

## Answer Guide Under the Microscope

## Grades 6-8

### 1. Answers will vary, but should include this list of organelles.

- Nucleus
- Endoplasmic reticulum
- Mitochondria
- Golgi Apparatus
- Peroxisome
- Lysosome
- Cell membrane
- Ribosome

The **nucleus** stores the DNA of a cell, and is responsible for carrying out the genetic functions of the cell.

The **Golgi apparatus** is like a packing plant inside the cell. The cell brings proteins to the Golgi apparatuses where they are packaged in vesicles and shipped outside of the cell.

The **mitochondria** is the powerhouse of the cell, it is where cellular respiration happens and sugars are converted into energy.

The **lysosomes** are responsible for destroying waste and other harmful stuff inside of the cell.

The **endoplasmic reticulum** is where the proteins coded for by DNA are made.

### 2. Substitutions, insertion, and deletion

After genes mutate, a permanent change is made to the DNA molecule. Sometimes this has no effect on the protein made by the gene. Other times this can change the order of the bases, resulting in altered proteins produced from the DNA. These altered proteins are then unable to carry out their intended function(s).

### 3. Some answers could include eliminating hereditary disease, scientific research, making crops more resistant to climate change.

**Benefits:** Some answers could include creating healthier animals, plants, or humans.

**Risks:** Some answers could include creating designer babies, increasing vulnerability to disease, biological weapons, etc.

### 4. The other type of reproduction is called mitosis.

Mitosis (or asexual reproduction) results in 2 cells being created from each parent cell. These resulting cells both have a full set of chromosomes unlike the cells resulting from meiosis which only have a half set. Meiosis creates genetic variation because when the two haploid cells combine you get one cells with two different half sets of chromosomes, this means that the resulting cells have two different sets of genes making it different from both of the parents genetically.

#### 1. Prophase, 2. Metaphase, 3. Anaphase, 4. Telophase, 5. Cytokinesis

5. It is also possible to obtain traits based on the conditions which you live in, such as animal fur turning white during winter, dogs shedding their coats when it gets warm out, and many more.
6. **Stomach, small intestine, gallbladder, liver**
7. **Cells communicate with each other by sending signals.** These can be something like electrical signals sent through neurons in the nervous system or hormones sent through our blood streams.
8. **The brain receives information from neurons throughout our body which send signals for things such as temperature, touch, pain, and many more.** These signals are then processed by the brain, and signals are sent out to the muscles of our bodies allowing us to interact with the world around us.