Environmental Science Q1

Unit: Core: Science , Grade(s) 9th Grade - 12th Grade

Environmental Science Q1

Duration: 0 Minute

Unit

Scope and Sequence

ADDITIONAL RESOURCES	• Environmental IQ quiz: http://www.wecanchange.com/high-school/resources/environmental-iq-quiz • U.S. EPA SCREEN3 computer-modeling program for air pollutants: http://www.epa.gov/scram001/aqmindex.htm. • Ohio Brownfield inventory: http://www.epa.state.oh.us/derr/SABR/brown_dtb/browndtb.aspx • The National Ground Water Association: http://www.ngwa.org • The U.S. Geological Survey outlines current surface water projects within the state of Ohio. Surface water-quality data (including stream gauge and volume data) can be found and used to support local field investigations. There also are links to provide historic surface and ground water data for analysis: http://oh.water.usgs.gov/projects.htm?Category=Surface+Water.

INSTRUCTIONAL ALIGNMENT

DIGITAL / PRINT TEXT

Annenberg Learner Online

- Unit 2 Atmosphere: http://www.learner.org/courses/envsci/unit/text.php?unit=2&secNum=0
- Unit 11 Atmospheric Pollution: http://www.learner.org/courses/envsci/unit/text.php?unit=11&secNum=0
- Unit 8 Water Resources: http://www.learner.org/courses/envsci/unit/text.php?unit=8&secNum=0
- Non-point source pollution: http://water.epa.gov/polwaste/nps/

ESSENTIAL QUESTIONS

- Which aspect of our daily lives has the biggest impact on our ecological footprint?
- How does my footprint impact the various spheres of Earth?
- How can we all live well and live within the means of one planet?

DIFFERENTIATION

The following can be used for gifted & struggling students with teacher modification & according to the needs of the student.

- Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org.
- Earth your fragile planet: http://www.takepart.com/photos/earth-images/the-exterminator
- Notable Environmentalists Projects http://en.wikipedia.org/wiki/Environmentalist#Notable_environmentalists
- Top 10 Environmental Science Books: http://grist.org/article/brits-eye-view-the-most-important-environmental-books/
- Home water usage survey: http://www.waterconservationschool.com/watercalculator.htm; http://wecalc.org/calc/; http://www.sjrwmd.com/waterconservation/survey.html

PERFORMANCE TASKS

This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.

- Research or investigate an actual environmental/geologic event (e.g., a specific release of a toxin/contaminant, hurricane, earthquake, flood, fire or landslide) and determine how each of Earth's spheres was impacted. Long-term and short-term impacts must be included. Provide scientific evidence and data to support conclusions and trace movement of contamination or energy through each sphere. Use a multimedia presentation to share findings with the class.
- Choose a specific environmental problem, such as the effect of herbicides in water (e.g., Atrazine and how this problem is being addressed in other countries/globally. Computer models or programs can be used to predict/analyze the problem or the movement of the contamination. Present scientific evidence and quantifiable data orally, through a poster session or in written form (scientific research paper).
- Research an actual contamination event (that has quantitative data available). Use a computer-modeling program (many are available through freeware sites, fate and transport modeling) to model and predict the movement of the contamination through Earth's spheres. Develop and evaluate solutions for the cleanup, containment or reduction of the contamination. Include consequences and/or alternatives for the proposed solution. Present findings to the class or an authentic audience.
- How Big is your carbon footprint?: https://www.ase.org/resources/lesson-plan-how-big-your-carbon-footprint-6-12\; http://footprintnetwork.org/en/index.php/GFN/page/calculators/
- Mapping Your Human Footprint: http://www.nationalgeographic.com/xpeditions/lessons/14/g68/HumanFootprint.pdf
- Interactive Carbon Virtual Lab: How carbon circulates through the atmosphere, biosphere, oceans, and crust: http://www.learner.org/courses/envsci/interactives/carbon/
- "Everything is connected to everything else": http://www.lewiston.k12.me.us/~lhaines/FOV1-0003C686/FOV1-0003E7B0/FOV1-0003E7A5/FOV1-0003E7A6/S024FFCE6.7/Earth%27s%20Spheres%20Poster%20Project.pdf
- Air Pollution Case Study: http://www.vcapcd.org/AirTheFilm/pubs/AirPollutionTragedyLessonPlan.pdf

INSTRUCTIONAL ALIGNMENT *cont.*

PERFORMANCE TASKS *cont.*

- High School Activities in Air Quality: http://www.uni.edu/storm/downloads/highschool/
- Water Testing Lab: http://water.usgs.gov/edu/characteristics.html
- Water Treatment Lab Dirty Water Project: http://www.teachengineering.org/view_activity.php?url=collection/cub_/activities/cub_environ/cub_environ_lesson06_activity2.xml#objectives
- Water Quality Lab - The Ohio Department of Natural Resources' Project Wet offers resources for K-12 teachers that promote deep understanding about all aspects of water and the interconnectedness of all of Earth's spheres (Earth Systems). http://www.dnr.state.oh.us/tabid/3501/Default.aspx
- Watershed Assessment Education: http://www.water-research.net/Watershed/index.htm
- Perils of Plastic: http://www.nationalgeographic.com/xpeditions/lessons/14/g68/HumanFootprint.pdf
- How do we clean up polluted water?: http://www.srpnet.com/education/pdfx/watertreatment.pdf

VOCABULARY	producers, consumers, herbivores, omnivores, carnivores, detrivores, scavengers, decomposers, trophic level, food chain, food web, diversity, stability, biological magnification, DDT, biomass, energy, ecological pyramid, feeding relationship
ASSESSMENTS	
ACADEMIC CONNECTIONS	**ELA:** RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; **SEL:** Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics ; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.
FIELD EXPERIENCES	• Participate in Adopt a Beach program and the Great Lakes is My World (must attend free PD to obtain materials) • Participate in ISLS (must attend free PD to obtain materials) • West Creek-limited bus vouchers available through the facility
ESL	

Standards Covered

Core: Science

Environmental Science

SCI.9-12.: Earth Systems: Interconnected Spheres of Earth

- SCI.9-12.: **Atmosphere**
- SCI.9-12.: **Biosphere**
- SCI.9-12.: **Hydrosphere**
- SCI.9-12.: **Lithosphere**
- SCI.9-12.: **Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere**
  - SCI.9-12.: **Energy transformations on global, regional and local scales**

SCI.9-12.: Earth's Resources

- SCI.9-12.: **Air and air pollution**
  - SCI.9-12.: **Clean Air Act**
  - SCI.9-12.: **Primary and secondary contaminants**
- SCI.9-12.: **Water and water pollution**

SCI.9-12.: Global Environmental Problems and Issues

- SCI.9-12.: **Potable water quality, use and availability**

Materials

For a closer look at the materials list below, log onto https://cleveland.schoolnet.com

Lessons:

1. ENV: Layers of the Atmosphere
2. ENV - Mapping Acid Precipitation
3. ENV - Principles of Science Lecture Notes
4. ENV - Principles of Science Presentation
5. ENV - Eyes of Nye Pseudoscience
6. ENV - Famous Examples of the Scientific Method
7. ENV - Energy and Matter Cycles Presentation
8. ENV - Energy and Matter Guided Notes
9. ENV - Cycles Webquest
10. ENV - Water, Carbon, and Nitrogen Worksheet
11. ENV - Great Lakes Coastal Update
12. ENV - Create a Watershed
13. ENV - Habitat Analysis
14. ENV - The Science of Water
15. ENV - No Impact Man: Water
16. ENV - Calculating Water Runoff

Resources:

1. ENV - Acid Rain Effects Lab Worksheet

ADDITIONAL RESOURCES	• NOVA Power Surge video: http://www.pbs.org/wgbh/nova/tech/power-surge.html • University of Maine scientific case study of a specific glacier, including quantifiable data documenting measurable yearly changes: http://climatechange.umaine.edu/Research/projects/byrdglacier.html. • The OSU Byrd Polar Research site offers numerous educational resources that are related to glacial geology and climate change: http://bprc.osu.edu/. • Infographic How climate change is destroying the Earth?: http://www.educatoral.com/wordpress/2013/03/05/awesome-climate-change-infographic/ • The National Academy of Science provides a number of resources related to climate change and greenhouse gases at http://www.nationalacademies.org/education/tsresources.html.

INSTRUCTIONAL ALIGNMENT

DIGITAL / PRINT TEXT

Annenberg Learner Online

- Unit 10 Energy Challenges http://www.learner.org/courses/envsci/unit/text.php?unit=10&secNum=0
- Unit 12 Earth's Changing Climate http://www.learner.org/courses/envsci/unit/text.php?unit=12&secNum=0
- Renewable Energy in Ohio http://www.nrdc.org/energy/renewables/ohio.asp
- How is climate change destroying the earth http://www.learnstuff.com/climate-change/
- Hot days are on the rise http://www.wunderground.com/news/hot-days-are-rise-graphic-20130531
- 2013 Proposed Carbon Pollution Standard http://www2.epa.gov/carbon-pollution-standards/2013-proposed-carbon-pollution-standard-new-power-plants

ESSENTIAL QUESTIONS

- What are the components of the spheres and how do they interact with one another?
- How does energy flow within the spheres?
- Why is balance essential for its sustainability?
- How have human activities impacted upon the balance of the world in which we live?
- What are some of the varying views regarding climate change?
- What are the potential uses and limitations of renewable energy sources?

DIFFERENTIATION

The following can be used for gifted & struggling students with teacher modification & according to the needs of the student.

- Strategies and free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org.
- Wind Power on Lake Erie: http://windustrious.org/
- The story is in the ice: http://www.earthday.org/climatechange
- Global Warming & Climate Change Myths: http://www.skepticalscience.com/argument.php
- Price of carbon video: http://climaterealityproject.org/the-price-of-carbon/
- Massive glacier breakoff video: http://deadstate.org/this-is-the-most-massive-and-destructive-glacier-breakup-to-ever-be-caught-on-film/
- Student Guide Global Climate change: http://www.epa.gov/climatestudents/

PERFORMANCE TASKS

This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.

- Research and collect specific data for a mass wasting or desertification event (can be present day or historical). Research questions should include: What factors led to the event? What was the result of the event (how was each of Earth's spheres impacted)? What data is present (analyze the data and draw conclusions)? What laws are related to the event? How can this be prevented in the future? Record the results graphically or in a scientific report. (3rd Quarter as it relates to food production, deforestation, etc.)
- Choose a specific location in the United States. Research and analyze the patterns of climate change throughout the geologic record, historic data (human records) and present-day data for the location. Be able to explain the interpretation and analysis of the data. Create a graphical representation of the pattern and discuss with the class.
- Investigate and research the effect that climate change is having or has had on a specific living or extinct species, such as the harp seal or elkhorn coral, or on an ecosystem, such as the Great Barrier Reef or the Arctic Circle. (lead into 3rd Quarter)
- Energy portfolio interactive lab: http://www.learner.org/courses/envsci/interactives/energy/
- New energy education resources https://www.plt.org/newsletter-new-energy-education-resources

INSTRUCTIONAL ALIGNMENT *cont.*

PERFORMANCE TASKS *cont.*

- Life Cycle of a product: Students can complete a product analysis, product impacts, and brainstorm ways to reduce unwanted environmental effects. https://www.plt.org/prek-8-activity-82---resource-go-round
- Nova: The Energy Lab - Students use scientific data to design renewable energy systems for cities across the U.S.—and compete with others to see whose designs can produce the most power. http://www.pbs.org/wgbh/nova/labs/lab/energy/
- International student carbon footprint challenge (Starts in September 2014)
- This project, specifically designed to help students measure their personal CARBON FOOTPRINT and discuss climate change concerns with students around the world. http://footprint.stanford.edu/
- How do solar panels work? Interactive http://www.pbs.org/wgbh/nova/tech/how-solar-cell-works.html
- Birthday data trend - Have students look up the mean (average) temperature on your birthday for the past 60+ years to determine if there is a warming trend on that day or not. www.wunderground.com
- The Global Climate: Shrinking Sea Ice Activity https://www.plt.org/newsletter-shrinking-sea-ice-activity
- 7 excellent Climate Change lessons http://www.epa.gov/climatestudents/resources/lesson-plans.htmlLessons Include:: Weather and Climate: What's the Difference, Mapping Greenhouse Gas Emissions Where you Live, Carbon Through the Seasons, Going to the Core: Climate Change Over Time, Tree Rings: Living Records of Climate, Sea Level: On the Rise, and Corals and Chemistry

VOCABULARY	greenhouse effect, greenhouse gas, thermohaline circulation, El Nino, topography, global climate change, global warming, proxy indicator, climate model, fossil fuel, coral bleaching, carbon footprint, carbon tax, carbon offset, carbon sequestration, Kyoto Protocol, biomass energy, biofuel, biopower, geothermal energy, ground source heat pump, hydropower, tidal energy, ocean thermal energy conversion (OTEC), passive solar heating, active solar heating, flat-plate solar collector, photovoltaic (PV), concentrating solar power, wind turbine, wind farm, electrolysis, fuel cell
ASSESSMENTS	
ACADEMIC CONNECTIONS	**ELA:** RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; **SEL:** Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics ; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.

Standards Covered

Core: Science

Environmental Science

SCI.9-12.: Earth Systems: Interconnected Spheres of Earth

- SCI.9-12.: **Atmosphere**
  - SCI.9-12.: **Atmospheric properties and currents**
- SCI.9-12.: **Hydrosphere**
  - SCI.9-12.: **Cryosphere**
  - SCI.9-12.: **Oceanic currents and patterns (as they relate to climate)**
- SCI.9-12.: **Lithosphere**
  - SCI.9-12.: **Geologic events and processes**
- SCI.9-12.: **Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere**
  - SCI.9-12.: **Climate and weather**
  - SCI.9-12.: **Energy transformations on global, regional and local scales**

SCI.9-12.: Earth's Resources

- SCI.9-12.: **Air and air pollution**
  - SCI.9-12.: **Greenhouse gases**
- SCI.9-12.: **Energy resources**
  - SCI.9-12.: **Alternate energy sources and efficiency**
  - SCI.9-12.: **Mining and resource extraction**
  - SCI.9-12.: **Renewable and nonrenewable energy sources and efficiency**
  - SCI.9-12.: **Resource availability**
- SCI.9-12.: **Soil and land**
  - SCI.9-12.: **Desertification**
  - SCI.9-12.: **Mass wasting and erosion**
  - SCI.9-12.: **Sediment contamination**
  - SCI.9-12.: **Solid and hazardous waste**

SCI.9-12.: Global Environmental Problems and Issues

- SCI.9-12.: **Climate change**

Materials

For a closer look at the materials list below, log onto https://cleveland.schoolnet.com

Lessons:

1. ENV: Layers of the Atmosphere
2. ENV-Effects of Global Warming LP
3. ENV - Global Warming Activity
4. ENV: Global Warming; Fact or Myth?
5. ENV - CFCs and the Ozone project
6. ENV - Atmosphere WebQuest
7. ENV - No Impact Man Energy
8. ENV - Fueling our Future
9. ENV - No Impact Man: Transportation
10. ENV - Alternative Energy Project
11. ENV - Resource Depletion
12. ENV - Topographic Features of the Taku Glacier Region

Additional Properties

Author: CMSD

Publisher: Cleveland Metro SD

Cost/Fee: No

Restricted Use: No

Keywords:

Created by: Potter, Jennifer (4/22/2015 10:36 AM)

Last modified by: Potter, Jennifer (5/26/2015 3:53 PM)

Environmental Science Q3

Unit: Core: Science , Grade(s) 9th Grade - 12th Grade

JCP - Environmental Science Q1

Duration: 0 Minute

Unit

Scope and Sequence

ADDITIONAL RESOURCES	• Observe Nature: students can record what you see in nature, meet other nature lovers, and learn about the natural world. http://www.inaturalist.org/

INSTRUCTIONAL ALIGNMENT

DIGITAL / PRINT TEXT

Annenberg Learner Online

- Unit 9 Biodiversity Decline: http://www.learner.org/courses/envsci/unit/text.php?unit=9&secNum=0
- Unit 4 Ecosystems: http://www.learner.org/courses/envsci/unit/text.php?unit=4&secNum=0
- Unit 5 Human Population Dynamics: http://www.learner.org/courses/envsci/unit/text.php?unit=5&secNum=0
- Invasive Species: http://www.takepart.com/photos/most-invasive-species-us-has-exported/red-white-and-exported?cmpid=tpnews-eml-2013-2-05-kid
- Invasive species in Ohio:: http://www2.ohiodnr.gov/invasive-species/invasive-species-in-ohio
- Corn Production: http://www.upworthy.com/we-used-to-have-307-kinds-of-corn-guess-how-many-are-left
- Breading the nutrition out of food: http://www.nytimes.com/2013/05/26/opinion/sunday/breeding-the-nutrition-out-of-our-food.html

ESSENTIAL QUESTIONS

- How does your water use affect the environment?
- How does what you eat have global impact?
- Is invasive species and extinction part of the natural order?

DIFFERENTIATION

The following can be used for gifted & struggling students with teacher modification & according to the needs of the student.

- Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org.
- Research habitat loss: http://na.unep.net/atlas/google.php
- Endangered species poster project:: http://www.earthsendangered.com/list.asp ; http://www.kidsplanet.org/factsheets/map.html
- The Trees are Talking: http://www.fishersci.com/ecomm/servlet/cmstatic?storeId=10652&href=ScienceEducation/scienceEduStandard/Features/Headline_Discoveries/2006_Spring/hd_ShhTreesTalking.jsp
- Forests of the world: https://www.plt.org/stuff/contentmgr/files/1/2cde608ecadb4a55228d9eba44417167/files/fotw_poster.pdf
- Learn about eating local: http://www.earthday.org/takeaction/eatlocal_info.html
- Hungry Planet: What the World Eats slideshow: Students determine and compare how their diet compares to families around the world. http://time.com/8515/hungry-planet-what-the-world-eats/

PERFORMANCE TASKS

This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.

- Choose a specific living species. Using scientific data, trace the history of that species. Show existing, proven evolutionary relationships, environmental (both biotic and abiotic) requirements, global locations, ecosystem characteristics and sustainability predictions. Use quantifiable data to support findings and present findings to the class orally, through demonstration/explanation or a poster session
- Research or conduct a field investigation for a specific invasive species that is present in the local community or in Ohio. Examples of research questions include: How did the organism get into Ohio? What is being done to control the spread of the species? What is the impact of the species on the native population? Use quantifiable data to draw conclusions and present research results in writing or orally.
- Plan and implement an investigation to explore biomagnification or bioaccumulation within a specific Ohio ecosystem (existing public case studies can be used, such as a local Brownfields case – see resource listed below). Document the steps and process to collect or research, evaluate or test and analyze the data. Research should include the possible impact to humans. Present the process and results to the class verbally or in writing.
- Research and analyze quantifiable scientific data pertaining to food availability, reproductive requirements and changes, adaptations or population changes to draw conclusions. Students present data and conclusions to the class.

INSTRUCTIONAL ALIGNMENT *cont.*

PERFORMANCE TASKS *cont.*

- Virtual biodiversity lab http://www.virtualbiologylab.org/Biodiversity.htm
- Ecology lab: (addition or removal of species) http://www.learner.org/courses/envsci/interactives/ecology/
- Schoolyard biodiversity investigation: An introduction to biodiversity concepts and outdoor investigations: http://www.fishwildlife.org/files/ConEd-Schoolyard-Biodiversity-Guide.pdf
- Schoolyard habitat project guide http://www.fws.gov/cno/pdf/HabitatGuideColor.pdf
- Zebra Mussels and the Lake Erie ecosystem: http://dnet01.ode.state.oh.us/ims.itemdetails/lessondetail.aspx?id=0907f84c80531c00
- Estimate tree cover and tree benefits for a given area with a random sampling process that lets you easily classify ground cover types. http://itreetools.org/canopy/
- 3 Protecting Earth's Wildlife http://www.nationalgeographic.com/xpeditions/lessons/14/g68/HumanFootprint.pdf
- Tips for local gardening and composting http://www.takepart.com/homegrown
- USDA Web soil survey http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

VOCABULARY	Bioaccumulation, Biomagnification, Desertification, invasive species, extinction,
ASSESSMENTS	
ACADEMIC CONNECTIONS	**ELA:** RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; **SEL:** Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics ; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.

Standards Covered

Core: Science

Environmental Science

SCI.9-12.: Earth Systems: Interconnected Spheres of Earth

- SCI.9-12.: **Biosphere**
  - SCI.9-12.: **Biodiversity**
  - SCI.9-12.: **Ecosystems (equilibrium, species interactions, stability)**
  - SCI.9-12.: **Evolution and adaptation in populations**
- SCI.9-12.: **Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere**
  - SCI.9-12.: **Biogeochemical cycles**
  - SCI.9-12.: **Ecosystems**
  - SCI.9-12.: **Energy transformations on global, regional and local scales**

SCI.9-12.: Earth's Resources

- SCI.9-12.: **Soil and land**
  - SCI.9-12.: **Desertification**
  - SCI.9-12.: **Land use and land management (including food production, agriculture and zoning)**
  - SCI.9-12.: **Mass wasting and erosion**
  - SCI.9-12.: **Sediment contamination**
  - SCI.9-12.: **Solid and hazardous waste**
- SCI.9-12.: **Wildlife and wilderness**
  - SCI.9-12.: **Endangered species**
  - SCI.9-12.: **Wildlife and wilderness management**

SCI.9-12.: Global Environmental Problems and Issues

- SCI.9-12.: **Deforestation and loss of biodiversity**
- SCI.9-12.: **Food production and availability**
- SCI.9-12.: **Species depletion and extinction**

Materials

For a closer look at the materials list below, log onto https://cleveland.schoolnet.com

Lessons:

1. ENV: Natural Selection with Teddy Grahams
2. ENV - Media Construction of the Env - Endangered Species
3. ENV - Ecology Population Grown
4. ENV - Estimating Popoulation Size
5. ENV - Range of Tolerance Graphing Activity
6. ENV - Lesson of the Kaibab
7. ENV - Species, Population, and Community
8. ENV - Coastal Journey
9. ENV - Great Lakes Explore and Restore
10. ENV - Coastal Habitat Research
11. ENV - Race for Survival
12. ENV - Food Web Invasion
13. ENV - Desertification: Cause and Effect
14. ENV - Genetically Modified Foods
15. ENV - Deforestation Research Assignment

Resources:

1. ENV: Limiting Factors: Density Dependent / Independent

Additional Properties

Author: CMSD

Publisher: Cleveland Metro SD

Cost/Fee: No

Restricted Use: No

Keywords:

Created by: Potter, Jennifer (4/22/2015 10:38 AM)

Last modified by: Potter, Jennifer (5/26/2015 5:07 PM)

Environmental Science Q4

Unit: Core: Science , Grade(s) 9th Grade - 12th Grade

JCP - Environmental Science Q4

Duration: 0 Minute

Unit

Scope and Sequence

ADDITIONAL RESOURCES	• ODNR's website discusses acid mine drainage issue in Ohio. There also are specific links to Ohio watersheds (including maps of the watershed locations) that are in the abatement program and water quality data to study changes within a local area. Find it at http://www.ohiodnr.com/mineral/acid/tabid/10421/Default.aspx. • The Ohio EPA offers a discussion about Ohio wetlands and the delineation, and qualitative analysis of Ohio wetlands at http://www.epa.state.oh.us/portals/47/facts/ohio_wetlands.pdf • \World Population clocks: http://www.worldometers.info/world-population/ ; http://www.census.gov/popclock/ • Garbology 101: https://www.plt.org/newsletter-plt-greenworks-waste-recycling-project

INSTRUCTIONAL ALIGNMENT

DIGITAL / PRINT TEXT

See previous recommendations

ESSENTIAL QUESTIONS

- How can you determine the health of an ecosystem?
- How can technology be used in comparative studies of the environment?
- How can you describe the effects of contaminants on the environment?

DIFFERENTIATION

The following can be used for gifted & struggling students with teacher modification & according to the needs of the student.

- Strategies and free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org.

PERFORMANCE TASKS

This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.

- Plan and implement a population study of a specific area (over a period of time) or critique/analyze an existing population study. Document changes in weather, food availability and any change to the population. Prepare a scientific analysis and conclusion (in writing) for the study.
- Research and collect specific data for a mass wasting or desertification event (can be present day or historical). Research questions should include: What factors led to the event? What was the result of the event (how was each of Earth's spheres impacted)? What data is present (analyze the data and draw conclusions)? What laws are related to the event? How can this be prevented in the future? Record the results graphically or in a scientific report.
- Using real-time data, research the most severe environmental problems (and the root causes for the problems) that face the local community, Ohio, the United States or the world. Present evidence (quantitative data) and conclusions orally, through a poster session or in written form (scientific research paper).
- Demographics interactive lab: http://www.learner.org/courses/envsci/interactives/demographics/
- Disease lab: http://www.learner.org/courses/envsci/interactives/disease/
- Numerous Population lesson plans: http://www.fishwildlife.org/files/ConEd-Schoolyard-Biodiversity-Guide.pdf
- How Big is Big? http://asiasociety.org/how-big-big
- Living on $500 a Day: http://www.populationeducation.org/index.php?option=com_content&view=article&id=35&Itemid=10
- Watershed Assessment Studies: http://www.water-research.net/Watershed/index.htm
- Water Testing Lab: http://water.usgs.gov/edu/characteristics.html
- Water Treatment Lab: The Dirty Water Project lab: http://www.teachengineering.org/view_activity.php?url=collection/cub_/activities/cub_environ/cub_environ_lesson06_activity2.xml#objectives
- Water Quality Lab: The Ohio Department of Natural Resources' Project Wet offers resources for K-12 teachers that promote deep understanding about all aspects of water and the interconnectedness of all of Earth's spheres (Earth Systems). http://www.dnr.state.oh.us/tabid/3501/Default.aspx
- Extension of Earth's Resource lessons from other quarters http://earthref.org/SCC/activities.htm
- Start an online petition encouraging a business or organization to adopt sustainable, "green" practices.: www.change.org

INSTRUCTIONAL ALIGNMENT *cont.*

VOCABULARY	See previous quarters
ASSESSMENTS	
ACADEMIC CONNECTIONS	**ELA:** RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; **SEL:** Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics ; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.
FIELD EXPERIENCES	• West Creek Watershed Stewardship Center Parma, OH- limited bus vouchers available • Adopt a Beach, Alliance for the Great Lakes- must participate in free professional development to receive materials • NEORSD: Sewer District tours • Waste Treatment tours • Cuyahoga River field trips as it relates to the Clean Water Act from when the river caught on fire.

Standards Covered

Core: Science

Environmental Science

SCI.9-12.: Earth Systems: Interconnected Spheres of Earth

- SCI.9-12.: **Biosphere**
  - SCI.9-12.: **Population dynamics**
- SCI.9-12.: **Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere**
  - SCI.9-12.: **Biogeochemical cycles**
  - SCI.9-12.: **Ecosystems**
  - SCI.9-12.: **Energy transformations on global, regional and local scales**

SCI.9-12.: Earth's Resources

- SCI.9-12.: **Air and air pollution**
  - SCI.9-12.: **Clean Air Act**
  - SCI.9-12.: **Greenhouse gases**
  - SCI.9-12.: **Primary and secondary contaminants**
- SCI.9-12.: **Energy resources**
  - SCI.9-12.: **Alternate energy sources and efficiency**
  - SCI.9-12.: **Mining and resource extraction**
  - SCI.9-12.: **Renewable and nonrenewable energy sources and efficiency**
  - SCI.9-12.: **Resource availability**
- SCI.9-12.: **Soil and land**
  - SCI.9-12.: **Desertification**
  - SCI.9-12.: **Land use and land management (including food production, agriculture and zoning)**
  - SCI.9-12.: **Mass wasting and erosion**
  - SCI.9-12.: **Sediment contamination**
  - SCI.9-12.: **Solid and hazardous waste**
- SCI.9-12.: **Water and water pollution**
  - SCI.9-12.: **Clean Water Act**
  - SCI.9-12.: **Hypoxia, eutrophication**
  - SCI.9-12.: **Point source and non-point source contamination**
  - SCI.9-12.: **Potable water and water quality**
- SCI.9-12.: **Wildlife and wilderness**
  - SCI.9-12.: **Endangered species**
  - SCI.9-12.: **Wildlife and wilderness management**

SCI.9-12.: Global Environmental Problems and Issues

- SCI.9-12.: **Human population**
- SCI.9-12.: **Potable water quality, use and availability**
- SCI.9-12.: **Sustainability**
- SCI.9-12.: **Waste management (solid and hazardous)**

Materials

For a closer look at the materials list below, log onto https://cleveland.schoolnet.com

Lessons:

1. ENV - Global Warming Activity
2. ENV: Global Warming; Fact or Myth?
3. ENV - Buy, Use, Toss (Story of Stuff)
4. ENV - Garbology
5. ENV - Human Population and Demographics PPT
6. ENV - Human Population and Demographics NOTES