or P beside each structural, behavioral, or physiological adaptation example.

Mangroves Meet the Coast

1. Inside a mangrove leaf cell, a cell membrane controls what enters and leaves. A stiff cell wall supports and protects the plant cell. Cytoplasm, a jellylike fluid, holds many cell parts. The nucleus stores chromosomes. Ribosomes build proteins by following genetic instructions. Mitochondria release usable energy from food, while chloroplasts capture light energy to make sugar. A large vacuole stores water and dissolved materials. Together, these parts help a mangrove leaf remain firm and make food in a salty coastal habitat.

2. Chromosomes are long DNA-containing structures in the nucleus, and they carry many genes. A gene is a section of DNA that contains instructions for a trait, such as how much salt a mangrove seedling can tolerate. Offspring receive genes from parents, so inherited traits can resemble parental traits. Different versions of a gene can lead to variation, or differences, among members of one population. For example, some seedlings may inherit versions that help their cells manage salt more effectively than others. These differences are present before the environment sorts which plants leave more offspring.

3. After storms flood a coast, mangrove seedlings with traits that help them survive salty water are more likely to grow, reproduce, and pass on their genes. Over many generations, helpful variations can become more common. A structural adaptation is a physical feature, such as roots that help anchor a tree in soft mud. A behavioral adaptation is an action, such as crabs moving into burrows during extreme heat. A physiological adaptation is an internal process, such as mangroves moving excess salt into older leaves. Each adaptation can affect survival and reproductive success.

2 ANSWER WITH EVIDENCE

Use the passage

1. How could a cell wall and a vacuole work together to help a mangrove leaf remain firm?

2. How are chromosomes, genes, and ribosomes connected to protein production in a mangrove cell?

3. Why might some mangrove seedlings survive salty water and leave more offspring than other seedlings in the same population?

4. Compare the structural adaptation of anchoring roots with the physiological adaptation of moving salt into older leaves. How can each improve a mangrove's chance to reproduce?

3 YOUR TURN

Your own words

Invent a coastal plant population. In five to seven sentences, name one cell structure and explain its function, explain an inherited gene variation, and describe a structural, behavioral, or physiological adaptation that makes some individuals more likely to leave offspring.

ANSWER KEY

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GRADE 8 · TEKS 8.13

PART 1 · READ AND MARK

Underline each named cell structure and the words that tell its function. Circle genes and chromosomes, then write S, B, or P beside each structural, behavioral, or physiological adaptation example. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How could a cell wall and a vacuole work together to help a mangrove leaf remain firm?	**The cell wall supports and protects the plant cell, while the vacuole stores water and dissolved materials. Water in the vacuole helps support the cell's firmness.**
2	How are chromosomes, genes, and ribosomes connected to protein production in a mangrove cell?	**Chromosomes carry genes in the nucleus. Genes contain genetic instructions, and ribosomes use those instructions to build proteins.**
3	Why might some mangrove seedlings survive salty water and leave more offspring than other seedlings in the same population?	**Some seedlings may inherit different gene versions that help their cells manage salt more effectively. Those seedlings are more likely to survive, reproduce, and pass on their genes.**
4	Compare the structural adaptation of anchoring roots with the physiological adaptation of moving salt into older leaves. How can each improve a mangrove's chance to reproduce?	**Anchoring roots help a tree stay in soft mud, while moving excess salt into older leaves helps the plant manage salt internally. Both traits can help the mangrove survive long enough to reproduce.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

In a coastal grass population, chloroplasts capture light energy to make sugar for each plant. Some plants inherit gene versions that cause them to make more protective substances when salt enters their roots. This physiological variation helps those plants keep working in salty soil. They survive long enough to produce more seeds than plants without that variation. Over generations, the helpful gene version may become more common in the population.

Accept accurate explanations that connect a cell structure to its stated function and connect inherited variation to differences in survival and reproduction. For the open task, accept any accurate adaptation type and any correctly described cell structure.