

**A New Hampshire e-Learning for Educators Online Professional Development Course**

**Course:** **SC-09 Understanding the Science of Life 2: Communities, Ecosystems, and Natural Selection**

**Instructor:** Instructor                      email address                      phone number

**Course Description** This course is designed for K-6 teacher and others wanting to see Life Sciences developments in the last ten years. This online course explores the following areas: Natural Selection; Evolution; Energy Flow in Communities; and Material Cycles in Ecosystems. It surveys the process of evolution and the importance of variations in natural selection, shows how energy flows in communities and reviews how material cycles within ecosystems. The course also allows participants to develop their own science unit lesson. This course serves as a companion to Understanding the Science of Life: Characteristics, Classification, and Cycles. Each course offers unique and important material enhancing your knowledge about the Fundamentals of Life and Living Things.

<b>Unit 1</b>	<b>Orientation: Making Yourself at Home</b>	<b>dates</b>
<p>The orientation unit is designed to make you familiar and comfortable learning and working with this online course environment. You will become acquainted with OPEN NH Moodle Learning System and the resources offered by Annenberg Media at Learner.org. This course will use the Materials of Essential Science for Teachers: Life Science on the Annenberg Media site. You will be introduced to a number of exercises on the site and familiarize yourself using the resources available from Annenberg Media. You will also explore the resources on Science NetLinks, which is a Thinkfinity partner site. You will also be acquainted with some basics of online learning that will help you become successful in this course. Along with exploring these sites you will also participate in activities and discussion. Throughout the course, you will be asked to offer and share your ideas and best practices for teaching life science.</p>		
<b>Unit 2</b>	<b>Variation, Adaptation, and Natural Selection</b>	<b>dates</b>
<p>How is it that life always seems to find a way? Changes – both large and small – are ever present in the environment that surrounds life. But despite some times extreme challenges to survival, life forms persist from generation to generation. In this unit, you will explore how organisms interact within their ecosystem to complete their life cycles. You will explore the variability in nature and see how that variation enables adaptation and natural selection. The next few units will build upon this as you examine the fundamentals of evolution.</p>		
<b>Unit 3</b>	<b>Evolution and the Tree of Life</b>	<b>dates</b>
<p>A living organism is unique among other living organisms, yet while there is great variability within species there is great diversity among species. In this unit, you will examine these ideas as you explore the fundamentals of evolution. Evolution is the process by which species change over time in order to be better suited to the environment in which they live. Building upon key ideas introduced last unit – variation and adaptation through natural selection – you will focus on the characteristics that define a species and how those characteristics can change over time as species change and new species evolve. The tree of life grows slowly, one change at a time.</p>		
<b>Unit 4</b>	<b>Looking Back and Forward in the Course</b>	<b>dates</b>
<p>This unit marks the mid-point in the course and offers you an opportunity both to review what you have learned and to look forward to the units that lie ahead. First, you will have a chance to reflect on the information, material, ideas and experiences from the first three units. Then, you'll have an opportunity to consider assessment using backward design. You'll take a closer look at the unit you are developing in terms of how you will assess it. You will review the standards you selected for the unit and develop some criteria for assessing those standards. As you build your unit and the assessment criteria for it, you can also look ahead at the remaining units of the course and consider how those concepts might fit into your overall teaching or unit plans. Finally, you will explore and share some other online resources for teaching life science. As you continue to develop your life science unit, you can consider the use of these resources for your life science project and find ways to relate them to your teaching life sciences and engaging your students.</p>		
<b>Unit 5</b>	<b>Energy Flow in Communities</b>	<b>dates</b>
<p>Living organisms need both matter and energy in order to grow, develop, and to survive. Energy flow through ecosystems by flowing through organisms, one organism to another. Like matter, energy must constantly be input into ecosystems, but does not transfer without losses. In this unit, you will become familiar with how ecosystems store and use energy and explore the processes by which energy is transferred among organisms. As you look at these interactions, you will gain a deeper understanding of the complex relationships organisms have with others in their community as well as with their physical surroundings.</p>		

Unit 6	Material Cycles in Ecosystems	Dates
In this unit, you will look at life in terms of the highest level of organization, the ecosystem. Shifting from the individual organism and the focus on energy, you will explore how matter or materials cycle through an ecosystem. You will look at how matter is stored in ecosystems and the processes by which it transfers from one storage location to another. As you look at the materials that are important to life, you will begin to make the connections between the matter and energy required by living organisms and understand how they all work together to create a stable ecosystem.		
Unit 7	Sharing Your Life Science Lesson Plan	dates
In this final unit, you will have an opportunity to consolidate your knowledge of the life science concepts covered in the course, review any materials, ask any questions you may have, and finalize the life science lesson you have been working on throughout the course. You will share your final lesson plan with your classmates and ask for their feedback in general or specific areas. As you review the content for yourself, you will consider how your understanding of it will affect how you teach the applicable, grade level content to your students. You'll have a chance to explore some of the Science Literacy Resources available for you to enhance your teaching and learning.		

## Course Project

The project for this course will be to design a life science lesson that incorporates NH framework standards appropriate to your grade level. A unit plan template is provided that uses the backward design process to guide you through the development of your unit. Upon completion of the course and project, you will be able to teach your students using the plan you developed.

## Course Goals

*At the end of the course, you will be able to:*

- evaluate your personal understanding of living things (and life science in general).
- define what is living thing and what makes it and also be able to say what is therefore not living thing.
- tell how things are related (or not) based on looking at characteristics and/or classification systems developed by others.
- understand a life cycle and the basic characteristics of animal life cycles?
- identify the features of plant life cycles and be able to identify where flowering plants and trees fit in that cycle.
- identify ways to incorporate the NH Curriculum Framework Science Process Skills and Life Science into your teaching life science and to connect your Life Science Unit to the NH Science Curriculum and Assessment Resources

## Course Expectations

Participants are expected to have regular access to the Internet, be able to use email, and navigate to websites and computer documents. When possible, participants will be asked to apply concepts and skills in a school setting. However, if the participant is not working in a school, the activities can be adapted or modified to meet individual needs.

This course is divided into seven one-week sessions beginning with an orientation week. Each unit includes readings, activities, and an online discussion among your classmates. The time for completing each session is estimated to be five to six hours.

Your instructor will review and assess your progress throughout the course. At the conclusion of each session, your instructor will update your course Gradebook. It is important to review the assessment criteria in the course rubric that will be used to determine your grades. In short, if you pay attention to the following, you will do just fine:

- Make sure you complete the readings each week and do the activities each week. Afterwards, your first posting in the discussion area should make reference to the readings and activities in such a way that your instructor can tell you read the material and engaged in the activities.
- Make sure you post at least 2 message replies in the discussion area each week, and that each posting contains substantial comments (i.e., a comment like "oh, that's interesting" is NOT substantial).
- Choose at least 2 different days each week when you will participate in the discussions. We suggest posting at least once within the first few days of the week, with your second post at least two days

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before the next week begins. If you only post on one day each week, you will not receive full credit because one posting a week does not help the group develop rich ongoing discussions.

- Make sure you post on time, not after everyone else has moved on to the next week's discussion.
- Keep up with your weekly journal. While you may not be asked to submit your journal, it will be very helpful to you as you work on your final project.

In order to be eligible to receive a Certificate of Completion, you must participate in all of the weekly discussions and complete all assigned tasks. Participants will be evaluated on the frequency and quality of their participation in class discussions. Participants are required to post a minimum of three substantial comments for each discussion, including one that addresses the discussion starter and demonstrates understanding of the course/unit concepts, citing examples from the readings. Additional postings should provide substantive comments to other participants, which are thoughtful, relevant, and serve to extend the discussion. Progress will be reviewed and assessed throughout the course. At the conclusion of each unit, the course Gradebook will be updated to reflect the quality of your participation in the course.

In order to receive a Certificate of Completion at the end of the course, you must earn a passing grade of 60% or more in the course requirements, earning at least 150 out of 250 points.

### **Graduate Credit**

If you choose to take the course for graduate credit, there is an additional requirement to complete a Reflection Paper, which is worth an additional 50 points. The guidelines and rubric for this paper are posted in each course. You will need to (a) send your tuition registration form with payment directly to the university graduate studies office no later than the start of Unit 7 of your course and (b) notify your instructor that you have registered for graduate credit. If taking the course for graduate credit, a passing grade is 70% or more, earning at least 170 out of 300 points.