

Grades 6-8

Genius by Stephen Hawking “Where Did the Universe Come From?”

Join Stephen Hawking as he challenges three ordinary people to work out where the universe came from. Hawking leads the trio on an extraordinary journey of discovery featuring racing cars, ice-skaters, balloons and running tracks.

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

- What can we learn from investigating the origins of the Universe?
 - How does Stephen Hawking challenge three ordinary people to work out where the universe came from?
 - Explain the Big Bang Theory.
 - What did Edwin Hubble study at the top of Mount Wilson?
 - Explain the Doppler Effect.
 - How did Hubble discover that galaxies are moving away from us?
 - What is the Doppler Shift?
 - What is a Singularity?
 - How did American Radio Astronomers, Arno Penzias and Robert Wilson contribute to the Big Bang Theory?
 - Can you hear the Big Bang today, what is it, on what device can you hear it and how is it produced?
 - Explain RedShift and BlueShift data.
 - What is the Uniform Expansion of Space?
 - Define Hubble’s Law and provide an example.
 - What marked the birth of The Big Bang Theory?
 - Where did the universe originate from?
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- What role do you play in the great expansion of what we call the universe?
 - What instrument was used to take the ULTRA-DEEP FIELD IMAGE and where is this instrument located and why?
 - How many Galaxies are **VISIBLE** from the Hubble Telescope?
 - Explain the sound pitch in different directions in terms of change in frequency and speed.
 - Has the universe always been here, will it always be here and will it ever change (move)?

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| <ul style="list-style-type: none">• Does light have frequencies, give examples?• Why do galaxies travel faster the further they are from Earth?• Are the Galaxies moving or the SPACE between them increasing? |
| <ul style="list-style-type: none">• If the universe is about 13.8 billion years old and is 93 billion light years from the earth, how would you determine the rate the universe expands according to the Big Bang Theory? Do you need to account for any adjustments? Would that make your estimate larger or smaller? How would you describe it?• Calculate the surface area of a sphere given 1000 ft. radius. Given one square foot. |
| <ul style="list-style-type: none">• Make a paper mache replica of the galaxies in our universe visible through our Hubble telescope. Use a balloon or ball as your sphere.• Look at opposing views as to the origin of the universe.• Make a replica model of the Hubble Telescope. |
| <ul style="list-style-type: none">• Measure various intensities of different sounds. Look at this Youtube video for help: https://www.youtube.com/watch?v=CFP-Kp_enU4• Take pictures of the night sky with your phone or camera and vary the light aperture to see our Milky Way Galaxy. |