

Great Minds in Science: Course Syllabus



Great Minds in Science: Ideas for a New Generation

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.

Unit 1: Vilayanur Ramachandran: Mysteries of the Mind

Objectives:

Upon completion of this unit, you will be able to:

- * 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.

ASSIGNMENTS:

Vilayanur Ramachandran: Mysteries of the Mind: Critical Thinking & Web Journey Questions

Homework

15 points

Unit 1 Discussion Assignment 1	<i>Discussion</i>	5 points
Unit 1 Discussion Assignment 2	<i>Discussion</i>	5 points
Unit 1 Quiz – Vilayanur Ramachandran: Mysteries of the Mind	<i>Quiz</i>	10 points

Unit 2: Bill Stone: Into the Depths

Objectives:

Upon completion of this unit, you will be able to:

- * 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.

ASSIGNMENTS:

Bill Stone: Into the Depths: Critical Thinking & Web Journey Questions	<i>Homework</i>	15 points
Unit 2 Discussion Assignment 1	<i>Discussion</i>	5 points
Unit 2 Discussion Assignment 2	<i>Discussion</i>	5 points

Unit 2 Quiz – Bill Stone: Into the Depths	Quiz	10 points
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Unit 3: Bonnie Bassler: The Bacteria Puzzle

Objectives:

Upon completion of this unit, you will be able to:

- * 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.

ASSIGNMENTS:

Bonnie Bassler: The Bacteria Puzzle: Critical Thinking & Web Journey Questions	Homework	15 points
Unit 3 Discussion Assignment 1	Discussion	5 points
Unit 3 Discussion Assignment 2	Discussion	5 points
Unit 3 Quiz – Bonnie Bassler: The Bacteria Puzzle	Quiz	10 points

Unit 4: Joshua Klein: Teaching Crows New Tricks

Objectives:

Upon completion of this unit, you will be able to:

- * 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.**

ASSIGNMENTS:

Joshua Klein: Teaching Crows New Tricks: Critical Thinking & Web Journey Questions	<i>Homework</i>	15 points
Unit 4 Discussion Assignment 1	<i>Discussion</i>	5 points
Unit 4 Discussion Assignment 2	<i>Discussion</i>	5 points
Unit 4 Quiz – Joshua Klein: Teaching Crows New Tricks	<i>Quiz</i>	10 points

Unit 5: Jayne Poynter: Inside Biosphere 2

Objectives:

Upon completion of this unit, you will be able to:

- * **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.**

ASSIGNMENTS:

Jayne Poynter: Inside Biosphere 2: Critical Thinking & Web Journey Questions	<i>Homework</i>	15 points
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Unit 5 Discussion Assignment 1	Discussion	5 points
Unit 5 Discussion Assignment 2	Discussion	5 points
Unit 5 Quiz – Jayne Poynter: Inside Biosphere 2	Quiz	10 points

Great Minds in Science Midterm Exam

Objectives:

Upon completion of this unit, you will be able to:

- * Review information acquired and mastered from this course up to this point.
- * Take a course exam based on material from the first five units in this course (Note: You will be able to open this exam only one time.)

ASSIGNMENT:

Great Minds in Science Midterm Exam	Exam	30 points
Midterm Discussion Assignment	Discussion	5 points

Unit 6: Ben Saunders: Exploring the Arctic

Objectives:

Upon completion of this unit, you will be able to:

- * 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.

ASSIGNMENTS:

Ben Saunders: Exploring the Arctic: Critical Thinking & Web Journey Questions	Homework	15 points
Unit 6 Discussion Assignment 1	Discussion	5 points
Unit 6 Discussion Assignment 2	Discussion	5 points
Unit 6 Quiz – Ben Saunders: Exploring the Arctic	Quiz	10 points

Unit 7: Richard Pyle: Into the Twilight Zone

Objectives:

Upon completion of this unit, you will be able to:

- * 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.

ASSIGNMENTS:

Richard Pyle: Into the Twilight Zone:

Critical Thinking & Web Journey Questions	Homework	15 points
Unit 7 Discussion Assignment 1	Discussion	5 points
Unit 7 Discussion Assignment 2	Discussion	5 points
Unit 7 Quiz – Richard Pyle: Into the Twilight Zone	Quiz	10 points

Unit 8: Richard Preston: In the Redwood Canopy

Objectives:

Upon completion of this unit, you will be able to:

- * 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.

ASSIGNMENTS:

Richard Preston: In the Redwood Canopy: Critical Thinking & Web Journey Questions	Homework	15 points
Unit 8 Discussion Assignment 1	Discussion	5 points
Unit 8 Discussion Assignment 2	Discussion	5 points

Unit 8 Quiz – Richard Preston: In the Redwood Canopy	Quiz	10 points
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Unit 9: Al Gore: Fighting Climate Change		
Objectives: Upon completion of this unit, you will be able to:		
<ul style="list-style-type: none">* 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.		
ASSIGNMENTS:		
Al Gore: Fighting Climate Change: Critical Thinking & Web Journey Questions	Homework	15 points
Unit 9 Discussion Assignment 1	Discussion	5 points
Unit 9 Discussion Assignment 2	Discussion	5 points
Unit 9 Quiz – Al Gore: Fighting Climate Change	Quiz	10 points
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Unit 10: Brian Cox: Searching for the Universe’s Beginning

Objectives:
Upon completion of this unit, you will be able to:

- * **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.**

ASSIGNMENTS:

Brian Cox: Searching for the Universe's Beginning: Critical Thinking & Web Journey Questions	<i>Homework</i>	15 points
Unit 10 Discussion Assignment 1	<i>Discussion</i>	5 points
Unit 10 Discussion Assignment 2	<i>Discussion</i>	5 points
Unit 10 Quiz – Brian Cox: Searching for the Universe's Beginning	<i>Quiz</i>	10 points

Great Minds in Science Final Exam

Objectives:

Upon completion of this unit, you will be able to:

- * **Review information acquired and mastered from this course up to this point.**
- * **Take a course exam based on material from units six to ten in this course – the last five units. (Note: You will be able to open this exam only one time.)**

ASSIGNMENT:

Great Minds in Science Final Exam	<i>Exam</i>	30 points
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Class Reflection Discussion Assignment

Discussion

10 points

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