

SCIENCE·3D

DESERT BATTLE: NINJA RAT VS RATTLESNAKE

In this packet, sample student answers are provided in **red** and notes to teachers are in **blue**.

During this **Mission Research**, students will use what they learned in the **Mission Reader** to reinforce and expand their understanding of cell structure and function and body systems. They will explore how different types of venom disrupt cells, tissues, and organs.



ACTIVITY I: VENOM AND CELLS

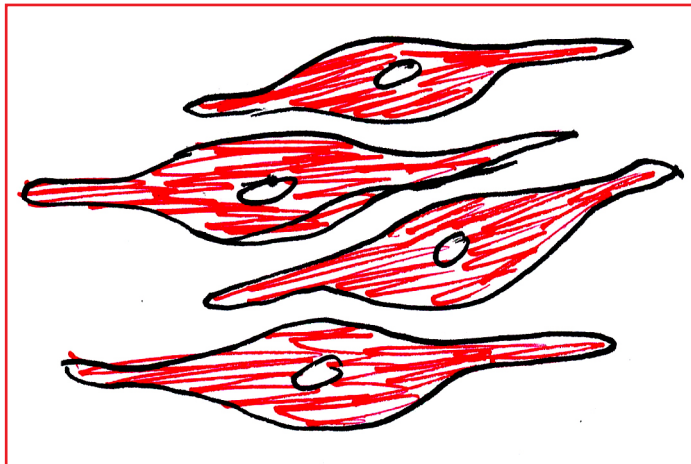
Tell the students they are about to help out with a scientific investigation of rattlesnakes and deserts, but before they get started, they need to learn more about them! To help with active reading, instruct the students to read the book independently. Have them take notes and encourage them to make drawings and diagrams of the information they gather to help them remember key information. Also, encourage them to write down anything that they find confusing or questions they might want to explore further! To complete the activity below, have students use the **Reader**, books, or online research to investigate cells and cell structure. Students can complete the activities independently or in groups (preferred).

Snake venom is built to disrupt the cells and organs of their victims. But what roles do the disrupted cells play in the body? How does the disruption work? Let's investigate for the three major types of venom!

Different types of venom attack different types of body cells. For each type of body cell, draw a picture of the cell, list its function, the tissue/organ they are associated with, and what would happen if the function of that cell were disrupted.

1. Muscle cells

My illustration:



Function:

contract to create movement

Tissue/organ:

muscle tissue/muscles (can give full credit for muscles)

Body system:

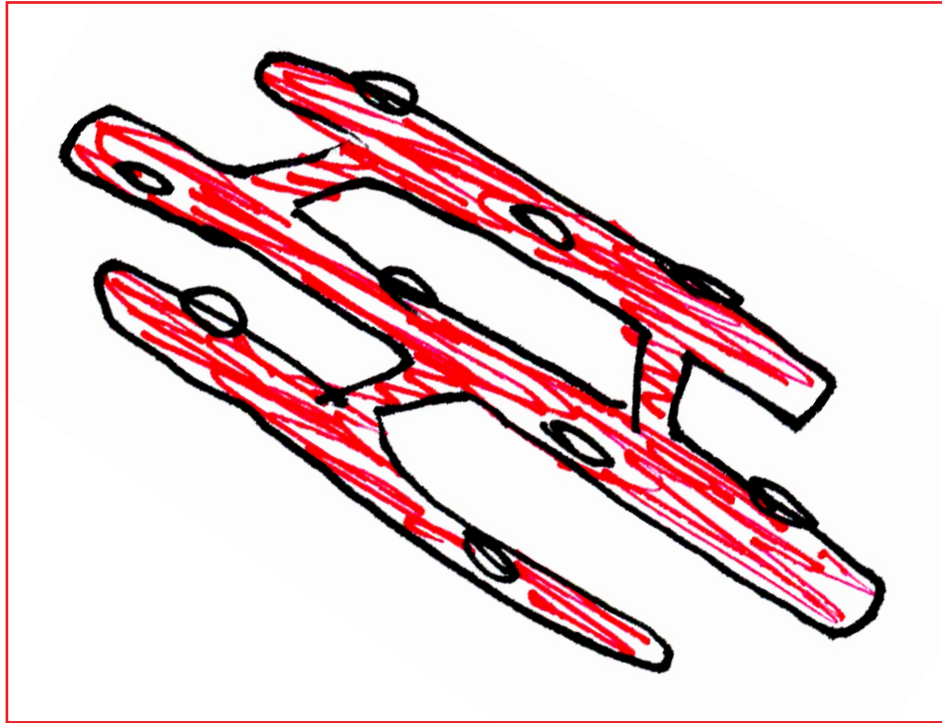
muscular system

What happens if the function is disrupted by venom?

Muscles will not contract; paralysis may occur.

2. Cardiac cells

My illustration:



Function:

contract to cause heart to beat

Tissue/organ:

cardiac muscle tissue and heart (can give full credit for heart)

Body system:

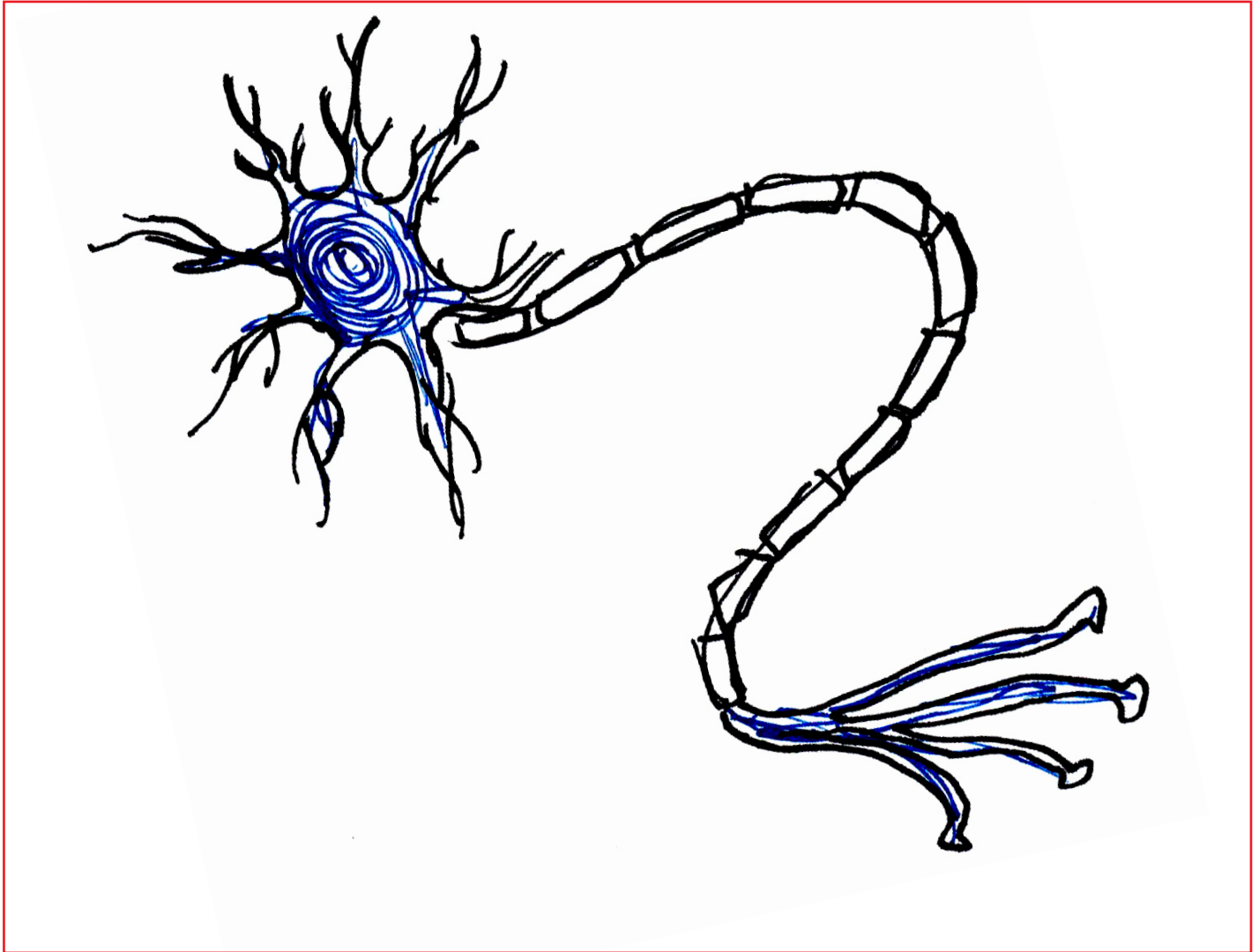
circulatory system

What happens if the function is disrupted by venom?

The heart will stop beating; blood will not circulate to the body.

3. Neurons

My illustration:



Function:

transmit messages as part of the nervous system

Tissue/organ:

brain, spinal cord, nerves, nervous system (not necessary to get all of these)

Body system:

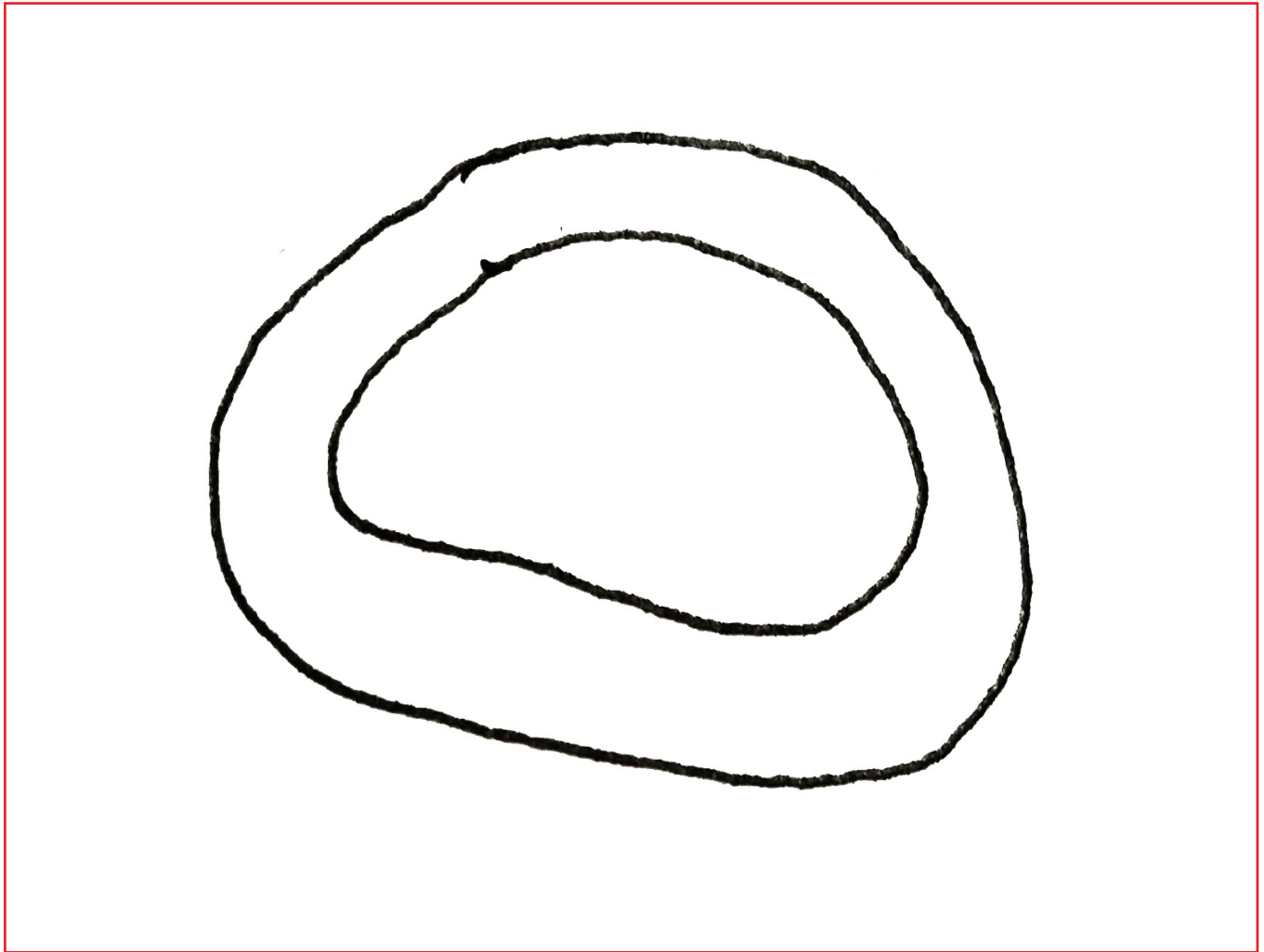
nervous system

What happens if the function is disrupted by venom?

Messages will not be sent from the brain to the rest of the body and the body will fail.

4. Red blood cells

My illustration:



Function:

carry oxygen from lungs to other body tissue

Tissue/organ:

blood, veins, capillaries, heart, lungs (not necessary to get all of these)

Body system:

circulatory system

What happens if the function is disrupted by venom?

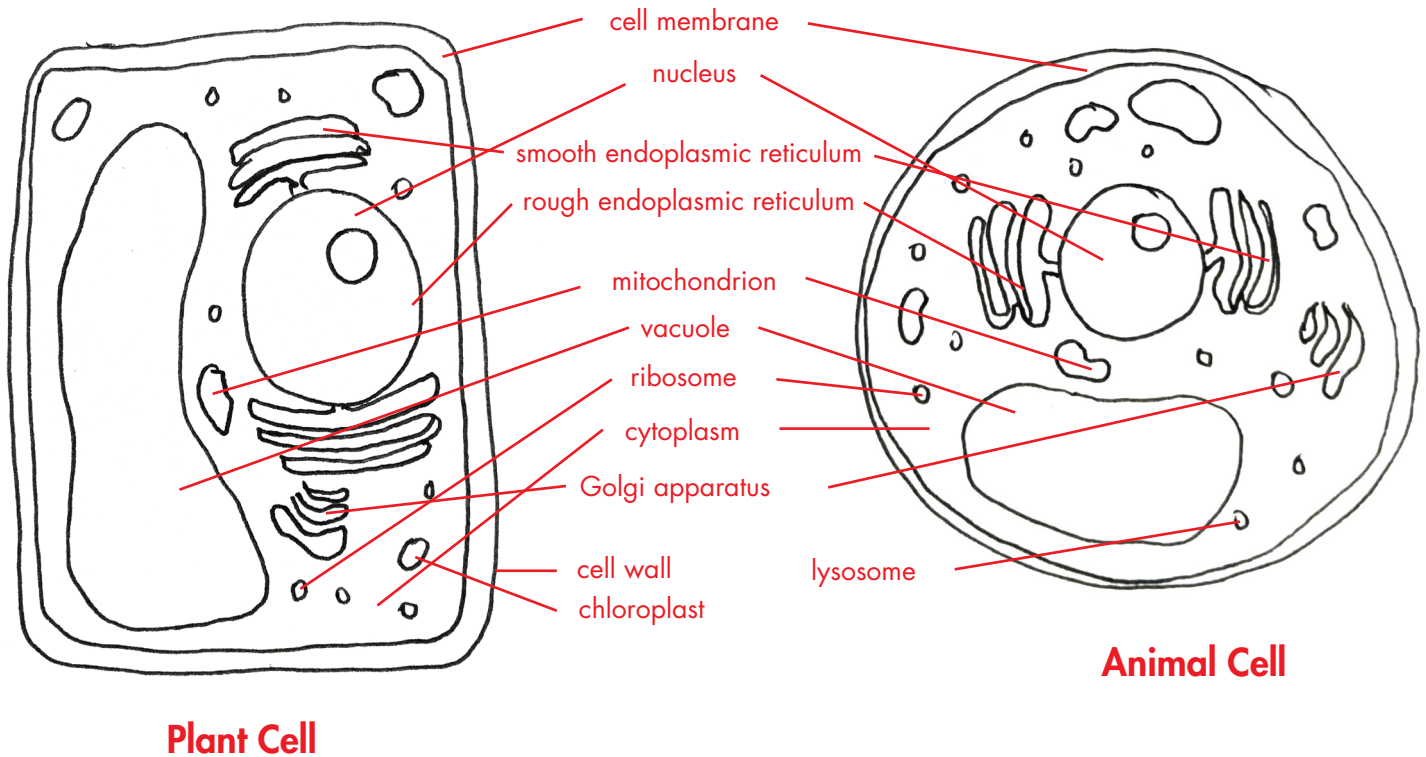
Oxygen will not be delivered to the body.

ACTIVITY 2: ANIMAL AND PLANT CELLS

Plants are also made of cells, but their cells are not exactly the same as those of animals. Use books or online resources to explore their similarities and differences.

1. **Draw** a diagram of a plant cell next to an animal cell. For each cell, make sure that you include all of the structures listed below that are part of that cell.

Nucleus, mitochondrion, chloroplast, cell wall, cell membrane, cytoplasm, genetic material, vacuole, Golgi apparatus, smooth endoplasmic reticulum, rough endoplasmic reticulum, ribosome, lysosome



2. **Compare** and **contrast** the plant and animal cells.

Plant and animal cells have many of the same structures. Some of these include mitochondria, the nucleus, ribosomes, the cell membrane, endoplasmic reticulum and Golgi apparatus. Plant cells have one large vacuole and animal cells have many smaller ones. Plant cells have chloroplasts for photosynthesis. Also, plant cells have a strong cell wall.

3. Briefly **describe** the function of the structures you drew:

Nucleus: contains genetic material

Mitochondria: convert food into energy the cell uses

Chloroplast: uses energy from sun to create sugars that store energy (location of photosynthesis)

Cell wall: provides rigid support of the cell

Cell membrane: protection and controls materials going in and out of the cell

Cytoplasm: surrounds and supports organelles

Genetic material: contains the information for the cell to function

Vacuole: contains materials and waste, maintains pressure in cell

Ribosome: make proteins

Golgi apparatus: moves proteins around the cell

Smooth endoplasmic reticulum: makes lipids (doesn't have ribosomes)

Rough endoplasmic reticulum: has ribosomes on the outside; making and processing proteins

Extend the Lesson: An additional extension of the lesson would be to compare and contrast prokaryotic and eukaryotic cells. For the activity below, you can remove specific structures as needed.