

Grades: 9-12

Nova, "Pluto and Beyond"

Join the mission as the New Horizons spacecraft attempts to fly by NASA's most distant target yet. Since it explored Pluto in 2015, New Horizons is zooming toward Ultima Thule, an object four billion miles from Earth.

After watching this episode, choose from the following questions and/or tasks to extend your learning

Question Box 1

- What did you learn after watching this program?
- What is the program's purpose? How do you know?
- What are the key details in this program?
- What is the central message in this program? Explain?
- What are the program's supporting claims that support the central message?
- What is the New Horizon Spacecraft and what was its mission?
- What is Ultima Thule and why is the probes' visit significant?

Question Box 2

- What was one section of the text(video) that stood out for you and why?
- What was most challenging or least interesting about this program?
- What about the show stood out to you?
- What did you find most interesting and why?
- What would you like to know more about?
- Should man continue exploring strange new worlds?

Box 3 (Tasks)

- New Horizons flew for nine and a half years to reach Pluto. Pluto is 3.0977 billion miles from the earth. What was its average speed? Create a linear graph that represents distance over time. Explain the key features of your graph.
- Once New Horizons reached Jupiter, it used the gravity of Jupiter to go more than 50,000 miles per hour. Create a non-linear graph that accounts for the pull of Jupiter. Explain the key features of your graph.
- Based on your previous calculations, does New Horizons, which passed Ultima Thule (or Arrokoth) on January 1, 2019 and is 4 billion miles from the earth, fit either of your previous graphs? Explain why or why not.
- Draw and label a timeline of the New Horizons project.

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- Research how long it took the New Horizons spacecraft to go 4 billion miles, how many more miles will it take to exit our solar system, and how long will it take for it to get there?

Box 4 (Enrichment)

- Draw a model that relates Newton's first law to the velocity of the New Horizon spacecraft.
- Research and describe the way that NASA communicates with the New Horizon spacecraft, and how long it takes to get a signal to the spacecraft and back to Earth.

Box 5 (Extend/Real-Life)

- Research and describe future deep space missions currently in planning.