

Lesson	Cross Curricular	Computational Thinking
	Safety Notes	Practice proper posture when using a computer
Big Ideas <ul style="list-style-type: none"> Demonstrate an understanding of concepts related to molecular genetics Learning Goals <ul style="list-style-type: none"> Students will learn about the various types of mutations and their impact on the organism Students will learn and explain how mutagens change genetic material to cause mutations. Students will learn about computational thinking. Students will code a game using Scratch on molecular genetics. 	Specific Expectations <ul style="list-style-type: none"> Explain how mutagens, such as radiation and chemicals, can cause mutations by changing the genetic material in cells (e.g., the mechanisms and effects of point mutations and frameshift mutations) 	

Description

Students will learn how mutagens can cause mutations by changing the genetic material in cells.

Materials <ul style="list-style-type: none"> <i>Molecular Genetics Mutations Exploration</i> handout <i>Molecular Genetics Mutations Exploration Teacher Copy</i> handout <i>Molecular Genetics Mutations PowerPoint</i> Internet Internet Accessible Devices such as Chromebooks, Computers, or Ipads 	Accommodations/Modifications Students have the opportunity to type, verbally record with speech-to-text software, and draw their answers.
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Introduction

- Introduction: View refresher video on Concept Map: <https://www.youtube.com/watch?v=sZJj6DwCqSU>
- After viewing the video, the educator will direct students, in pairs, to create a concept-map using one colour (ex. Only black pen) to demonstrate their ideas on genetic mutations. Students are encouraged to use words, drawings, different fonts, etc. to demonstrate their

ideas.

- The educator will use prompts such as *Teenage Mutant Ninja Turtles*, *Blue Eye Colour*, *Radiation*, *Cancer*, etc. to help students brainstorm genetic mutations.

Action

- Complete *Molecular Genetics Mutations PowerPoint* with Amoeba Sisters video <https://www.youtube.com/watch?v=v16V1f2thvI>
- Educators will pause the PowerPoint on Slide 17 and direct students to try the Exploration Genetic Mutation online Scratch program, <https://scratch.mit.edu/projects/360798931/>
- Students, in pairs, will complete the program, and answer the understanding and making connections questions on the *Molecular Genetics Mutations Sentence Exploration* handout.
- Educators will facilitate a class discussion on ideas and answers for *Molecular Genetics Exploration* handout with Slides 17-23 in the *Molecular Genetics Mutations PowerPoint*
- Educators will continue with the *Molecular Genetics Mutations PowerPoint* on Slide 24, facilitating class discussion with questions.
- Students will then design and create a coded game on Molecular Genetics in the **Brainstorming** section of the *Molecular Genetics Mutations Sentence Exploration* handout, examples ideas include *Find the Stop Code*, *Avoid Mutagens*, *Matching Nucleotides*.
- Educators can provide students with this example Nucleotide Matching Scratch game, <https://scratch.mit.edu/projects/360072232/>

Consolidation/Extension

- Students will share their Scratch game with their peers and educator.
- Students will test out their peers' Scratch games and provide feedback on their coding.
- To consolidate the lesson, the educator will direct students, in pairs, to add to their concept-map using a different colour (ex. *If they used black pen to create the concept-map, they will now use a blue pen to add to the concept-map*) to expand on their genetic mutation ideas. Students are encouraged to use words, drawings, different fonts, etc. to demonstrate their ideas.