



# The Big Bang Theory

## A WebQuest for Universal Exploration

Our universe is more than 13 billion years old, and its formation began at the moment scientists refer to as the Big Bang, or the birth of the universe. At this time, the universe was expanding rapidly in all directions and was in an extremely dense, hot state. Subatomic particles called protons, neutrons, and electrons formed after the universe had substantially cooled following the initial “bang” and expansion. The materials generated during and after the Big Bang were used in the formation of galaxies, stars and planets. Using a variety of instruments and methods, scientists are able to detect how long ago this phenomenon occurred.

### Task

Your task is to work in teams of 3 or 4 to research and construct an explanation of the Big Bang theory based on astronomical evidence, including light spectra, the motion of distant galaxies, and the composition of matter in the universe. Use a variety of reputable resources to develop your explanation.

### Process

Use your resources to answer the following questions.

1. What is cosmic background radiation, and what instrument has provided us with detailed measurements of this in our universe? What does data from this instrument say the rough age of our universe is?

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2. What is the Doppler effect, and how did Edwin Hubble use this to support the theory of universal expansion?

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3. What are the three possible outcomes of an expanding universe?

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## The Big Bang Theory *CONTINUED*

4. What are the three major components of an atom of matter? Inside each atom, identify where each component is located, what its mass is, and its charge.

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### Presentation

Once you and your team have completed your research, prepare a 5-10 minute presentation. The presentation should discuss the evidence of the Big Bang that you have researched. Visuals, such as diagrams and graphs, can enhance your presentation.

### Resources

Many online resources can be used to assist your research. These include websites, journal articles, and scientific news and magazines.

### Evaluation

Read the following rubric to see how you will be scored on the WebQuest.

Criteria					Points
	0	5	10	15	
<b>Task</b>	The tasks were not completed.	Some effort was made to complete the tasks, but the major ideas are missing.	The tasks were completed but some information was omitted or incorrect.	The tasks were completed with great attention to detail.	
<b>Process</b>	The process was not followed.	The process was begun but not all questions were answered.	The process was followed but some answers were incorrect.	The project showed thorough research and a deep understanding of the topic.	
<b>Presentation</b>	There was no attempt to create a poster.	There was minimal effort making the poster.	There was good material and ideas in the poster.	The poster was excellent, and showed knowledge of the topic.	
<b>Total Score</b>					