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Introduction to Physics

Have you ever noticed that the more you learn about a topic, the more questions you have? The study of physics works this way! Physics stretches our imagination about and understanding of the world around us. From the smallest particles on the planet to the largest objects known in the universe, scientists called *physicists* use physics to learn what *matter* is and why it behaves as it does (everything in the universe is made up of matter). Even today, physicists do research to find answers to hard questions.

To learn how complex the universe can be, let's start from the beginning...

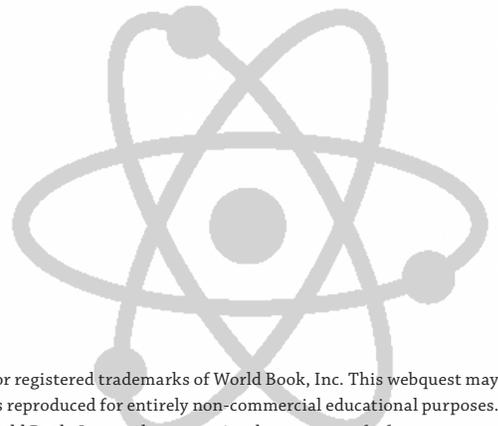
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Find the answers to the questions below by using the "Search" tool to search key words. Since this activity is about physics, you can start by searching the key word **Physics**.

Write the answers on the lines provided or in the space below the question.

1. Physics is the science devoted to the study of _____ and _____.
2. The word *physics* comes from a Greek word meaning _____.
3. Name at least four other types of sciences that benefit from the study of physics.
4. In what way does the existence of Stonehenge show that people, even in prehistoric times, had some understanding of physics?



5. In the timeline below, describe the advances in physics that occurred during each time period.

Timeline

3000 B.C. in Egypt, and Mesopotamia	600 B.C. Greece	300 B.C.	A.D. 100 Egypt

6. During the early Middle Ages in Europe (years 400 to 1000), why were there few scientific discoveries in Western Europe?

7. How was physics re-introduced to Western cultures around the year 1000?

8. In the timeline below, describe the advances in physics that occurred during each time period.

Timeline

1300's Europe	1400's Europe	1543 Poland	1609 Italy

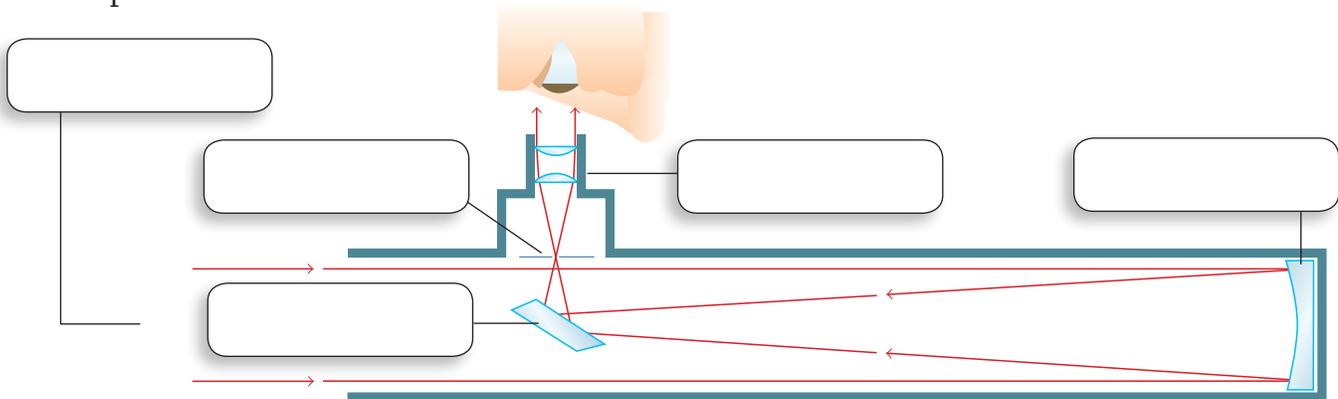
9. What change in attitude towards science occurred during the Renaissance, largely because of the contributions of Galileo, Kepler, and Descartes?

10. In the mid-1600's, Rene Descartes proposed that objects have *inertia*. What is inertia?

11. Sir Isaac Newton was a brilliant English scientist. What form of mathematics did he create?

12. Who also developed this new form of mathematics, working independently from Newton?

13. Newton constructed the world's first reflecting telescope. Label the parts of this simple, but important invention.



14. What allowed scientific research to become more complex in the 1800's?

15. As the science of physics became more complex, what three areas of physics became more narrowly defined?

16. Near the end of the 1800's, many physicists thought that the work of discovering the physical laws of the universe was nearly finished. Were they correct?

17. Use the article on physics to fill in a short timeline of discoveries that were made towards the end of the 1800's. All of these discoveries told scientists that their research was far from over!

1895 –

1896 –

1897 –

1898 –

1900 –

1905 –

1913 –

1924 –

18. What are *postulates*?

19. What two postulates did Albert Einstein create in 1905?

20. What conclusion did he draw from these two postulates?

21. In what way did the study of physics lead to the creation of the atomic bomb?

The study of physics becomes more complex as new discoveries are made!

Match the branches of physics to the correct description to see which fields are studied today.

- | | |
|------------------------------|--|
| ____ 22. Acoustics | A. studies the nature and behavior of light. |
| ____ 23. Nuclear physics | B. studies the behavior and properties of elementary particles. |
| ____ 24. Optics | C. studies the physical properties of solid materials. |
| ____ 25. Biophysics | D. studies highly ionized gases. |
| ____ 26. Fluid physics | E. studies heat and other forms of energy. |
| ____ 27. Electrodynamics | F. studies living things and life processes. |
| ____ 28. Health physics | G. studies Earth and its atmosphere and waters. |
| ____ 29. Thermodynamics | H. studies the protection of people who work with or near radiation. |
| ____ 30. Plasma physics | I. studies the production and properties of sound. |
| ____ 31. Solid-state physics | J. studies the relationship between electrical and magnetic forces. |
| ____ 32. Particle physics | K. studies the structure and properties of the atomic nucleus. |
| ____ 33. Cryogenics | L. studies the behavior and movement of liquids and gases. |
| ____ 34. Geophysics | M. studies extremely low temperatures. |

Extension Activity 1:

Check out the “Related Information” tab in the “Physics” article. Under the heading “Back in Time” you can read articles from early editions of the *World Book Year Book*, dating back to the 1920’s. Each article is preserved as it was written originally for the time.

Describe how our understanding of physics has evolved as new discoveries were made!

Extension Activity 2:

You are a physicist in need of funding! Your university has to cut costs and is considering reducing your research funds. This means that all of your research will come to a screeching halt! You’ve worked hard at your chosen field and have made discoveries that could potentially help people all over the world!

To start, decide which one of the branches of physics to call your own and research its history. Know who has made important contributions and what questions remain unanswered. Then, write a persuasive essay outlining major accomplishments in your field and the benefits of continuing your research. You may even include questions that still need to be answered and how your branch of physics may help find answers!

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