**UNDERSTANDING GENETIC MUTATIONS TIME:** 60 minutes total within 2-3 Days

**ESSENTIAL QUESTION:** Are mutations always harmful to organism?

**EXPECTATIONS:** Complete the instructions below in order. You can break it up in 20-30 minute sessions OR do as much as you prefer, then take a break. Since your goal is to be able to describe how mutations happen inside a cell, you need to study resources that will help this make sense. If the resources provided in the lesson don’t help you, check out the other resources below instead.

**PART 1 (20-30 minutes)** (Available in Actively Learn)

**WARM-UP:**  Watch this quick video then answer the questions Video Link: <https://learn.genetics.utah.edu/content/basics/mutation/>

Answer these questions to prepare for what you’re about to learn. (It’s okay not to know the answers yet. Thinking about them first helps prepare your brain for learning).

Q1: **When are mutations good? When are mutations bad?**

Q2:  ***What factors might cause genetic mutations?***

**USING YOUR MODEL:**  Read this article and complete the directions below

Article Link: [How Stuff works: Genetic Mutations Link](https://science.howstuffworks.com/life/genetic/dna-mutation.htm)

Next to your original model draw a revision model showing what might happen to the cell to cause a mutation and describe 3 possible causes for these mutations.

**REVIEW:** Try to answer the questions again. (They should make more sense now).

 Q1: **When are mutations good? When are mutations bad?**

 Q2:  ***What factors might cause genetic mutations?***

**FINISHED EARLY? GOT QUESTIONS? NEED DIFFERENT RESOURCES?**

**Explore:** <https://www.amnh.org/explore/ology/genetics>

**PART 2 (20-30 minutes)**

**RESEARCH:** Watch this video to look for environmental causes of genetic mutations. (Watch the other videos if you are curious to know more about how mutations work). Video Link: <https://www.pbs.org/pov/watch/inthefamily/video-inthefamily-classroom-clip-gene-mutation-animation/>

**EXPLORE:**  Write down 3 questions you have about genetic mutations then follow this link to look for answers to your questions. Record them on paper or digitally. Resource Link: <https://www.amnh.org/explore/ology/genetics>

**PART 3 (20-30 minutes)**

**PRACTICE:**  Follow this link to go on a quest for helping save a dragon using genetics.

 Resource Link:<http://demo.geniverse.concord.org/>

**HINT:** There is no need to create an account. Just play with the “Demo” option, or “Play as guest”.

**REVISED THOUGHTS:** Complete these reflection questions to see how much you’ve grown your learning and email your teacher a copy, so they know how to help you.

 Q1: ***What was surprising about genetics?***

 Q2: ***What did you already know but see in a new way?***

 *Q3:* ***What do you still need help with?***

**FINISHED EARLY? GOT QUESTIONS? NEED DIFFERENT RESOURCES? WANT A CHALLENGE?**

**Experiment:** [http://learn.genetics.utah.edu/content/labs/extraction/](https://learn.genetics.utah.edu/content/labs/extraction/howto/)

**Video:** [Bill Nye Genes on Youtube Link](https://www.youtube.com/watch?v=H2Vw6HgMmTs)  **OR**  [PBS Video Link](https://www.pbs.org/video/dna-doesnt-look-like-what-you-think-qudzfw/)

**What does DNA REALLY look like?** <https://genetics.thetech.org/online-exhibits/zooming-dna>