**WCSD High School Environmental Science Unit Resources**

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| **1st Semester: Ecology** | |
| **Unit Title: Characteristics of Ecosystems** | |
| **Topics and Performance Expectations Covered** | **Resources** |
| **HS-LS2-7**    Succession  Trophic Levels  Symbiotic Relationships  Limiting Factors  Abiotic & Biotic Factors | [Ecosystem in a Jar](http://www.bsu.edu/eft/ecosystems/p/activity1.html)  [Zombie Lab Safety Video](https://www.youtube.com/watch?v=S6WARqVdWrE)  [Ecology Lesson Plans](http://www.bsu.edu/eft/ecosystems/p/activity1.html)  [Bottle Biome](http://www.bsu.edu/eft/ecosystems/p/activity1.html)  Lab 11. Ecosystems and Biodiversity: How Does Food Web Complexity Affect the Biodiversity of an Ecosystem? (Argument-Driven Inquiry in Biology Lab Book) NOTE: Also applies to next unit.  [Food For Thought-Trophic Levels](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes-_food_for_thought.pdf)  [How A Food Web Is Formed Activity](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes-_how_a_food_web_is_formed_activity.pdf) [Fermentation Challenge: Making Ethanol from Cellulose](https://www.glbrc.org/education/classroom-materials/fermentation-challenge-making-ethanol-cellulose)[CB2E: Converting Cellulosic Biomass to Ethanol](https://www.glbrc.org/education/classroom-materials/cb2e-converting-cellulosic-biomass-ethanol) [Research Story: Entomology Detectives](https://www.glbrc.org/education/classroom-materials/research-story-entomology-detectives)  [Biofuels vs. Fossil Fuels Unit](http://issuu.com/glbioenergy/docs/biofuels_vs_fossil_fuels_unit) |
| **Unit Title: Matter and Energy Cycles** | |
| **HS-ESS2-4**    Nitrogen Cycle  Carbon Cycle  Phosphorus Cycle  Water Cycle | [Carbon/Nitrogen Cycling Video](http://study.com/academy/lesson/cycles-of-matter-the-nitrogen-cycle-and-the-carbon-cycle.html)  [Yeast Cellular Respiration Lab](http://serendip.brynmawr.edu/sci_edu/waldron/)  **The following labs are from the Argument-Driven Inquiry in Biology book:**  Lab 9. Population Growth: How do changes in the amount and nature of the plant life available in an ecosystem influence herbivore population growth over time?  Lab 10. Predator-prey population size relationships: Which factors affect the stability of a predator-prey population size relationship?  Lab 11. Ecosystems and biodiversity: How does food web complexity affect the biodiversity of an ecosystem?  Lab 12. Explanations for animal behavior: Why do great white sharks travel over long distances?  Lab 13. Environmental influences on animal behavior: How has climate change affected bird migration?  Lab 14. Interdependence of organisms: Why is the sport fish population of Lake Grace decreasing in size?  Lab 15. Competition for resources: How has the spread of the Eurasian Collared-Dove affected different populations of native bird species?  Lab 23. Mechanisms of evolution: Why will the characteristics of a bug population change in different ways in response to different types of predation?  Lab 25. Mechanisms of speciation: Why does geographic isolation lead to the formation of a new species?  [Population Growth – Exponential and Logistic Models vs. Complex Reality](http://serendip.brynmawr.edu/exchange/bioactivities/pop) |
| **Unit Title: Biomes** | |
| **HS-ESS2-7**    Terrestrial biomes  Aquatic biomes | [Predicting Biomes](http://d43fweuh3sg51.cloudfront.net/media/media_files/Biome-Activity-Educator.pdf)  [Aquatic Ecosystem/Truckee](http://truckeeriverguide.org/) [Communities and Biomes](http://www.nclark.net/CommunitiesBiomes)[Terrestrial Biome Lesson Plans & Worksheets | Lesson Planet](http://www.lessonplanet.com/lesson-plans/terrestrial-biome/all) [www.lessonplanet.com](http://www.lessonplanet.com)  [BIOME ACTIVITY - University of Hawaii](http://www.wcc.hawaii.edu/facstaff/miliefsky-m/BIOL%20124%20Lab/05%20biome%20activity.doc)  [Biome Map-Coloring Activity](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/biome_map.pdf)  [Biome Virtual Lab](http://www.mhhe.com/biosci/genbio/virtual_labs/BL_03/BL_03.html) |
| Unit Title: **Population Dynamics** | |
| **HS-ESS3-1**  **HS-ESS3-2**    Biodiversity  Endangered, invasive, & exotic species  Extinction  Adaptations  Change over time | [Predator/Prey](http://be011.k12.sd.us/Lists/7th%20Science%20Calendar/Attachments/159/Toothpick%20Birds.pdf)  [Change over time resources](http://ncseteach.com/)  [New York Regency Biodiversity Lab](http://www.sfponline.org/uploads/biolabdiversity.pdf)  [Bunny Population Growth phet Lab](https://phet.colorado.edu/en/contributions/view/3896)  From Argument-Driven Inquiry in Biology book:  Lab 22. Biodiversity and the fossil record: How has biodiversity on Earth changed over time? [The Bioenergy Farm Game](https://www.glbrc.org/education/classroom-materials/bioenergy-farm-game) [Website with activities for sustainability.](http://study.com/academy/lesson/cycles-of-matter-the-nitrogen-cycle-and-the-carbon-cycle.html)  [The National Parks: America’s Best Idea](http://study.com/academy/lesson/cycles-of-matter-the-nitrogen-cycle-and-the-carbon-cycle.html)  **Lesson ideas:**  [National Parks](http://study.com/academy/lesson/cycles-of-matter-the-nitrogen-cycle-and-the-carbon-cycle.html)  [National Parks](http://study.com/academy/lesson/cycles-of-matter-the-nitrogen-cycle-and-the-carbon-cycle.html) |
| **2nd Semester: Resource Use** | |
| **Unit Title: Renewable/Non Renewable Resources** | |
| **HS-ESS3-1**  **HS-ESS3-2**  **HS-ESS3-3**    Energy  Soils  Minerals  Water  Forests | [Kidwind](http://study.com/academy/lesson/cycles-of-matter-the-nitrogen-cycle-and-the-carbon-cycle.html)  [Geothermal Lessons](http://study.com/academy/lesson/cycles-of-matter-the-nitrogen-cycle-and-the-carbon-cycle.html)  [High School Solar lab resources](http://www.fsec.ucf.edu/en/education/k-12/curricula/use/index.htm)  [Great Renewable Energy Resources](http://www.fsec.ucf.edu/en/education/k-12/curricula/use/index.htm) The Risks of Green Energy Video [Who Owns the Ocean? Tragedy of the Commons](http://www.fte.org/teacher-resources/lesson-plans/ewelessons/lesson-5-the-tragedy-of-the-commons-3/)  [20 Things To Know About Water](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/20_important_things_to_know_about_water.pdf)  [Blue Gold-Water Wars Movie Viewing Guide](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes-blue_gold-_water_wars_gv_copy.pdf)  [Water Footprint Calculator- National Geographic](http://environment.nationalgeographic.com/environment/freshwater/change-the-course/water-footprint-calculator/?source=link_tw20110801env-water)  [Personal Water Use Inventory](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/personal_water_use_inventory.pdf)  [What If Water Cost As Much As Gasoline?](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/water_vs_gasoline.pdf)  [Tooth Brushing Activity](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes-_tooth_brushing_activity.pdf)  [Visualization of Limited Global Food Availability](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes_food_and_population.pdf)  [Water Quality PSA Activity](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/water_quality_psa.pdf)  [Water Quality PSA Rubric](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/water_quality_psa_video_ruberic.pdf) |
| **Unit Title: Environmental Degradation** | |
| **HS-ESS2-2**  **HS-ESS2-4**  **HS-ESS3-2**  **HS-ESS3-4**  **HS-ESS3-5**  **HS-ESS3-6**    Mining  Logging pollution  Urbanization | [Population](https://www.populationeducation.org/sites/default/files/food_for_thought.pdf)  [Climate change lessons](http://ncseteach.com/)  [Water filter/ purification](https://www.teachengineering.org/view_activity.php?url=collection/wpi_/activities/wpi_water_filtration/water_filtration.xml)  [Cookie Mining Activity](http://www.earthsciweek.org/classroom-activities/cookie-mining)  [Logging Information](http://www.forestsmonitor.org/en/reports/550066/550083)  [Interview with Katie Couric and Bill Nye regarding his new book on climate change](https://screen.yahoo.com/yahoo-news-katie-couric/yahoo-news-live-bill-nyes-193000900.html)  [How To Model An Oil Preserve](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes-_drilling_for_oil.pdf)  [Strip Mining Lab](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes-_strip_mining_lab.pdf) [Poker Chip Model: Global Carbon Pools and Fluxes](https://www.glbrc.org/education/classroom-materials/poker-chip-model-global-carbon-pools-and-fluxes) [Living On $500 A Year](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/activity-living_on_500_a_year.pdf)  [Research Story: The Science of Farming](https://www.glbrc.org/education/classroom-materials/research-story-science-farming)  [Growing Energy: Comparing Bioenergy Crop Yields](https://www.glbrc.org/education/classroom-materials/growing-energy-comparing-bioenergy-crop-yields) |
| **Unit Title: Environmental Policies** | |
| **HS-ETS1-1**  **HS-ETS1-2**  **HS-ETS1-3**  **HS-ETS1-4** | [Case Studies](http://sciencecases.lib.buffalo.edu/cs/)  In Nevada:  <http://ballotpedia.org/Environmental_policy_in_Nevada>  <http://ndep.nv.gov/>  [Environmental History and Laws Presentation](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes-_environmental_history_and_laws.pdf)  [Environmental Laws and History-Guided Viewing](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/apes-_environmental_history_and_law-_guided_viewing.pdf)  [Acts and Treaties Flash Cards](https://quizlet.com/59797775/acts-and-treaties-of-environmental-laws-flash-cards/) [Life Cycle Assessment of Biofuels 101](https://www.glbrc.org/education/classroom-materials/life-cycle-assessment-biofuels-101)[Quantitative Modeling of Biofuels Life Cycles](https://www.glbrc.org/education/classroom-materials/quantitative-modeling-biofuels-life-cycles) [Research Story: A Modern Scientist-Engineer in the World of Fermentation](https://www.glbrc.org/education/classroom-materials/research-story-modern-scientist-engineer-world-fermentation) |
| **Sustainability & Ethics** | |
| **HS-ETS-1**  **HS-ESS3-1**  **HS-ESS3-2**  **HS-ESS3-3**  **HS-ESS3-4**  **HS-ESS3-6** | [Story of Stuff](https://www.youtube.com/watch?v=9GorqroigqM)  [Fishing for the Future](http://www.pbs.org/emptyoceans/educators/activities/fishing-for-the-Future.html)  Current Events: <http://www.livescience.com/>  <https://newsela.com/>  <http://www.iflscience.com/>  Organizations focused on sustainability In Nevada:  <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/nevada/placesweprotect/truckee-river-project.xml>  <http://www.sustainablenevada.org/>  <http://greenevada.org/>  blackrocksolar.org  <http://ktmb.org/>  <http://greenpower.dri.edu/>  <http://nevadarecycles.nv.gov/>  [Redesigning A Green Neighborhood](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/redesigning_a_green_neighborhood.pdf)  [World In Balance: *The People Paradox* (Video)](https://www.youtube.com/watch?v=gubSO_U8MW0)  [Earth From Space (Nova Video).](https://www.youtube.com/watch?v=aU0GhTmZhrs) Looks at Earth systems and how they are connected using  satellite data.  [Health And Longevity](http://ogoapes.weebly.com/uploads/3/2/3/9/3239894/health_and_longevity.pdf)  Fields of Fuel Computer Game |