6. **Find The Recipe of Life.** DNA can have mutations which can change the sequences of genes. These mutations are what allow new traits to develop and can be beneficial, harmful, or neutral to the organism. What are the three different types of mutations?

_____

What happens when genes are mutated?

_____

_____

_____

7. **CRISPR** is a system that is able to cut strands of DNA at very specific locations. Scientists use **CRISPR** to edit genes and make precise changes to DNA sequences. What is one application of CRISPR?

_____

_____

What are some potential risks or benefits of using CRISPR to edit genes?

_____

_____

_____

_____

MUSEUM OF NATURAL HISTORY
UNIVERSITY OF MICHIGAN

Discovery Guide
Under the Microscope
Grades 9-12

Directions

Answer the guide as you travel through *Under the Microscope.*

1. **Find Common Processes.** What animals do humans share a common process of early stage **embryonic development** with?

_____

In certain groups of species, cells from embryonic development have many similarities, but evolution has shaped those similar cells differently in different species. Give an example of how similar cells can result in different features.

_____

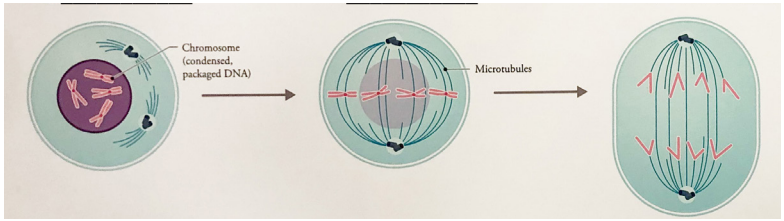
_____

2. **Find the Transparent Anatomy Manikin.** Our body has many systems which function together to maintain life. Homeostasis is the process by which the body maintains a livable condition. One example is when the body's blood sugar level is too high. When this occurs, the pancreas releases insulin to lower blood sugar levels. If blood sugar is too low, the liver can release sugar back into the bloodstream. What is another example of homeostasis in the body?

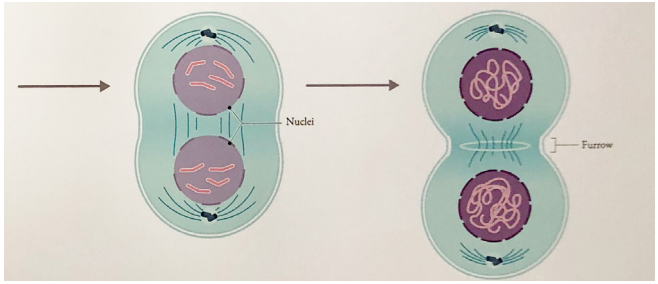
_____

_____

3. **Find Everybody Grows.** There are two processes for cell replication in humans: **Meiosis** and mitosis. **Meiosis** creates 4 cells with half a set of chromosomes. These cells join with other meiosis-produced cells to create one cell with a full set of chromosomes. Since both halves came from different parents it creates genetic variation. **Mitosis** creates two cells from one cell which are identical to the parent cell. In the model below, label each stage of mitosis.

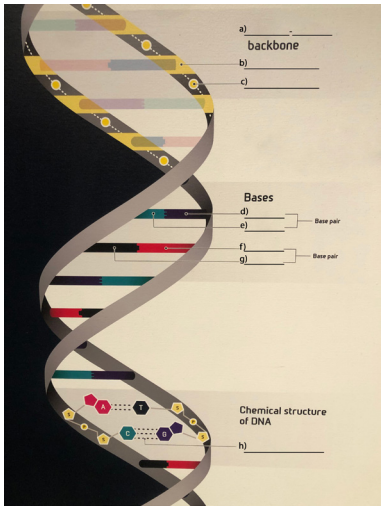


1. _____ 2. _____ 3._____



4. _____ 5. _____

4. **Find The ATCG's of Life. DNA** is the instruction manual of our cells, responsible for coding for the proteins we need to live. DNA has a distinct double helix structure made of a backbone and base pairs. Using the picture of the DNA model found in the exhibit, fill in the blanks to label the DNA model below. Make sure that the bases are matching the correct paired bases.



a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

g. _____

h. _____

5. **Find Continue the Code with the DNA model.** Try to assemble the strand of DNA! DNA contains things called codons. What is a codon?

_____

_____

_____

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