

MIGHTY MICE IN SPACE

TEACHER'S GUIDE



JAX MIGHTY MICE IN SPACE

In December of 2019, the Jackson Laboratory's Dr. Se-jin Lee sent genetically engineered mice onto the International Space Station to study muscle and bone loss. Now, teachers and students are invited to follow the journey and immerse themselves in the research process through these Mice In Space lessons.

THE LESSONS

A series of three lessons were created for high school students at the introductory biology level. Students will learn several skills including prediction, experimental design, data interpretation, and graphing analysis. Lessons are stand-alone, meaning they can be completed individually without any prerequisites, or given together as a set.

Lesson 1: Introduction to Mice in Space. In this lesson, students are introduced to the Mice In Space research project. They learn about Dr. Lee's genetically engineered Might Mice, the questions and hypotheses motivating his research, and the implications this project has for human health. Students are asked to make predictions about what they believe the scientists will observe during this experiment.

Lesson 2: Graphing & Data Interpretation. In this lesson, students are given the opportunity to analyze some of the data from the Mice in Space experiment. Students are asked to graph the muscle masses of Mighty Mice and non-engineered mice, and to interpret these findings.

Lesson 3: Research Project on Human Disease. In this lesson, students perform an independent research project on their own or in a small group. After picking a human muscle or bone disease, students share their research findings using the included poster template.



REFERENCES & FURTHER READING

Before beginning the lessons, explore these resources to gain more information on the project.

Follow the story of the JAX Mighty Mice in Space

- jax.org/miceinspace
- #MiceInSpace

Dr. Lee's Mighty Mice

- <https://www.jax.org/news-and-insights/2018/october/se-jin-lee-of-mighty-mice-and-men>
- https://www.hopkinsmedicine.org/news/media/releases/mighty_mice_made_mightier
- <https://www.scientificamerican.com/article/genetically-engineered-mi/>
- <https://www.nature.com/news/2007/070827/full/070827-3.html>

Using mice for biomedical research

- <https://www.jax.org/about-us/why-mice>

Muscle loss in space

- https://www.nasa.gov/pdf/64249main_ffs_factsheets_hbp_atrophy.pdf

Other animal studies in space

- <https://www.nasa.gov/spacebio/animal/our-experiments>
- https://www.nasa.gov/audience/forstudents/9-12/features/F_Animals_in_Space_9-12.html