

# Biology 101: Introduction to Biology for Nonmajors in Ecuador

Western Washington University

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**ECUADOR LOCATIONS:** Quito, Yacuma, Banos, Riobamba, Cuenca, Guayaquil, and Galapagos

**COURSE DESCRIPTION** Studying biology helps us to uncover mysterious and seemingly miraculous processes that propel organisms to thrive in an ever-changing world. It also helps us to understand our place and influence in ecosystems, which is paramount to our survival as a species on this planet. Come explore biology this summer in Ecuador by studying biodiversity across three biomes: the Andes, the Amazon basin, and the Galapagos. We will study topics ranging from metabolism, reproduction, genetics, evolution, and ecology.

We will weave four big ideas throughout our class:

1. **ENERGY:** All living things require an energy input and a method of processing that energy into chemical energy. The laws of thermodynamics govern energy pathways within cells, organisms, populations, and ecosystems.
2. **INFORMATION FLOW:**
  - a. **CELL GROWTH and REPRODUCTION:** The expression of genetic information (DNA and/or RNA) is responsible for the growth and reproduction of organisms.
  - b. **PROTEIN SYNTHESIS:** The expression of genetic information (DNA and/or RNA) is responsible for the variability we see within and between species. That variability is expressed through changes in protein form/activity and is studied through genetics.
3. **EVOLUTION:** Patterns emerge when scientists study changes in DNA within a population over time. Scientists call this evolution.
4. **ECOSYSTEMS:** Ecosystems are complex, interconnected systems that are dynamic and can be studied using the scientific method.

## Learning Objectives

After this course, you should:

- Analyze and communicate ideas effectively in oral, written, and visual forms.
- Analyze, compare, and interpret information from varied sources, including print and visual media, as well as species logs.
- Use quantitative and scientific reasoning to frame and solve problems.
- Identify and analyze complex problems.
- Work collaboratively and manage projects to effective completion.
- Understand and assess the impacts of interactions among the individual, society, and the environment.



This is an **inclusive class**. Everyone is welcome and heartily encouraged to participate regardless of race, sexual orientation, ethnicity, religion, sex, citizenship status, or age! Let's all monitor our intentions in class so that everyone feels welcome. Please let me know if there is something I can do (or not do) to make you feel more welcome and comfortable engaging in Biology. Let's recognize and celebrate the differences among us. Those differences will add value to our conversations about biology.

## REQUIRED MATERIALS:



Books and articles



Field notebook with perforated pages, three section tabs, and a folder. A tab should be designated: scientific notebook, class notes, and reflections.



Phone or camera to take photos

## INSTRUCTOR BACKGROUND:

Georgianne Connell, M.S. from WWU marine and estuarine science program. I am a senior instructor in the biology department and teach Biology 101 and Honors 213 at WWU. I have also taught oceanography, nutrition, environmental science, marine invertebrate ecology, and tropical marine biology for Seattle Pacific University and Whatcom Community College. As a graduate student, I researched the effect of temperature on coral symbioses for my M.S. I have a heart for effective teaching and enjoy conducting research in science education. My husband is the Women's soccer coach here and we have three young children. You can call me Georgianne or Professor Connell and my pronouns are she/her/hers.

## POLICIES

### Professionalism:

Appropriate conduct includes:

1. Talking to others with a respectful voice.
2. Listening and empathizing.
3. Waiting to speak.
4. Using electronics at appropriate times and in a way that supports class learning.
5. Academic integrity. As a reminder, cheating can involve copying another student's work, allowing another student to copy your work, collaborating during an individual exam (this includes allowing someone look at your exam answers), using unauthorized material during an exam, or removing an exam. See university policy: [https://www.wwu.edu/registrar/acad\\_dishonesty.shtml](https://www.wwu.edu/registrar/acad_dishonesty.shtml)) and <http://www.wwu.edu/integrity/>  
If a lack of professionalism points 1-4 are observed you will be subject to a class dismissal for the day and a zero on any assignments that were scheduled.

If academic dishonesty (5) is witnessed you will be subject to:

- First offense: a zero on the assignment and report to the university
- Second offense: Course failure

### Accommodations:

Reasonable accommodation for persons with documented disabilities should be established within the first week of class and arranged through Disability Resources for Students: telephone 650-3083; email [drs@wwu.edu](mailto:drs@wwu.edu); and on the web at Disability Resources.

### Student Services:

Western encourages students to seek assistance and support at the onset of an illness, difficulty, or crisis.

- In the case of a medical concern or question, please contact the Health Center: 650-3400 or visit Student Health.
- In the case of an emotional or psychological concern or question, please contact the Counseling Center: 650-3400 or visit Counseling Center.
- In the case of a health and safety concern, please contact the University Police: 650-3555 or visit University Police.

- In the case of a family or personal crisis or emergency, please contact the Dean of Students: 650-3450 or visit Dean of Students.

## **ASSESSMENTS & GRADING**

Expectations Handouts: students will fill out a handout outlining their expectations for the trip, then return to those expectations on the way home to reflect on their experiences.

Reflections: students will journal each day to reflect upon their experiences and related reading assignments with required journal entries for the following:

- Cotopaxi National park in Quito
- Amazon basin in Yacuma
- Chimborazo
- Cajas National Park near Guayaquil
- Charles Darwin Research Center in Galapagos (Puerto Ayora)
- Snorkeling in Galapagos

Species Log: students will identify and draw species from multiple sites. Drawings should be labeled, and any relevant adaptations or remarkable features noted. Location and date should also be listed. Required entries for:

- Cotopaxi National park in Quito
- Amazon basin in Yacuma
- Chimborazo
- Cajas National Park near Guayaquil
- Galapagos Islands

Participation: Student engagement during field work, class discussions, pen and paper activities, and natural history tours. Examples of engagement include:

- Being present for class activities.
- Practicing active listening.
- Completing assignments.
- Being curious and asking questions.
- Speaking during group discussions.

Photo journal: culminating class project. Students will choose an ecological topic that interests them and photograph/document evidence of the issue while in Ecuador. Projects should include any conservation efforts that we witness. Example topics include:

- Climate change
- Eutrophication (nitrate and phosphate water pollution)
- Plastic pollution
- Biodiversity loss
- Garbage and sanitation
- Potable water
- Agriculture

Projects will be a composition of photos and captions. Captions should include reference to relevant biology background.

Quizzes: daily assessments over content during our class time at WWU.

**Summary of Student learning hours and point breakdown:**

- Pre-departure student hours, June 23-July 1, 2019: **14 hours**
- In – country student hours, July 2 – June 20, 2019: **100 hours**
- Total: **114 hours**

<b>ASSESSMENTS</b>	<b>% of Grade</b>	<b>Pts.</b>
2 pre/post trip expectations handouts @ 10 points each	4%	20
6 Reflection entries @ 10 points each	13%	60
Species log	22%	100
Participation	22%	100
Photo journal	22%	100
7 on campus quizzes @ 10 points each	15%	70
<b>TOTAL POINTS</b>		<b>450</b>

A	100%	to	93%
A-	< 93%	to	90%
B+	< 90%	to	87%
B	< 87%	to	83%
B-	< 83%	to	80%
C+	< 80%	to	77%
C	< 77%	to	73%
C-	< 73%	to	70%
D+	< 70%	to	67%
D	< 67%	to	63%
D-	< 63%	to	60%
F	< 60%	to	0%

**Schedule:**

<b>DATE</b>	<b>LOCATION</b>	<b>Topics</b>	<b>ACTIVITIES</b>
June 23 – July 1	WWU classes 9am -5pm	Various	Various
July 2	Quito	N/A	Flight
July 3	Quito	Human alteration of ecosystems	Gondola ride. Formal class meeting after dinner: Cotopaxi National Park preparation
July 4	Quito	Photosynthesis & cell respiration, eutrophication	Cotopaxi National Park hike species log, and lectures
July 5	Quito	Photosynthesis & cell respiration, eutrophication. Prep for Yacuma activity.	Formal class meeting: Debrief hike, work on energy and eutrophication activities.
July 6	Yacuma	Eutrophication	Canoe ride, species log
July 7	Yacuma	DNA, proteins, evolution, microclimates	Rainforest hike, species log, bat cave, lectures, Formal class meeting after dinner: protein synthesis/evolution of medicinal plants.
July 8	Yacuma	Sustainability practices of aboriginal cultures	Visit indigenous community, cocoa crop activity
July 9	Yacuma - Banos	Biodiversity, ecology: competition, primary succession, evolution: genetic drift	Bird feeding area, species log, volcano tour and lecture
July 10	Banos	Hydrologic cycle and agriculture/potable water. Prep for Chimborazo activity	Waterfall walk, species log Formal class meeting: Yacuma debrief, modern day vs sustainable agriculture
July 11	Chimborazo	Forest succession	Chimborazo hike, species log activity, lectures
July 12	Cuenca	Forest succession, climate change	Formal class meeting: Chimborazo debrief and field work activity
July 13	Cuenca	Sustainability practices of aboriginal cultures	Visit Museum of Aboriginal Cultures, lectures

July 14	Cuenca	Eutrophication	Turi viewpoint
July 15	Guayaquil	Cloud forest ecology	Guayaquil National Park hike, species log, lectures
July 16	Guayaquil	Biomes, prep for Galapagos	Formal class meeting: Cajas National Park debrief and comparison of mainland biomes activity
July 17	Santa Cruz Island	Behavior and sexual reproduction (meiosis) of giant tortoises	Observe giant tortoises, species log Formal class meeting: behavior and reproduction of tortoise activity.
July 18	Santa Cruz Island	Evolution: natural selection, gene flow	Visit Charles Darwin Research Center, species log, marine iguana conservation, Formal class meeting: debrief Santa Cruz Island, prep for snorkeling activity
July 19	Isabela Island	Marine ecology	Snorkeling, species log
July 20	Seattle	Marine ecology	Formal class meeting: debrief snorkeling, final project Q&A, post class reflection