Online Courses for High School Students
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Great Minds in Science: Ideas for a New Generation

Sometimes there are simply more questions than answers. Does life exist on other planets? How extreme is the human ability to survive? Will the issue of global warming ever be solved? Today, scientists, explorers, and writers are working to answer such questions by using extensive inquiry to find innovative solutions. Similar to such famous minds from history as Edison, Einstein, Curie, and Newton, the scientists of today are finding ways to revolutionize our lives and the world. Great Minds in Science: Ideas for a New Generation takes an in-depth look at the extraordinary work of these individuals and demonstrates how their ideas may very well shape the world of tomorrow.

Course Highlights

- Look to the future to see how emerging science and technologies will help protect and sustain humans.
- Travel from the depths of the ocean into space with some of the world's more innovative scientists.
- Explore some of the world's more extreme environments and learn what they have to teach us.
- Ask big questions and look for answers with some of the greatest minds in science.

Prerequisite: None
Course Length: One Semester
Required Text: There are no required textbook for this course.
Materials List: There are no required materials for this course.

Course Outline

Unit 1: Vilayanur Ramachandran: Mysteries of the Mind
In this unit, we will learn more about the brain research of Vilayanur Ramachandran. Ramachandran will walk us through three different brain disorders, including phantom limbs, and what research is telling us about these disorders. He argues that we can better understand our brains and the ways that they work through the study of disorders and brain dysfunction. You will also learn more about neuroscience and why Ramachandran is interested in studying the brain. Finally, you will explore more about the brain, learn how neuroscientists are using magic to investigate brain function, and see whether you can create your own fake limb.

Unit 2: Bill Stone: Into the Depths
In this unit, we will explore the deepest, darkest caves in the world with renowned cave explorer Bill Stone. In order to descend into the depths of caves, Stone has been at the forefront of creating new technologies and equipment, allowing cavers to go places that were not possible in the past. You'll learn more about some of this new equipment and technology and how Stone is exploring uses for it in space as well as caves.

Unit 3: Bonnie Bassler: The Bacteria Puzzle
In this unit, we will join Bonnie Bassler in her search to better understand bacteria and how bacteria communicate with each other. In doing so, we will learn more about what bacteria are and the role that they play in the world. We will also explore Bassler's research, which seeks to understand how bacteria use a chemical language to talk to each other. Bassler will show us several implications of her research, including the possibility of treating harmful drug resistant bacteria.

Unit 4: Joshua Klein: Teaching Crows New Tricks
In this unit, you will learn about Joshua Klein's experiment to teach crows a new trick. Klein came up with the idea to create a vending machine for crows, which gives them food when they pick up coins from the environment and put them in the machine. This mutually beneficial action is one example of how humans and animals can live in urban areas together more peacefully. In teaching the crows, you'll see how Klein used methods from operant conditioning in his experiment. In learning more about Klein's experiment, you'll read more about crows, animals in urban environments, and conditioning methods.

Unit 5: Jane Poynter: Inside Biosphere II
In this unit, Jane Poynter shows us what it is like to live in an artificial world. She spent over two years inside Biosphere II, a sealed, artificial world. You'll learn more about this project, its implications, and how it relates to the original biosphere, earth. You'll also learn more about how the various biomes of earth work together to support life and how these biomes were recreated in Biosphere II.

Unit 6: Ben Saunders: Exploring the Arctic
In this unit, you will explore the Arctic with Ben Saunders. In doing so, you will learn more about Saunders' expeditions to the North Pole and the equipment that helps to keep him safe. You will also learn more about the animals and cultures that live in the Arctic. Finally, you will examine some of the challenges that the Arctic faces environmentally and what is being done to try to stop these threats.

Unit 7: Richard Pyle: Into the Twilight Zone
In this unit, we will dive with Richard Pyle hundreds of feet under the ocean to study coral reefs. We will learn about the importance of the equipment and how Pyle has contributed to new technologies, allowing divers to go study parts of the ocean that they haven't been able to reach before. We will examine what plants and animals live in the ocean's Twilight Zone and learn why this zone is an important area for research.

Unit 8: Richard Preston: In the Redwood Canopy
In this unit, you will travel with Richard Preston to the top of redwood trees. In the process, you'll learn more about these tall trees, including the habitat that they grow in, what mechanisms may allow them to grow so tall, and why they die. You'll also learn about some of the threats to these large trees and their habitat. Finally, you'll explore what other plants and animals make up the redwood ecosystem and learn about different types of redwoods.

Unit 9: Al Gore: Fighting Climate Change
In this unit, we will learn more about climate change and the effects that are happening around the globe. We will examine what climate change is, what is causing climate change, and what consequences this might have for different areas of the world. We will also investigate some of the difficulties of solving the climate change problem, including financial and social concerns.

Unit 10: Brian Cox: Searching for the Universe's Beginning
In this unit, we will learn about particle physics and what this type of science can tell us about the universe. We will explore the experiments that scientists hope to carry out with the Large Hadron Collider and what these experiments may reveal. We'll learn more about how scientists are using computers to study the universe, what the Higgs Boson particle may be, and why scientists hope to uncover the Higgs Boson particle.