

## Great Minds in Science

**COURSE DESCRIPTION:** Is there life on other planets? What extremes can the human body endure? Can we solve the problem of global warming? Today, scientists, explorers, and writers are working to answer all of these questions. Like Edison, Einstein, Curie, and Newton, the scientists of today are asking questions and working on problems that may revolutionize our lives and world. This course focuses on 10 of today's greatest scientific minds. Each unit takes an in-depth look at one of these individuals, and shows how their ideas may help to shape tomorrow's world.

### COURSE OBJECTIVES:

- Explain what neuroscience is and how Ramachandran became interested in studying the brain.
- Understand three brain disorders and what they are telling us about brain function.
- Identify the various parts of the brain and the function of each.
- See how magic is helping scientists learn about the brain.
- Understand fake limbs and why this phenomenon happens in our brains.
- Discuss why exploring caves is important.
- Explain some of the new technologies and equipment that is taking cave exploration to new depths.
- Identify about some of the deepest caves in the world.
- Understand what it would be like to study caves.
- See how some of the caving technology is being used for space exploration.
- Identify what bacteria are and what role they play in the world.
- Discuss how bacteria communicate with each other through a chemical language.
- Explain what the implications of Bassler's research may be.
- Understand some of the different types of bacteria in the world.
- Define about operant and classical conditioning and how they differ.
- Discuss B.F. Skinner's experiments using operant conditioning.
- Understand crows and their adaptations to urban life.
- Detail Klein's experiment and how he got the crows to feed the machines for food.
- Explain what Biosphere 2 is.
- Discuss what it would be like to live within an artificial world like Biosphere 2.
- Understand other sealed worlds and what lessons we are learning from them for the future.
- Grasp more about biomes, habitats, and ecosystems.
- Discuss the ecosystem and cultures in the Arctic.

- Understand what it would be like to explore the Arctic.
- Identify some of the men and women who have explored the Arctic.
- Understand what equipment is needed to explore extreme environments.
- Discuss why extreme environments are important to explore and learn about.
- Talk about the technologies and equipment that are allowing divers to swim deeper than ever before.
- Identify the ocean's Twilight Zone.
- Discuss coral reefs and the animals and plants that live in and around them.
- Explain the threats and challenges to the world's coral reefs.
- Understand why coral reefs are an important part of the ocean's ecosystem.
- Talk about redwood trees and the habitat they live in.
- Explain some of the threats to redwoods and their habitats.
- Detail what it is like in the canopy of a redwood.
- Understand what makes redwood trees unique and different from other trees.
- Discuss what other plants and animals live in a redwood's ecosystem.
- Talk about climate change and why scientists believe that this is happening.
- Explain some of the causes of climate change.
- Identify how humans are contributing to climate change.
- Discuss some of the effects of climate change around the globe.
- Understand efforts to reduce the factors causing climate change.
- Talk about particle physics.
- Explore the different types of particles found in the universe.
- Identify some of the experiments scientists hope to do with the Large Hadron Collider.
- Talk about the Higgs Boson particle.
- Discuss some of the challenges scientists have faced with the LHC.

**PREREQUISITES:** None

**COURSE LENGTH:** One Semester

**REQUIRED TEXT:** No required textbook for this course.

**MATERIALS LIST:** No required materials for this course.

**COURSE OUTLINE:**

**Unit One: Vilayanur Ramachandran**

**Unit Two Bill Stone: Into the Depths**

**Unit Three Bonnie Bassler: The Bacteria Puzzle**

**Unit Four Joshua Klein: Teaching Crows New Tricks**

**Unit Five Jayne Poynter: Inside Biosphere 2**

**Midterm**

**Unit Six Ben Saunders: Exploring the Arctic**

**Unit Seven Richard Pyle: Into the Twilight Zone**

**Unit Eight Richard Preston: In the Redwood Canopy**

**Unit Nine Al Gore: Fighting Climate Change**

**Unit Ten Brian Cox**

**Final Exam**