

Attack of the 50 Foot Mutant: Radiation in Popular Culture

How do fictional portrayals of the sources and effects of ionizing radiation compare to the known sources and biological effects of ionizing radiation?



overview

LESSON CONTEXT

Since the dawn of the atomic age, fears of the effects of ionizing radiation have manifested themselves in popular culture through the creation of mutants, either monsters or superheroes, from exposure to ionizing radiation.

LEARNING GOALS

- Understand that popular portrayals of ionizing radiation are often inaccurate scientifically.
- Demonstrate an understanding of the sources of ionizing radiation and how it enters and affects the body of an organism.
- Evaluate evidence and consider alternative perspectives, ideas, and explanations.

LEARNING ACTIVITIES

In this lesson, students will examine whether there is any scientific basis for some of effects of ionizing radiation in popular culture through the creation of a poster featuring a mutant that is the product of exposure to ionizing radiation.

BIG IDEAS

Popular portrayals of the sources and effects of ionizing radiation often do not reflect scientific understandings of those sources and effects.

assessment & evaluation

PRIOR KNOWLEDGE AND SKILLS

- Experience locating legitimate information using internet sources
- Familiarity with ionizing radiation
- It would be beneficial for students to complete the **From the Outside In: Biological Effects of Radiation** lesson and the **It's All Greek to Me: Radioactive Decay** lesson to establish prior knowledge or review concepts.

SUCCESS CRITERIA

- Students participate in meaningful discussion during class discussion
- Posters demonstrate student understanding of ionization radiation
- Students can identify misconceptions about mutation in popular culture

ASSESSMENT STRATEGIES

- Observation of large group discussions
- Review of **Radioactive Mutant Poster Assignment BLM**



time

85-110

MINUTES PLUS TIME
OUTSIDE OF CLASS



subject focus








BIOLOGY
ENVIRONMENTAL SCIENCE
HISTORY
PHYSICS
SCIENCE



skills

COLLABORATION
COMMUNICATION
CRITICAL THINKING

resources & materials required

-   **BLM – Monsters and Superheroes Trivia Multiple Choice Quiz** – one per student
-   **BLM – Radioactive Mutant Poster Assignment** – one per student
-   **BLM – Radioactive Mutant Poster Rubric** – one per student
-  Curriculum alignment

- Electronic device with internet access

minds-on

 35-50 MINUTES

PART I – WHOLE CLASS

- Hand out **BLM – Monsters and Superheroes Trivia Multiple Choice Quiz** to the students and allow them several minutes to complete the quiz.
- When the quiz is complete, review the answers.
- Brainstorm with the students what the three examples mentioned in the quiz all have in common.
- Once radiation has been identified as the common element between Godzilla, Spider-Man and the zombies in *Night of the Living Dead*, discuss with the students the concept of “mutants” (organisms that have been genetically altered through exposure to ionizing radiation or chemicals). The use of ionizing radiation as the cause for mutations in fiction has become common since the 1950s, when popular fears of radiation (primarily due to nuclear weapons) became widespread. How well-founded are those fears?

PART II – SMALL GROUP

- Have students think individually about a mutant monster or superhero they know of (from film, television, print, video games, etc.) that was created by the effects of ionizing radiation, then pair with another student and share their ideas.

PART III – WHOLE CLASS

- Have the pairs of students share with the class some of the mutants that they think/pair/shared. As a class, discuss the backstories for the mutants:
 - » *What was the ionizing radiation source that they were exposed to?*
 - » *How were they exposed to the ionizing radiation?*
 - » *Were the effects permanent?*
 - » *Do you think that there is any factual basis for the backstory from a scientific standpoint in terms of understanding of the sources and effects of ionizing radiation?*

QUIZ ANSWERS

- 1 – c
- 2 – b
- 3 – d
- 4 – e
- 5 – a
- 6 – c

IMPLEMENTATION OPTION

- Have students read about radiation or watch a [video clip](#) on the subject before or after the initial class discussion.

action

 10 MINUTES PLUS TIME OUTSIDE OF CLASS

- Explain the poster assignment to the students. In this assignment, students will choose one mutant (either a monster or superhero) created from exposure to ionizing radiation and create a poster that illustrates their chosen mutant, along with how exposure to ionizing radiation contributed to that mutant's creation and whether there are any factual elements in the story.
- Provide students with the **Radioactive Mutant Poster Assignment BLM** and the **Radioactive Mutant Poster Rubric BLM** to help students focus their research.
- You may wish to create a sign-up sheet to ensure that each student chooses a different subject for his/her poster. You may also choose to have students work in pairs on their posters.

IMPLEMENTATION OPTION

- Instead of creating a poster, students could create PowerPoint presentations or videos about their mutants that discuss the fiction and fact behind their subjects. Students could then present their presentations to the class.

consolidation

 40-50 MINUTES

- Place the completed posters around the class and allow students time to examine them.
- After the students have examined the posters, discuss the similarities and differences between their chosen mutants. Questions for discussion could include:
 - » *Were there any similarities in terms of the sources of ionizing radiation, effects, etc.?*
 - » *In general, how accurate were the portrayals of the sources of ionizing radiation?*
 - » *Was a particular source and type of exposure more commonly portrayed than others?*

extensions

- Most radioactive mutants chosen were likely the results of somatic effects of radiation. Examine mutants that were the results of reproductive effects of radiation (e.g. the mutant family in *The Hills Have Eyes* [1977, remade in 2006]).
- Look at the dates when the radioactive mutants that students researched first appeared. What historical events might have influenced public perceptions of radiation at the time? How were these perceptions reflected in popular culture of the time?



DID YOU KNOW?

The most famous of all the 1950s atomic monsters was Godzilla, a 120 m (400-foot) prehistoric monster that has spawned many sequels and remakes, including ones in 1998 and 2014.

additional resources

CANADIAN NUCLEAR ASSOCIATION WEB PAGES

- [What is radiation?](#)
- [Quantifying radiation](#)
- [Effects on the body](#)

RELATED TEACHNUCLEAR LESSON PLANS

- [Flying the Radioactive Skies](#)
- [From the Outside In: Biological Effects of Radiation](#)
- [It's All Greek to Me: Radioactive Decay](#)

VIDEOS

- [Scientists Keep Radiation in Its Place – LabTVonline](#)
- [What is radiation? – Canadian Nuclear Safety Commission](#)

background information

[Retrieved August 2019]

- [The Biology of B-Movie Monsters – Fathom Archive, The University of Chicago Library Digital Collections](#)
Interesting analysis of the scientific issues raised by some of the classic monsters.
- [Radiation Protection – United States Environmental Protection Agency](#)
Information about radiation sources and doses, health effects and regulations. Includes a dose calculator, technical resources and a document library.
- [How can I become contaminated by radiation? – Health Canada, Government of Canada](#)
Radiation exposure pathways, surface exposure, external exposure, and internal exposure (archived).
- [How would radiation affect my body? – Health Canada, Government of Canada](#)
Cellular effects of radiation, cellular repair, cellular death, and cellular mutation, as well as deterministic and stochastic effects (archived).
- [Mutations, Mutagens, and DNA Repair – Kansas State University](#)
A look at how radiation causes mutations, as well as DNA repair.
- [Ionizing radiation, health effects and protective measures – World Health Organization](#)
Information about ionizing radiation and the risks of radiation to human health.
- [Radiation Cinema!](#)
A nuclear-themed movie blog with film trailers and clips about B-movies that involve radioactive mutants and other monsters.
- [Superhero Database](#)
Everything you need to know about superheroes, villains, battles, teams and superpowers in encyclopaedia format.