

## Grades 6-8

### Genius by Stephen Hawking “Are We Alone?”

Join Professor Stephen Hawking as he challenges three ordinary people to work out the likelihood of alien life out there in the universe. See why the team has their minds blown in a way they were never expecting.

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

- Are we alone? What evidence do you have to support your opinion?
- Is there alien life in the universe?
- What does life need to survive on a planet?
- What is the Goldilocks zone? And, what role does it play in determining if “we are alone”?
- What makes life possible?
- Who was Galileo?
- What is the Milky Way made out of?
- How many tons of sand represent our galaxy?
- What did Giordano Bruno propose?
- How can we spot a distance planet around the star?
- What happened in 1999?
- Describe Planet Osiris. How many light years away is it? What is the physical distance of this planet?
- Explain how a light meter works?
- Why do scientists need a bigger telescope and go outside our atmosphere to look for a solar system around another star?
- How many rocky planets are there in the Milky Way?
- What is water made out of? What are the most abundant elements in the cosmos?
- What state should water be for life to exist?
- What is an alternative source of energy for life?
- Explain how we could find life in Europa?
- What are astronomers using to pick up sounds throughout the universe?
- What are electromagnetic vibrations from space?

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<ul style="list-style-type: none"> <li>• What did Giuseppe Cocconi and Philip Morrison Proposed?</li> <li>• What does SETI propose?</li> <li>• What is the paradox revealed by physicist Enrico Fermi?</li> <li>• What does the Great Filter represent? What does the flame represent in the Great Filter Theory?</li> </ul>
<ul style="list-style-type: none"> <li>• What beliefs help shape our point of view as to whether there is or is not life on other planets?</li> <li>• How many stars are in our galaxy?</li> <li>• What is the mass of the Milky Way?</li> <li>• What do you think is the meaning of life?</li> <li>• How do we find other planets around other stars?</li> <li>• Can life exist on non-rocky planets?</li> <li>• Why is water the essential liquid for life to begin?</li> <li>• What are the properties of water?</li> <li>• Explain the evolution of life over the 13 billion years of the existence of our universe.</li> <li>• Why do stars and planets emit radio waves all the time?</li> <li>• Explain how an equalizer works?</li> <li>• What are the barriers for the evolution of life?</li> <li>• Why are humans so fragile?</li> </ul>
<ul style="list-style-type: none"> <li>• If the Breakthrough Listen Project scans the nearest million stars to find extraterrestrial life, how long would it take to accomplish? What factors would you have to consider? Do the scans happen all at once? Does a scan take longer if the star is farther away? Do satellites play a role? (ELD) Present your findings to your family using details and evidence to support ideas?             <ul style="list-style-type: none"> <li>• How can alternating compression and tension of iron produce internal heat? Use mathematical models to describe this phenomenon.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Watch ET!</li> <li>• Design a Telescope that would be able to detect planets from earth.</li> <li>• Make a PowerPoint on the design and cost of the NASA KEPLER Telescope.</li> <li>• Make a Model showing the various bands of frequencies used for television, sound, radio waves, microwaves, electromagnetic waves, light waves and compare it to the Hydrogen Line Frequency.</li> </ul>
<ul style="list-style-type: none"> <li>• Look at the points of view from scientists such as Avi Loeb and Giorgio A. Tsoukalos. How do their beliefs about aliens shape science today?</li> <li>• What is the difference between 4G and 5G frequencies that are used in your phone?</li> <li>• How are 5G transmissions measured and can they penetrate our human cells?</li> <li>• Social Emotional Connection - Share or write in your journal:</li> </ul>

**Continued on the next page...**

- What are some skills that you need to be able to work with others on a problem or project? Explain why these skills are important?
- When working on a project with others, brainstorm some ways you can deal with conflict if it arises, ex: you don't all agree on the direction a project is going.