

HUMAN SCIENCE Lesson Plan

Day 1: We're out of balance - now what?



NOTE: The lesson plans for this standard contain a plethora of web resources and activities, you may want to be prepared to build in extra time when planning this unit.

Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
- 6a. Students know biodiversity is the sum total of difference kinds of organisms and is affected by alterations of habitats.

PREPARE

1. Background Background knowledge to engage the content

What is ecology?

Ecology is the study of the relationships between organisms their physical environment and one another.

- The study of an individual organism or a single species is termed autecology;
- The study of groups of organisms is called synecology.

The Earth's biosphere (the total expanse of water, land, and atmosphere able to sustain life) contains the basic ecological unit, called the ecosystem. An ecosystem can be small like a tidepool or a rooting log or plant or as large as an ocean or a continent-spanning forest.

Each ecosystem consists of a community of plants and animals in an environment that supplies them with raw materials for life, i.e., chemical elements and water. The ecosystem is delimited by the climate, altitude, water and soil characteristics, and other physical conditions of the environment.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Biodiversity:	The variability among living organisms on the earth, including the variability within and between species and within and between ecosystems.
Organism:	An individual form of life, such as a plant, animal, bacterium, protist, or fungus; a body made up of organs, organelles, or other parts that work together to carry on the various processes of life.
Alteration:	The act of; To change or make different
Habitat:	The area or environment where an organism or ecological community normally lives or occurs: <i>a marine habitat</i> .
Ecosystem:	An ecological community together with its environment, functioning as a unit.
Stability:	Resistance to change, deterioration, or displacement.
Resiliency:	Marked by the ability to recover readily, as from misfortune

READ

3. View

Article:

Go to: www.nationalgeographic.org
Search: benefits of biodiversity
Locate: Muck Is Last Frontier of Biodiversity, Experts Argue
Read: As a class

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)
Search: Biodiversity
Locate: More Is Better: The Biodiversity Story (approximate run time 19:30)
View: As a class

RESPOND

4. Visual Process.

What's New in *Your Zoo*

All living things need a habitat. As we study ecology we study the habitats of living things large and small. But we often don't consider our habitats. What do we need in order to survive? Using a "T" Chart and your imagination consider the things that you NEED in your habitat.

- On one side of the chart list and illustrate what you NEED to have in your habitat in order to survive. Think of all of the items that your survival is based on. Don't forget our friend the fungus and bacterial.
- On the other side of the chart list and illustrate what you WANT in your habitat. Think about where you would want your habitat to be, the beach, desert, or mountains. Does it need to be large or small etc?
- At the bottom write 1-2 paragraphs. How do these two lists differ? Is there a large difference between your needs and wants? Should there be? Why or why not?

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

For this standard and others in standard 6, we suggest contacting the following offices to invite guest speakers to your class. Contact your local college or university, State Park, National Park, or private business and invite a guest speaker into your class.

In addition there are a variety of websites that you can use to take students on a virtual ecological tour.

The Peregrine Fund

<http://www.peregrinefund.org/default.asp>

This site gives an overview on birds of prey and their ecosystems. You can take virtual tours. Investigate various different birds and their needs. Read about notes from the field. There is a webquest for this site attached to the lesson plan for day one.

San Diego Zoo

<http://www.sandiegozoo.org/videos/>

- Click the link videos.
- Choose one of the different animal cams that are located at the zoo.
- Students can visualize the various different types of habitats that individual animals have.

Monterey Bay Aquarium

http://www.montereybayaquarium.org/efc/cam_menu.aspx?c=dd

- Click Animals and Activities
- Click Podcast, videos, and webcams

Environmental Protection Agency

<http://water.epa.gov>

This website has links to many waterways and swamp areas.

Red Rock Canyon

<http://redrockcanyonlv.org/index.html>

- Click flora and fauna to see examples of the animals and plants that live in this habitat.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- Why is conservation important? How do you balance the needs of the planet and conserving areas with the needs of countries?
- It saves cost to genetically modify food. What are issues that surround the ecosystem and environment when we modify crops for pests and growth?
- How have some of the smallest creatures benefited you?
- What is stewardship?
- How can ecosystems change over time?

EXTEND

7. Write, Draw or Speak.

Science Journal:

Draw an ecosystem. Label the system in the following way:

- What ecosystem are you depicting?
- Add 5-7 producers and consumers that live in your ecosystem?
- Why is it important to preserve the system you have depicted?

8. Close

Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

Title:

Date:

Column 1: Phrases, words, questions or a sketch related to the details in column 2.	Column 2: Important Details

Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

WebQuest

Go To: <http://www.peregrinefund.org/default.asp>

Click: Conservation Projects. Choose a project to investigate.

In your own terms: What does the project do? _____

What outcome has the project had? _____

Visit: Notes from the Field

How do these real time notes, photo's, and blogs help you understand the area's each of the scientists are in better?

Go to Explore Birds of Prey:

- Choose 2 birds to investigate
- Write 2 facts on each of the birds
- Sketch one of the birds

HUMAN SCIENCE Lesson Plan

Day 2: We're out of balance; now what?



Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
- 6a. Students know biodiversity is the sum total of difference kinds of organisms and is affected by alterations of habitats.

PREPARE

1. Background Background knowledge to engage the content

What is biodiversity?

The number and variety of organisms found within a specified geographic region. Biodiversity is the variability among living organisms on the earth, including the variability within and between species and within and between ecosystems.

The variety of life on Earth, its biological diversity is commonly referred to as biodiversity. The number of species of plants, animals, and microorganisms, the enormous diversity of genes in these species, the different ecosystems on the planet, such as deserts, rainforests and coral reefs are all part of a biologically diverse Earth.

Keeping the vastness and richness of the biodiversity of the planet is important. Many resources and advances in science stem from the ability to research various different genetic make-ups and plant life. This allows us as humans to have made huge advances in medical research as well as in other fields.

2. Word Wall

vocabulary words to teach and add to the Word Wall.

Biodiversity:	The variability among living organisms on the earth, including the variability within and between species and within and between ecosystems.
Organism:	An individual form of life, such as a plant, animal, bacterium, protist, or fungus; a body made up of organs, organelles, or other parts that work together to carry on the various processes of life.
Alteration:	The act of; To change or make different
Habitat:	The area or environment where an organism or ecological community normally lives or occurs: <i>a marine habitat</i> .
Ecosystem:	An ecological community together with its environment, functioning as a unit.
Stability:	Resistance to change, deterioration, or displacement.
Resiliency:	Marked by the ability to recover readily, as from misfortune

Review words from day 1. Add today's word.

Variability: The quality, state, or degree of being variable or changeable.

READ

3. View

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Biodiversity Threat

Locate: Inventions and Invasions: The Great Lakes Ballast Technology Project (approximate run time 17:00)

Video

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Biodiversity Threat

Locate: The Threat to Biodiversity (approximate run time 20:14)

View: As a class

Article

Go to: www.pbs.org

Search: Biodiversity threats

Locate: Deep Sea Invasion

Read: As a class

Note:

There are many articles on Biodiversity and the threat to biodiversity if you would like to use other locations or topics that are more relevant to your class search Biodiversity Threat on PBS, Discovery Education, or National Geographic. com.

RESPOND

4. Visual Process.

Biodiversity/Ecology collage

Think of all of the things natural and manmade that can harm an ecosystem or threaten biodiversity.

- Create a collage depicting as many of these threats as possible
- Choose one threat and explain in detail how it can affect the biodiversity of an ecosystem.

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Oil Spills and their Effects

http://www.associatedcontent.com/article/657099/ecology_experiments_for_kids.html?cat=32

Or search: Ecology experiments for teens on google or yahoo

Locate: Science Experiment #1: [How to clean up an oil spill](#)

We all know that oil spills can damage our environment. Understanding how much damage an oil spill can do is best illustrated by replicating an oil spill in a controlled setting. The purpose of this experiment is to recreate an oil spill, and experiment with different methods to determine the most efficient method of cleaning up after a spill.

Experiment and observation form is attached at the end of today's lesson.

For this standard and others in standard 6, we suggest contacting the following offices to invite guest speakers to your class. Contact your local college or university, State Park, National Park, or private business and invite a guest speaker into your class.

In addition there are a variety of websites that you can use to take students on a virtual ecological tour.

The Peregrine Fund

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This site gives an overview on birds of prey and their ecosystems. You can take virtual tours. Investigate various different birds and their needs. Read about notes from the field. There is a webquest for this site attached to the lesson plan for day one.

San Diego Zoo

<http://www.sandiegozoo.org/videos/>

- Click the link videos.
- Choose one of the different animal cams that are located at the zoo.
- Students can visualize the various different types of habitats that individual animals have.

Monterey Bay Aquarium

http://www.montereybayaquarium.org/efc/cam_menu.aspx?c=dd

- Click Animals and Activities
- Click Podcast, videos, and webcams

Environmental Protection Agency

<http://water.epa.gov>

This website has links to many waterways and swamp areas.

Red Rock Canyon

<http://redrockcanyonlv.org/index.html>

- Click flora and fauna to see examples of the animals and plants that live in this habitat.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- Why is biodiversity critical? How do more organisms help the health of an ecosystem?
- What causes a loss of biodiversity in an ecosystem? Consider both natural and manmade issues?
- How does the extinction of a species affect us?
- If biodiversity positively affects all people and animals on the planet, why are there so many issues surrounding its preservation?
- What is stewardship?
- What is our role in the community? In the country? In the world?
- How do your actions affect the world negatively and positively?
- How does globalization negatively affect the biodiversity of the planet?
- Should limits be placed on our global economy? Why? What?

EXTEND

7. Write, Draw or Speak.

Science Journal—speak for the planet

Pretend you are the planet and being harmed by natural and manmade forces. What would you say?

Create a cartoon strip that represents the planet as it is being harmed.

- Make sure you give the planet a voice—tell the issue
- Make sure you give the reader a solution—what can we do to help the planet.

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

Oil Spills and their Effect

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Or search: Ecology experiments for teens on google or yahoo

Locate: Science Experiment #1: [How to clean up an oil spill](#)

Oil spills can damage our environment. Understanding how much damage an oil spill can do is best illustrated by replicating an oil spill in a controlled setting. The purpose of this experiment is to recreate an oil spill, and experiment with different methods to determine the most efficient method of cleaning up after a spill.

Materials needed to make the oil spill:

a large cookie tray

water

automotive oil (dirty is best)

small rocks and sand

bits of wood, tufts of grass, and feathers

a fan

Step 1: Line the edge of the tray with rocks and sand to create a shoreline. Tuck in bits of wood and the grass in the shoreline to represent some of the plant life that live on the coast.

Step 2: Gently add water to the tray until 2/3 full. Drop a small handful of feathers into the water.

Step 3: Gently pour a small amount of automotive oil carefully into the tray.

Step 4: Place the fan along one end of the tray, and switch to the "on" position. Leave the fan on, until the oil spill drifts to one of the shorelines, then shut off.

Step 5: Experiment with different ways of trying to clean up the oil on both the water, the shoreline, and on the organisms themselves. Things to experiment with should include sand, kitty litter, string, Dawn dish washing detergent, laundry degreasers, newspapers, turkey baster, rags, and pet fur.

Step 6: Record your findings and observations.

Oil Spill—Findings

Prior to starting the experiment:

Which substance do you think will have the best outcome when cleaning up the spill?

Why? _____

Which substance do you think will have the worst outcome when cleaning up the spill?

Why? _____

What environmental factors affect oil spills and their clean up? _____

Record your findings from the experiment here:

- In column one list the item or substance you tried for clean up
- In column two list the effect it had in cleaning the water
- In column three list the effect it had in cleaning the shoreline
- In column four list the effect it had in cleaning the organisms

Item used for clean up:	Effect on: The Water	Effect on: The Shoreline	Effect on: The organisms

HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

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Title:

Date:

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Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 3-4: We're Out of Balance; Now What?

Note this is a two day lesson. There are many activities and articles. You do not have to do everything. Day four is optional if you need additional time.



Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
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PREPARE

1. Background Background knowledge to engage the content

How do we help the ecosystem and biodiversity? (for discussion)

In many ways the answer to this question is fairly simple. In order to help our various ecosystems and biodiversity we must preserve them. Although, it seems like a simple and easy idea the idea is preservation is extremely complex.

There are many land use issues that come into play. If you live in a developed country it is much easier to preserve certain areas of land. However, does the government have the right to keep tax payers off of property that they pay for in taxes?

Is you are in an emerging country does the rest of the world have the right to tell you how to develop and what industry and standards you should implement?

It is much easier to preserve something when you have excess then when you need that item to survive and to thrive. Preservation at its most basic element asks for all people to use something sparingly, treat our space with respect, and to not overuse a certain area or item. If we all did something to accommodate those basic principles we would be a little close to maintaining our environment, ecosystem, and biodiversity.

2. Word Wall

vocabulary words to teach and add to the Word Wall.

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Stability:	Resistance to change, deterioration, or displacement.
Resiliency:	Marked by the ability to recover readily, as from misfortune
Variability:	The quality, state, or degree of being variable or changeable.

Review words from day 2. Add the word for today

Preservation: To keep in a perfect or unaltered condition.

READ

3. View

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Preserving resources

Locate: Treasures of the Deep: Our Ocean Resources (approximate run time (20:00)

Other videos and segments can be found on protecting the waterways, deserts, rainforest etc. You can locate a video or clip that meets the needs of your class if needed.

Article:

Go to: www.nationalgeographic.com

Search: Preserve natural resources

Locate: National Geographic Travel Geotourism

http://travel.nationalgeographic.com/travel/sustainable/about_geotourism.html

Video/Article/Activity:

Go to: www.PBS.org

Search: Preserve natural resources

Locate: The National Parks; America's Best Idea. This is a film and article combination. There are discussion questions with each clip and article.

RESPOND

4. Visual Process.

Bumper Sticker

Create a bumper sticker that highlights an ecosystem that is threatened.

- Create a catchy slogan to encourage others to preserve that area.
- Add illustrations or graphics of the biodiversity the area supports.

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Public Lands Preserve or Develop (allow 3-4 hours for the activity)

This is an activity that is geared for a 7-9th grade class. Know your class prior to participating in the activity. It does raise many good issues.

Go to:

<http://www.nationalgeographic.com/xpeditions/lessons/13/g68/preserveordevelop.html>

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Environmental Protection Agency

<http://water.epa.gov>

This website has links to many waterways and swamp areas.

Red Rock Canyon

<http://redrockcanyonlv.org/index.html>

- Click flora and fauna to see examples of the animals and plants that live in this habitat.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- What is preservation? Why is it necessary?
- How do you balance progress and preservation?
- Can you preserve an area without taking away people's rights?
- Who has the right to determine what other countries do to their lands?
- Should all countries participate in some sort of global reduction of resources? Who should set the standards?
- What is the cost to people to increase environmental standards?
- Do you think you would be able to purchase goods and services for the same price if manufacturing countries had to adhere to the same standards as a developed country has to? Do you think people are willing to pay more to have countries adhere to stricter standards?

EXTEND

7. Write, Draw or Speak.

Interview:

Speak to a relative or someone you know has lived in the same area for 20+ years. Ask them how the area has changed? What factors have contributed to those changes? Are they positive or negative? If they could have something back from the past what item would they like to preserve?

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

HUMAN SCIENCE Video Notes



Name:

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Note taking tips: (Cornell Notes)

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Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 1: What a changing world we live in!



Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
6. b Students know how to analyze change in an ecosystem resulting from changes in climate, human activity, introduction of normative species, or changes in population size.

Health: Expectation 4. Students understand and demonstrate how to play a positive, active role in promoting the health of their families. Participate in community efforts to address local health and environmental issues.

PREPARE

1. Background Background knowledge to engage the content

What are some health issues that can be impacted by climate change?

Those with heart problems, asthma, and the elderly and very young can be vulnerable to extreme heat. Extreme events caused by climate change can result in related deaths, injuries, and infectious disease. In warmer areas, climate change can increase the risk of vector born diseases, including malaria, yellow fever, and encephalitis.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Adapt	To adjust oneself to different conditions, environment, etc.: to adapt easily to all circumstances.
Vector	An insect or other organism that transmits a pathogenic fungus, virus, bacterium, etc.
Exposure	Situation with regard to sunlight or wind; aspect: a southern exposure.
Vulnerability	Capable of or susceptible to being wounded or hurt, as by a weapon: a vulnerable part of the body.

READ

3. View

Video

Go To: www.discoveryeducation.com (Subscription Based Website)

Search: Health and Climate

Locate: Mosquito Coil (3:22 minutes)

Have students use the note taking form during the video.

RESPOND

4. Visual Process.

Brainstorm: (individual or entire class)

Using the brainstorming template (attached) or students can create their own have students brainstorm the effects of climate on health.

- Have students extend a minimum of 6 lines from the circle
- On each line have students write the different effects climate has on health.
- They may want to use notes from the video

You can use this brainstorm to have students work on a research paper or write an essay.

EXTEND

5. Write, Draw or Speak.

Science Journal:

Environmental Health Scavenger Hunt

- Think about the area where you live.
- What factors both manmade and natural could possible affect your health?
- List 5 of each
- What can do to minimize the health effects of each of them?

Example: My house backs up to a freeway. I will not let my children play during rush hour when there are more cars.

6. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
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<i>Change I can make</i>	
Habit I can build	

Brainstorm



**EFFECTS OF
CLIMATE ON HEALTH**

HUMAN SCIENCE Lesson Plan

Day 2: What a changing world we live in!



Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
6. b Students know how to analyze change in an ecosystem resulting from changes in climate, human activity, introduction of normative species, or changes in population size.

Health: Expectation 4. Students understand and demonstrate how to play a positive, active role in promoting the health of their families. Participate in community efforts to address local health and environmental issues.

PREPARE

1. Background Background knowledge to engage the content

Why is it important to be able to predict cycles in ecosystems due to climate change and human activity?

Overtime ecosystem s have changed due to natural occurrence and human involvement. Since we rely on ecosystems for food, water, and weather, the ability to monitor and predict changes helps us reevaluate what actions we need to take to prevent and plan for major changes.

Weather patterns change over time. The ability for a local area to predict the weather cycles gives them an opportunity to prepare for natural disasters and keep their area residents safe and prepared. This is also a need in agriculture areas to get the best yield from crops.

2. Word Wall

vocabulary words to teach and add to the Word Wall.

Longitudinal

Analysis: The study of a population over time, as opposed to cross-sectional analysis which is limited to a single point in time. time-series analysis and panel studies are both examples. In general, panel surveys use individual-level data and time-series analysis uses aggregate-level data (see ecological association). However, the chief difference is that panel studies have a relatively large number of units studied over a small number of time points (maybe just two), whilst time-series data have a small number of units (maybe just one) and a large number of time points.

Prediction: To know in advance; based on the basis of special knowledge.

Trend: A general tendency or inclination.

Irregularities: Of uneven rate, occurrence, or duration

READ

3. View

Article/Slide show

Go to: www.epa.gov
Search: Climate Change
Locate: Climate Change indicators
Read: This is a great resource some of it is technical but most of the slides are high school friendly and explain the factors that indicate climate change well.
This site has a lot of information on the science behind climate change and the health affects that change has on populations.

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)
Search: Predicting climate change
Locate: Understanding weather/Predicting Climate Change (approximate run time 05:46)

Article:

Go to: http://www.pbs.org/frontlineworld/rough/2007/04/france_the_prec.html
Search: Analyze Population Changes
Locate: Rough Cut France: The Precarious Generation Au revoir job security
Read: As a class

RESPOND

4. Visual Process.

There is no visual process in today's lesson.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Get the Facts!

<http://www.pbs.org/wnet/need-to-know/environment/audio-skepticism-vs-denial-of-climate-change/2238/>

- Read the article above which give another perspective on climate change.
- Based on what you know about both sides of the issue create a Venn Diagram that depicts both sides of the issue.

The Worlds Weather and Climate Change

This is a four part activity 50 minutes each or the activities can stand alone.

<http://www.pbs.org/newshour/extra/teachers/lessonplans/science/weather.html>

use some or all of the lesson based on your time constraints.

6. Discussion

Ask discussion questions that engage at many levels

Key Questions

- What factors affect climate change on the world?
- How does urban sprawl affect the local ecosystems?
- What things can we do to battle a changing climate?
- Are these changes due to population or naturally occurring overtime or both?
- How has science helped the ability to predict outcomes of change on our earth?
- What can introducing a non-native species do to an ecosystem?
- Why is it important to track population changes? Growth and deaths? Besides the environmental effects what are the effects of a changing population on the local economy and growth industry.

EXTEND

7. Write, Draw or Speak.

Investigate:

Investigate and ecosystem that interests you. Investigate changes that have occurred when a non-native species has been introduced.

Options: The mongoose's introduction to the Hawaiian Islands;
Cactus introduced on the Channel Islands in California
Oil and tourism in the Galapagos Islands
<http://news.nationalgeographic.com/news/2001/01/0123-galapagos2.html>

- List the characteristics of the ecosystem prior to the non-native species being introduced.
- List the characteristics and issues of the ecosystem after the non-native species has been introduced.

8. Close

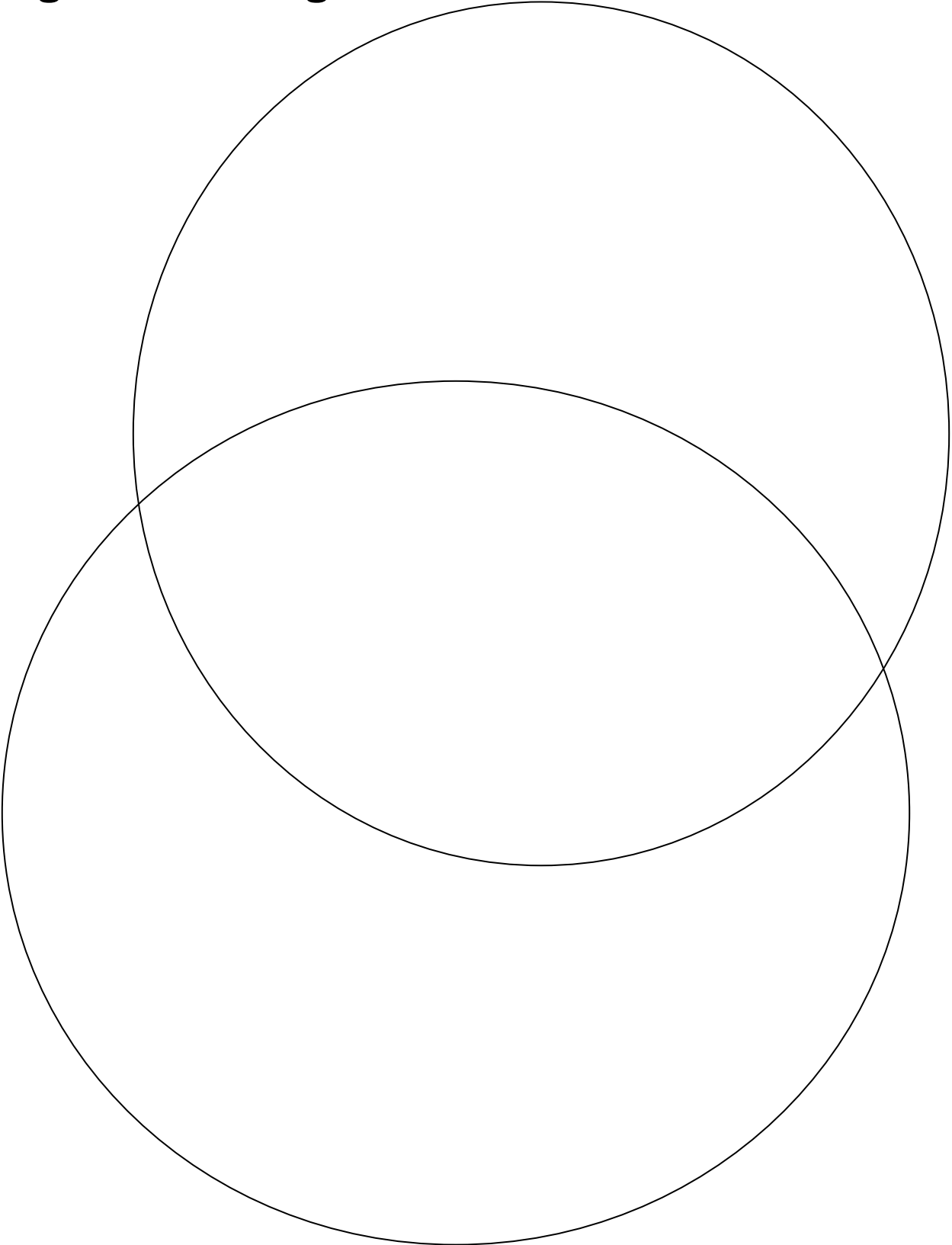
Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
<i>Habit I can build</i>	

6g6 Venn Diagram Chart



HUMAN SCIENCE Video Notes



Name:

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HUMAN SCIENCE Lesson Plan

Day 3: What a changing world we live in!



Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
 6. b Students know how to analyze change in an ecosystem resulting from changes in climate, human activity, introduction of normative species, or changes in population size.

Health: Expectation 4. Students understand and demonstrate how to play a positive, active role in promoting the health of their families. Participate in community efforts to address local health and environmental issues.

PREPARE

1. Background Background knowledge to engage the content

What is longitudinal analysis and why is it important?

The study of a population, weather, seasonal cycles, or reproductive cycles over time.

The ability to study certain changes over time allows scientist to track and develop trends and then make predictions. Although, this is a great method scientist also have to take into account other natural factors like disasters or human interference when making their predictions.

2. Word Wall

vocabulary words to teach and add to the Word Wall.

Longitudinal

Analysis:

The study of a population over time, as opposed to cross-sectional analysis which is limited to a single point in time. time-series analysis and panel studies are both examples. In general, panel surveys use individual-level data and time-series analysis uses aggregate-level data (see ecological association). However, the chief difference is that panel studies have a relatively large number of units studied over a small number of time points (maybe just two), whilst time-series data have a small number of units (maybe just one) and a large number of time points.

Prediction:

To know in advance; based on the basis of special knowledge.

Trend:

A general tendency or inclination.

Irregularities:

Of uneven rate, occurrence, or duration

READ

3. View

Video

Go to: <http://news.discovery.com/videos/news-monitoring-climate-change.html>

Search: Analyze changes in an ecosystem

Locate: News: Monitoring Climate Change (approximate run time 02:22)

Article:

Go to: <http://www.pbs.org/earthonedge/science/>

Search: Analyze changes in an ecosystem

Locate: The Earth on Edge: The Millennium Ecosystem Assessment

Read: As a class

RESPOND

4. Visual Process.

There is no visual process in today's lesson.

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Get the Facts!

<http://www.pbs.org/wnet/need-to-know/environment/audio-skepticism-vs-denial-of-climate-change/2238/>

- Read the article above which give another perspective on climate change.
- Based on what you know about both sides of the issue create a Venn Diagram that depicts both sides of the issue.

The Worlds Weather and Climate Change

This is a four part activity 50 minutes each or the activities can stand alone.

<http://www.pbs.org/newshour/extra/teachers/lessonplans/science/weather.html>

Use some or all of the lesson based on your time constraints.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- Why can the ability to analyze weather and climate affect our decisions as humans?
- How does urban sprawl affect the local ecosystems?
- How do we know for sure that our climate is changing?
- What information can we gain from long term studies of the environment and ecosystems?
- Do you think that climate change is due to human interference or a naturally occurring event?
- Who benefits from climate change issues?
- Why is the study of population important? Think about this issue at a local and global level?

EXTEND

7. Write, Draw or Speak.

Science Journal:

Think about your neighborhood.

- Draw a likeness of your home and neighborhood as it is now.
- Draw a likeness of your home and neighborhood if it had 20 fewer homes and 200 fewer people
- Draw a likeness of your home and neighborhood if it had 20 more homes and 200 more people than it had now.

Answer the following questions:

Which of the above models would be more habitable to live in? Why? What impact does having fewer and more homes have on a neighborhood? Which scenario gives you the best quality of life? How does this information help you understand the study of population in an area? How would those studies help people plan where they live?

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
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<i>Change I can make</i>	
Habit I can build	

HUMAN SCIENCE Video Notes



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Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 1: Population: life and death—oh my!

Day 2: Optional for additional activities



Outcomes for Today

- 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
 - 6.c. Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.

PREPARE

1. Background Background knowledge to engage the content

How can the increase or decrease of a specific population affect an ecosystem?

In order for an ecosystem to stay self-sustaining and healthy there needs to be a balance in population. Population increases and lead to over consumption of food and resources leaving some species under fed and unable to survive. In order to survive they need to relocate to another ecosystem or adapt in a new environment.

The same issue arises with under-population. If a population of another species is low then they will not be able to consume their food source and a needed rate and therefore that food sources population may explode or become weak since they are not being thinned out naturally.

Population affects natural resources, birth and death rates, and the ability to produce and consume goods. If those factors do not stay in balance the ecosystem becomes unbalanced.

2. Word Wall vocabulary words to teach and add to the Word Wall.

- Fluctuation:** To vary irregularly; to rise and fall with no consistency
- Population:** All the organisms that constitute a specific group or occur in a specified habitat.
- Rate of birth:** The ratio of total live births to total population in a specified community or area over a specified period of time. The birthrate is often expressed as the number of live births per 1,000 of the population per year.
- Immigration:** To enter and settle into a country or location that is not native.
- Emigration:** To leave ones country or origin and settle in another
- Death:** Termination of life

READ

3. View

Article:

Go to: <http://www.globalissues.org>
Search: Effects of population increases
Locate: Effects of Over-Consumption and Increasing Populations
Read: As a class

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)
Search: Topic
Locate: The Life of a Forest; The Forest Grows Old
Segment 8: The Delicate Balance Between Predators and Prey in the Forest Ecosystem (approximate run time 03:31)

Video/Interactive/Article

Go to: www.nationalgeographic.com
Search: Ecosystem population
Locate: Aftermath
This series has 5 video segments attached to it plus a power point. It discusses issues such as a sharp population increase/decrease, water issues, and presents “what if” scenarios. There is also an interactive portion in the series.

RESPOND

4. Visual Process.

Ecosystem Populations

Choose an ecosystem—listed below (or choose another)

Swamp	Tide pool
Forrest	Ocean
Rain Forrest	Dessert

Draw your ecosystem. Include the following:

- Which animals and organisms live in your ecosystem
- Label the producers with a P and consumers with a C
- What natural resources does your ecosystem need to survive?

Answer the questions below:

Choose one animal in your ecosystem. Pretend that organism or animal has a population explosion. What will happen to the ecosystem?

Choose one animal in your ecosystem. Pretend there has been extreme cold weather—what will happen to your ecosystem and that animals population?

Choose one animal in your ecosystem. Pretend that one animal or organism has gotten a disease and is nearly wiped out what happens to your ecosystem?

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Population Activities:

Go to: <http://www.k12science.org>

Search: K12 Curriculum--→Projects using primary sources and archived collection-
→Population Growth

Locate: Student activities

This site has approximately 10 activities that cover topics such as:

Population Explosion

Factors in Population Growth

Population Rate of Change

Population Growth Rates

Population Histograms

Modeling Population Growth

Exponential Models—constant
growth rate model

Exponential Models—Continuous
change model

Impact of a growing population

Activities for additional
Exploration

You can place students in groups and have them complete 1-2 of the activities and report back to the group in a “jig saw” fashion. Or have the class complete activities as a class. All resources for the activities are available on the website.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- What are the effects of an unbalanced population and ecosystem?
- How can moving one species to another location impact the environment?
- What effects does weather and natural occurrences have on a population?
- What happens to a ecosystem or area if it is affected by mass emigration?
- What happens to an ecosystem/area and its resources if it is affected my mass immigration?
- Why is population study important? What can it be used for? (think about resources and building) Why is it important to study birth and death rates in an area?
- Should governments be allowed to restrict the number of births families are allowed to have in order to control population?
- Which kinds of resources are needed to care for a child? Is it socially responsible for families to continue having children when they can not support them with the resources they currently have?
- In nature what happens to animal and plant populations if the ecosystem can not support them?
- If a certain population growing how are they expected to get the resources they need to survive—water, food, clothing?

EXTEND

7. Write, Draw or Speak.

Science Journal:

What ethical issues surround population increases and decreases?

Who should determine if populations increase or decrease?

What role should government and churches play in population control?

Whose responsibility is it to ensure the children you have are cared for? What does that take?

8. Close

Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day.

They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
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HUMAN SCIENCE Video Notes



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- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 1—Take a deep breath!



Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
- 6.d. Students know how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration.

PREPARE

1. Background Background knowledge to engage the content

What's the matter?

Matter by basic definition is something that occupies space and can be perceived by one or more senses; a physical body, a physical substance, or the universe as a whole.

As we study in this unit there are various different types of matter. There is organic matter which is something that comes from a once living thing and is capable of decay. An example: A tree falls in the forest. That tree then provides nutrients to other living organisms as it begins to break down. This is also an example of composting yard waste or food products to be used as soil in the garden.

Inorganic matter would be considered a discharge waste from a plant or animal (not necessarily capable of decay) something like pus or feces.

In this unit we will place most of the focus on organic matter.

2. Word Wall

vocabulary words to teach and add to the Word Wall.

Abiotic Resources:	Meaning not alive, are nonliving factors that affect living organisms. Environmental factors such habitat (pond, lake, ocean, desert, mountain) or weather such as temperature, cloud cover, rain, snow, hurricanes, etc. are abiotic factors.
Carbon:	A naturally abundant nonmetallic element that occurs in many inorganic and in all organic compounds...
Nitrogen:	A nonmetallic element that constitutes nearly four-fifths of the air by volume, occurring as a colorless, odorless, almost inert diatomic gas, N ₂ , in various minerals and in all proteins...
Water:	A clear, colorless, odorless, and tasteless liquid, H ₂ O, essential for most plant and animal life and the most widely used of all solvents.
Organic Matter:	Matter that has come from a once-living organism; is capable of decay, or the product of decay; or is composed of organic compounds
Oxygen:	A nonmetallic element constituting 21 percent of the atmosphere by volume that occurs as a diatomic gas, O ₂ , and in many compounds such as water and iron ore. It combines with most elements, is essential for plant and animal respiration, and is required for nearly all combustion
Photosynthesis:	The process in green plants and certain other organisms by which carbohydrates are synthesized from carbon dioxide and water using light as an energy source. Most forms of photosynthesis release oxygen as a byproduct
Respiration:	The act or process of inhaling and exhaling; breathing. Also called <i>ventilation</i> . The act or process by which an organism without lungs, such as a fish or plant, exchanges gases with its environment.

READ

3. View

Article:

Go to: www.PBS.org

Search: Photosynthesis

Locate: Illuminating Photosynthesis

Read: As a class

This site contains a power point as well as interactive web activities to do with your class that explain photosynthesis and the chemical cycles plants and humans rely on. These are good to walk through with your class.

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Photosynthesis

Locate: The World of Plants; Photosynthesis (approximate run time 13:21)

RESPOND

4. Visual Process.

Waste Chart

Use the information you have learned so far to draw the photosynthesis and respiration cycle of a plant. Label the parts of the cycle. Is there one portion that is more important than the others.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Guest Speaker:

Invite someone from your local college or arboretum to come and speak to your students about the need for plants in the community. You could also invite someone from your local city's planning department.

6. Discussion

Ask discussion questions that engage at many levels

Key Questions

- What are the products of photosynthesis? Why are they needed?
- Why is the sun needed for the photosynthesis process?
- What role does nitrogen play in the process?
- Can photosynthesis occur without animals and humans releasing carbon dioxide?
- It is agreed that we have cleared too many plants which is affecting our carbon output. What can you do to alleviate this problem?

EXTEND

7. Write, Draw or Speak.

Science Journal:

Write down five facts of photosynthesis.

Re-write them in the form of a question.

8. Close

Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day.

They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
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HUMAN SCIENCE Video Notes



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HUMAN SCIENCE Lesson Plan

Day 2: Take a deep breath!



Outcomes for Today

- 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
- 6.d. Students know how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration.

PREPARE

1. Background Background knowledge to engage the content

What is the greenhouse effect?

The greenhouse effect is the rise in temperature that the Earth experiences because certain gases in the atmosphere (water vapor, carbon dioxide, nitrous oxide, and methane, for example) trap energy from the sun. Without these gases, heat would escape back into space and Earth's average temperature would be about 60°F colder. Because of how they warm our world, these gases are referred to as greenhouse gases.

There is a need for a certain amount of greenhouse gasses. Without them the planet would be too cold to survive on. However, if there are too many trapped in the atmosphere there is the potential for global warming.

2. Word Wall

vocabulary words to teach and add to the Word Wall.

Abiotic Resources:	Meaning not alive, are nonliving factors that affect living organisms. Environmental factors such habitat (pond, lake, ocean, desert, mountain) or weather such as temperature, cloud cover, rain, snow, hurricanes, etc. are abiotic factors.
Carbon:	A naturally abundant nonmetallic element that occurs in many inorganic and in all organic compounds...
Nitrogen:	A nonmetallic element that constitutes nearly four-fifths of the air by volume, occurring as a colorless, odorless, almost inert diatomic gas, N ₂ , in various minerals and in all proteins...
Water:	A clear, colorless, odorless, and tasteless liquid, H ₂ O, essential for most plant and animal life and the most widely used of all solvents.
Organic Matter:	Matter that has come from a once-living organism; is capable of decay, or the product of decay; or is composed of organic compounds
Oxygen:	A nonmetallic element constituting 21 percent of the atmosphere by volume that occurs as a diatomic gas, O ₂ , and in many compounds such as water and iron ore. It combines with most elements, is essential for plant and animal respiration, and is required for nearly all combustion
Photosynthesis:	The process in green plants and certain other organisms by which carbohydrates are synthesized from carbon dioxide and water using light as an energy source. Most forms of photosynthesis release oxygen as a byproduct
Respiration:	The act or process of inhaling and exhaling; breathing. Also called <i>ventilation</i> . The act or process by which an organism without lungs, such as a fish or plant, exchanges gases with its environment.

READ

3. View

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Green House Effect

Locate: Discovery Education 3M Young Scientist Challenge: MYTHBUSTERS Special (approximate run time 00:00)

Segment 3: Testing the Green House Effect (05:41)

Segment 5: Are Cows Causing Global Warming (06:11)

Segment 11: Results from the Green House experiment (01:47)

RESPOND

4. Visual Process.

There is no visual process in today's lesson.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Global Warming Interactive:

Go to: www.PBS.org

Search: Green House Effect

Locate: On Line News Hour; The Global Warming Debate

- Have students read the resources and participate in the interactive.

Go to: <http://www.oar.noaa.gov/k12/html/greenhouse2.html>

Search: Green House Effect

Locate: Green House Effect

Have students participate in the model in small groups or as a class.

6. Discussion

Ask discussion questions that engage at many levels

Key Questions

- What is the green house effect?
- Why is a certain amount of green house gas needed?
- What is causing the increased global temperature?
- The US Government has proposed a 20% reduction in green house gasses. However, many developing nations do not have the same air quality standards that the United States has. Do developing nations have the same responsibility to curb their output of carbon like the developed nations? What will happen to costs of goods and services if those same standards are put in effect everywhere?
- What are other things we can be doing to lower our output of carbon?

EXTEND

7. Write, Draw or Speak.

Science Journal:

Create a poster that gives ideas for people to help reduce their output of carbon. Use illustrations and simple statements to get your point across.

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
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HUMAN SCIENCE Video Notes



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Part II:

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Consider this: An forest ecosystem is doing extremely well. For 5-7 years the system is hit by a drought. An insect that thrives off of dry wood starts to increase its population therefore infesting the trees and making them sick. The season is hit with drastic winds and low humidity drying out the trees and ecosystem a little more.

What threats does this situation have on the plants and animals in the ecosystem?

What can the human population do?

What would be the results of a natural disaster such as high winds and fire?

HUMAN SCIENCE Lesson Plan

Day 1—A little dirt won't hurt



Outcomes for Today

- 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
 - 6.e. Students know a vital part of an ecosystem is the stability of its producers and decomposers.

PREPARE

1. Background Background knowledge to engage the content

What's the matter?

Matter by basic definition is something that occupies space and can be perceived by one or more senses; a physical body, a physical substance, or the universe as a whole.

As we study in this unit there are various different types of matter. There is organic matter which is something that comes from a once living thing and is capable of decay. An example: A tree falls in the forest. That tree then provides nutrients to other living organisms as it begins to break down. This is also an example of composting yard waste or food products to be used as soil in the garden.

Inorganic matter would be considered a discharge waste from a plant or animal (not necessarily capable of decay) something like pus or feces.

In this unit we will place most of the focus on organic matter.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Producers:	An autotrophic organism (as a green plant) viewed as a source of biomass that can be consumed by other organisms
Consumer:	An organism requiring complex organic compounds for food which it obtains by preying on other organisms or by eating particles of organic matter.
Decomposer:	Any of various organisms (as many bacteria and fungi) that return constituents of organic substances to ecological cycles by feeding on and breaking down dead protoplasm

READ

3. View

Article:

Go to: www.pbs.org

Search: Organic Matter

Locate: Dirt 101/Composting 101

Read: As a class

There are also additional web resources on this site.

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Organic Matter

Locate: The Garbage Story; Dealing with Solid waste Disposal (approximate run time 21:57)

RESPOND

4. Visual Process.

Waste Chart

Think of the organic waste that you create on a daily basis—trash, food, leftovers, mail, etc. What are ways you can reduce what you use.

- Create a collage of the waste you produce
- List on the back how you can reduce your waste
- List what your community and school can do to reduce their waste.
- What are the benefits of reducing waste.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Guest Speaker:

Invite someone from your local waste disposal company to come and speak to your students about the waste disposal process and the need to reduce waste.

Invite someone from your local college or arboretum to come and speak on the merits of composting.

6. Discussion

Ask discussion questions that engage at many levels

Key Questions

- What types of issues go into waste disposal?
- What can happen to an area if waste is not properly disposed of?
- What are the long-term effects of waste disposal sites?
- What are creative ways societies deal with waste disposal?
- What are peoples personal role in properly disposing of waste?
- Why is it important for all people to reduce their consumption as it relates to waste?

EXTEND

7. Write, Draw or Speak.

Science Journal:

What are the issues that surround waste disposal? As our nation grows and more houses are built what role do individuals have in reducing their wastes. Should composting be required?

8. Close

Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
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HUMAN SCIENCE Video Notes



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HUMAN SCIENCE Lesson Plan

Day 2: A little dirt won't hurt

Optional Activity: 3—45minute class periods



Outcomes for Today

- 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
 - 6.e. Students know a vital part of an ecosystem is the stability of its producers and decomposers.

PREPARE

1. Background Background knowledge to engage the content

What role do producers and consumers play in an ecosystem?

Producers gain their energy from the sun and nutrients from the soil or ground. They also are involved respiration and perform photosynthesis to grow. Typically, plants are producers and are in great numbers to feed other organisms. Producers can typically manufacture their own food.

A consumer is an organism that generally obtains food by feeding on other organisms or organic matter due to lack of the ability to manufacture own food from inorganic sources. Most animals are a consumer of some sort. Eating other plants and animals in order to survive.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Producers:	An autotrophic organism (as a green plant) viewed as a source of biomass that can be consumed by other organisms
Consumer:	An organism requiring complex organic compounds for food which it obtains by preying on other organisms or by eating particles of organic matter.
Decomposer:	Any of various organisms (as many bacteria and fungi) that return constituents of organic substances to ecological cycles by feeding on and breaking down dead protoplasm

READ

3. View

Video

Go to: www.discoveryeducation.com (Subscription Based Website)
Search: Producers and consumers
Locate: Deposit Feeders: Decomposers (approximate run time 22:00)
View as a class.

Article

Go to: http://www.geography4kids.com/files/land_foodchain.html
Search: Role of producers and consumers
Locate: Another link on the food chain
This is a lower level resource but is good support material—assess the level of your students prior to showing the clips.

RESPOND

4. Visual Process.

Venn Diagram

Create a Venn Diagram where you compare and contrast the role of a producer and consumer.

- What role does each play in the ecosystem?
- Compare and contrast their qualities.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Dare to Care for the Grizzly Bear

This activity will take three 45 minute class periods for grades 9-11.

Go to: www.PBS.org
Search: Decomposer
Locate: Dare to Care for a Grizzly Bear; Lesson and Activity
This activity enables students to investigate Grizzly Bears in their natural habitat. They will look into their food sources and find out what happens if an ecosystem becomes out of balance.

6. Discussion

Ask discussion questions that engage at many levels

Key Questions

- What are the three types of consumers and what are their roles?
- What role does a producer play in an ecosystem?
- Why is it important to have balance between the consumers and the producers? What can happen if one has a sharp rise in population?
- What role does the decomposer play in an ecosystem?
- Which organism plays the most important role in an ecosystem: the producer, the consumer, or the decomposer? Explain your answer.

EXTEND

7. Write, Draw or Speak.

Science Journal

A grassland ecosystem has lived in harmony and balance for many years. After two to three years of heavy rainfall the grass and plant population in the area spikes.

Write the effects of this scenario on the plant and animal population.

- What will happen to the producers over time?
- What will happen to the consumer population over time?

You may have to go 2 or 3 levels up the food chain to support your answers.

8. Close

Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
<i>Habit I can build</i>	

HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
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Title:

Date:

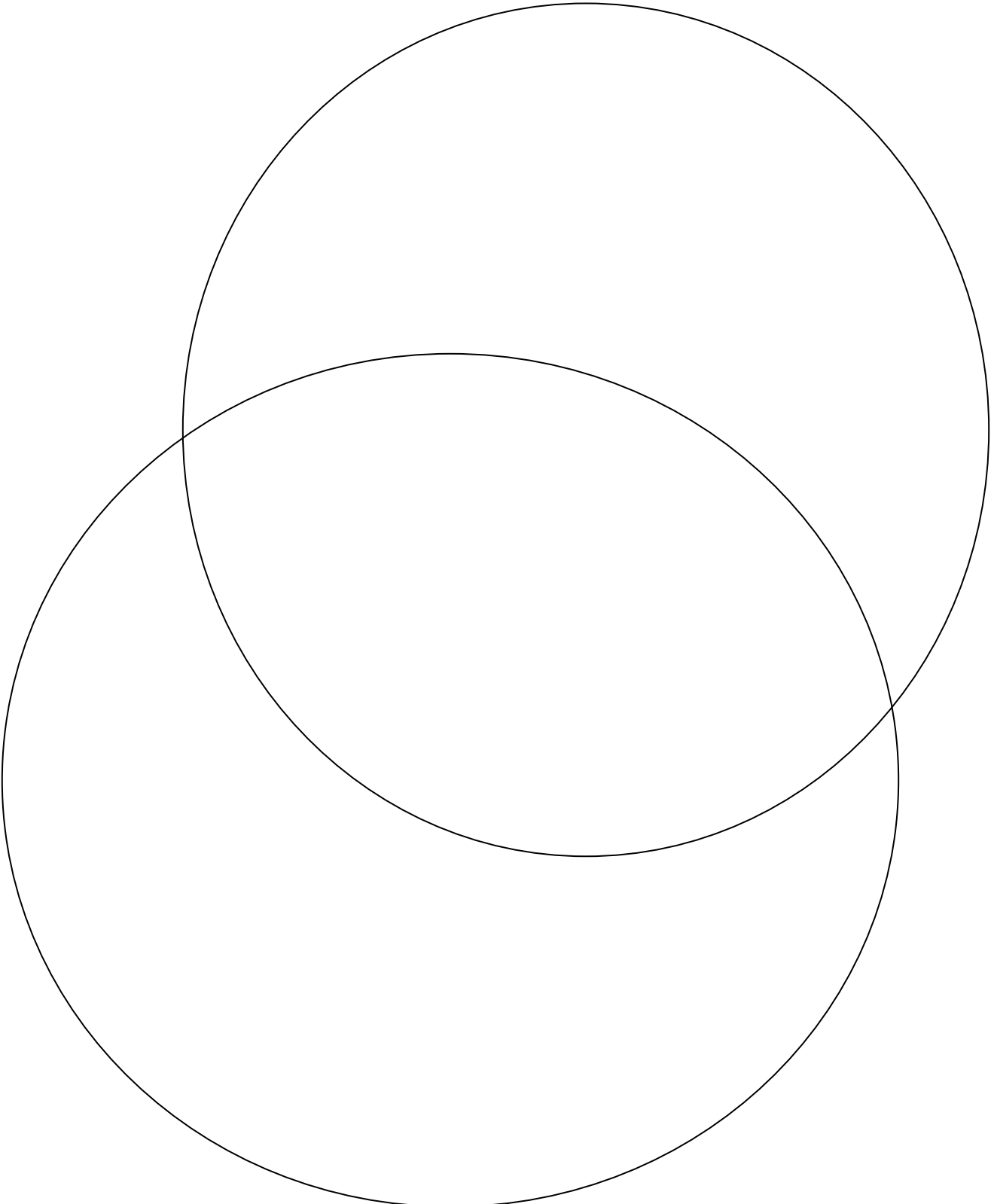
Column 1: Phrases, words, questions or a sketch related to the details in column 2.	Column 2: Important Details

Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

6g6 Venn Diagram Chart



HUMAN SCIENCE Lesson Plan

Day 3: A little dirt won't hurt

Optional activity: additional 2-3 hours



Outcomes for Today

- 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
 - 6.e. Students know a vital part of an ecosystem is the stability of its producers and decomposers.

PREPARE

1. Background Background knowledge to engage the content

What is a closed or restricted ecosystem? (for discussion)

A closed or restricted ecosystem is an environment that is created and controlled to study the interaction between consumers, producers, and decomposers.

What factors do humans need to consider when trying to create a closed or restricted ecosystem?

An example of a restricted environment would be the International Space Station and a biosphere. You will explore the biosphere more in the view section of today's lesson.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Producers:	An autotrophic organism (as a green plant) viewed as a source of biomass that can be consumed by other organisms
Consumer:	An organism requiring complex organic compounds for food which it obtains by preying on other organisms or by eating particles of organic matter.
Decomposer:	Any of various organisms (as many bacteria and fungi) that return constituents of organic substances to ecological cycles by feeding on and breaking down dead protoplasm
Interaction:	To act on one another; act reciprocally

READ

3. View

Video/Article/Slideshow

Go to: <http://www.calacademy.org>
Search: Explore the Academy
Locate: Rainforest Exhibit
Read about the exhibit and also about the dome.

Video:

Go to: www.discoveryeducation.com
Search: Biosphere
Locate: The Role of Microbes & Biosphere Two (approximate run time 06:54).
The Power of Microbes in the Biosphere (approximate run time 06:30)

RESPOND

4. Visual Process.

There is no visual process in today's lesson.

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Closed or Restricted (ecosystems)

Have students create a closed or restricted ecosystem such as a:

Worm farm:

<http://urbanext.illinois.edu/worms/neighborhood/01-intro.html>

Composting system:

<http://www.lessonplanspage.com/ScienceCompostMixtureChallengeProject68.htm>

Terrarium: This lesson plan spans 4 weeks of time. Giving students an opportunity for observation. <http://www.eduref.org/Virtual/Lessons/Science/Ecology/ECL0118.html>

Aquarium:

<http://www.nationalgeographic.com/xpeditions/lessons/08/g35/aquarium.html>

Make sure you allow enough time to collect the materials for the activity for your class. In addition the activities take approximately 2 hours to complete. Budget that time in your planning.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- What considerations went into planning the rainforest exhibit? The humidity is kept at a certain level. What would happen if they let too many people in at one time? How do they keep control of the plants and animal populations?
- Why does the sphere need to have skylights and special lights in it to maintain the plant diversity?
- Why is it important to study ecosystems in a closed or restricted environment?

EXTEND

7. Write, Draw or Speak.

Science Journal

Draw the closed system you chose to create. What did you learn by the experience? What gains can scientist make by studying restricted or closed environments? If you had to live in a biosphere what items or types of plants, etc. would you need to have with you? List them and state your reasons.

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
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HUMAN SCIENCE Video Notes



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HUMAN SCIENCE Lesson Plan

Day 1—It's lonely at the top.

Day 2-3: Optional lab activity

Day 4: Optional Cyber Field Trip



Outcomes for Today

- 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
 - 6.f. Students know at each link in the food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.

PREPARE

1. Background Background knowledge to engage the content

What is a food web?

A complex of interrelated food chains in an ecological community.

A food web is often referred to as a food chain. Both are illustrations that depict how animals, organisms, consumers and producers are related to one another.

Note: You can do a google or yahoo search for images of different ecosystem food chains and webs.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Metabolism: The chemical processes occurring within a living cell or organism that are necessary for the maintenance of life. In metabolism some substances are broken down to yield energy for vital processes while other substances, necessary for life, are synthesized.

Energy Pyramid: Ecological pyramids begin with producers on the bottom (such as plants) and proceed through the various trophic levels (such as herbivores that eat plants, then carnivores that eat herbivores, then carnivores that eat those carnivores, and so on). The highest level is the top of the food chain.

**Food Chain/
Food Web:** Food chains and food webs are representations of the predator-prey relationships between species within an ecosystem or habitat.

READ

3. View

Article:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Food Chain/Food web

Locate: Encyclopedia Article (there are two)

Read: As a class

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Food Web

Locate: Elements of Biology: Ecosystems: Organisms and Their Environment
(approximate run time 20:14)

RESPOND

4. Visual Process.

Energy Pyramid

Re-create the energy pyramid.

How is energy passed from one organism to another.

- Bullet specific steps that need to be used.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

What's My Role?

Directions for the activity and chart are located at the end of the lesson.

Go to: www.pbs.org

Search: Food web/Food Chain

Locate: Genetically Modified Foods: From the Lab to the Dinner Table

This activity will take two 45 minute class periods.

6. Discussion

Ask discussion questions that engage at many levels

Key Questions

- What roles does each level play in the food web (producer, consumer, decomposer)? Why are they all equally important?
- How does a diverse ecosystem benefit the health of a food chain or food web?
- What role do you play in the food chain?
- Is it important to eat low on the food chain? Why?
- Many nations are genetically modifying food. How can that positively and negatively affect the food chain?
- What can you do to make the least amount of impact on the food web?

EXTEND

7. Write, Draw or Speak.

Science Journal:

Explain why energy is lost at each level of the food pyramid. Can any of that energy be saved?

8. Close

Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

What's My Role?

Review the definitions of producers and consumers below.

- **Producers** are green plants capable of making their own food using energy from the sun in a process called photosynthesis.
- **Consumers** are animals that cannot make their own food. They get their energy from other plants and animals. A food chain can have as many as three to four consumers.
- **First level consumers** feed directly on plants; an example of this would be a mouse.
- **Second level consumers** feed on first level consumers; an example of this would be a rattlesnake that eats the mouse.
- **Third level consumers** feed on second level consumers; an example of this would be a hawk eating the rattlesnake.
- **Decomposers** are also unable to make their own food. Bacteria and fungi are decomposers. They break down waste products and dead organisms for food. These broken down materials are returned to the soil to be recycled and used by plants again. An example of this would be a fungus growing on a log.

Have students look at the following list of organisms.

Students should label how each organism fits in the food chain/food web.

<u>Organisms</u>	<u>Role in food chain</u>
Human	
Deer	
Pine tree	
Bear	
Rabbit	
Bacteria	
Mouse	
Snake	
Wheat	
Fly maggot	
Bluegrass	
Hawk	
Millipede	
Sparrow	
Cat	
Frog	
Algae	
Trout	

HUMAN SCIENCE Video Notes



Name:

Part I:

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Note taking tips: (Cornell Notes)

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HUMAN SCIENCE Lesson Plan

Day 2 and 3—It's lonely at the top-activity
This requires two 50 minute class periods
Activity in section five of the lesson plans.



Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
 - 6.f. Students know at each link in the food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.

PREPARE

1. Background Background knowledge to engage the content

Do you think that humans are required or obligated to help endangered species? For class discussion.

As we think about the resources and needs of the humans on the planet it is invariable that sometimes animals will be threatened by what we do to the earth. In some cases they are endangered in others they become extinct.

Think about the need for diversity in the ecosystems. If we do not save endangered species we threaten to shrink the diversity of our planet. What role should humans play as the world population grows?

2. Word Wall vocabulary words to teach and add to the Word Wall.

Metabolism:	The chemical processes occurring within a living cell or organism that are necessary for the maintenance of life. In metabolism some substances are broken down to yield energy for vital processes while other substances, necessary for life, are synthesized.
Energy Pyramid:	Ecological pyramids begin with producers on the bottom (such as plants) and proceed through the various trophic levels (such as herbivores that eat plants, then carnivores that eat herbivores, then carnivores that eat those carnivores, and so on). The highest level is the top of the food chain.
Food Chain/ Food Web:	Food chains and food webs are representations of the predator-prey relationships between species within an ecosystem or habitat.

READ

3. View

There is no article or video in today's lesson. See section 5.

RESPOND

4. Visual Process.

There is no visual process in today's lesson. See section 5

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Go to: www.pbs.org
Search: Food Web
Locate: Point of View—The Chances of the World Changing
This activity requires two 50 minute class periods.
Lesson plans are attached.
http://www.pbs.org/pov/chancesoftheworld/lesson_plan.php

6. Discussion

Ask discussion questions that engage at many levels

Key questions are imbedded in the activity lesson plan.

EXTEND

7. Write, Draw or Speak.

Science Journal:

Why would people like Richard take on the responsibility of preserving endangered turtles? Should government be playing a bigger role in species conservation? Why or why not? Review legislation, such as the [The Endangered Species Act of 1973](#) and discuss whether or not appropriate laws are in place to address current needs.

8. Close

Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day.

They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
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<i>Change I can make</i>	
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HUMAN SCIENCE Video Notes



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Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 4—Destination the Galapagos Islands Cyber Field Trip (see section 5 of the lesson plans)



Outcomes for Today

6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
 - 6.f. Students know at each link in the food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.

PREPARE

1. Background Background knowledge to engage the content

Where are the Galapagos Islands?

The Galapagos Islands are near the coast of Ecuador, South America. The islands are home to a variety of sea life and coastal birds many of them on the endangered species list. The island is trying to protect the wildlife and balance the needs of the humans who live and visit the islands.

The attached website has great information and teacher resources on the islands.

<http://www.galapagos.org>

2. Word Wall vocabulary words to teach and add to the Word Wall.

There are no new words in today's lesson.

READ

3. View

There are now articles or videos in today's lesson.

RESPOND

4. Visual Process.

There is no visual process in today's lesson.

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Cyber Field Trip: Destination the Galapagos Islands

Go to: www.pbs.org

Locate: Destination the Galapagos Islands
Backyard Science: How Ecosystems Work
Cyber Field Trip Teaching Guide
There is a student guide on this link also.

6. Discussion Ask discussion questions that engage at many levels

EXTEND

7. Write, Draw or Speak.

Science Journal:

Based on today's learning write one fact that you learned about the ecosystem.
How would ecosystems work without human intervention?

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day.
They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
<i>Habit I can build</i>	

HUMAN SCIENCE Lesson Plan

Day 1—Can Gene's Change?



Outcomes for Today

- 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
- 6.g. Students know how to distinguish between the accommodation of an individual organism to its environment and the gradual adaption of a lineage of organisms through genetic change.

PREPARE

1. Background Background knowledge to engage the content

What can animals or organisms do to survive change?

Animals and organisms can go through two types of changes to survive in a changing habitat.

In many cases animals or organisms will learn to adapt. They change with the environment and learn to live a different areas. An example would be the coyote. Normally found in wild spaces they have learned to adapt to a more urban environment to survive. They have had learned changes in their behavior.

Over long periods of time animals and organisms can undergo genetic changes in behavior. These changes are much harder to measure because they have to be studied over the course of many generations.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Accommodation:	To make suitable; adapt
Modification:	To alter; to change in form or character
Adapt:	Fit for a specific use or situation
Learned Change:	An example of a learned change would be adaption. Animals may adapt to certain situations by changing their behavior to survive.

READ

3. View

Article:

Go to: www.pbs.org
Search: Animal Adaption
Locate: Animal Guide: The Red fox
Read: As a class

Article:

Go To: www.pbs.org
Search: Plant Adaption
Locate: The Seedy Side of Plants
Read as a class

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)
Search: Adapt
Locate: Elements of Biology: Biomes: The Adaptations of Organisms (approximate run time 56:00)
This video is broken into segments based on various different ecosystems. Choose the ones that are pertinent to your class. Be sure to show segment 1 and 10 with whatever other segment you choose.

RESPOND

4. Visual Process.

What's Your Adaption:

- Choose an animal that you like.
- Divide a sheet of paper into 6 segments
- In the first square draw the animal as it is now.

In the next five squares draw the animal as it has had to adapt to the following situations. What will it do in order to survive? Think about behavioral changes that will have to occur for survival.

- The weather has gotten extremely hot;
- There is 3 times more rain than normal for 10-20 years
- Effects of urbanization—more people are moving into its natural habitat
- Drought; there is less food and water for the animal.
- Natural or man-made disaster of your choice (earthquake, flood, oil spill, hurricane, etc)

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Interactive Activity

Go to: www.PBS.org

Search: Animal Adaption Activity

Locate: Mt. St. Helens; Back from the Dead-Life Returns to the Blast Zone

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- What is resilience? How does it help animals or organisms survive?
- How does diversity help animals or organisms adapt?
- How did the gophers aid the re-seeding of the area in Mt. St. Helens?
- What is the purpose of adaption for most animals or organisms?
- What do you think is the driving force of adaption for animals or organisms?
- Why is human intervention sometimes needed to help an animal adapt? Think of the California Condor or the Panda's

EXTEND

7. Write, Draw or Speak.

Science Journal:

What behavior drives an animal or organisms instinct to survive?

As a human how do you adapt—to new situations, different weather patters, new foods?

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day.

They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
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HUMAN SCIENCE Video Notes



Name:

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HUMAN SCIENCE Lesson Plan

Day 2—Can Gene's Change?

Day 3—optional to complete activity in section 5



Outcomes for Today

- 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:
- 6.g. Students know how to distinguish between the accommodation of an individual organism to its environment and the gradual adaption of a lineage of organisms through genetic change.

PREPARE

1. Background Background knowledge to engage the content

What are examples of genetic change?

The human body readily responds to changing environmental stresses in a variety of biological and cultural ways. We can acclimatize to a wide range of temperature and humidity. When traveling to high altitudes, our bodies adjust so that our cells still receive sufficient oxygen. We also are constantly responding in physiological ways to internal and external stresses such as bacterial and viral infections, smog, dietary imbalance, and overcrowding.

This ability to rapidly adapt to varying environmental conditions has made it possible for us to survive in most regions of the world. We live successfully in humid tropical forests, harsh deserts, arctic wastelands, and even densely populated cities with heavy pollution. Most other animal and plant species are restricted to one or relatively few environments by their more limited adaptability.

Genetic changes normally occur over generations and are therefore hard to track.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Accommodation:	To make suitable; adapt
Modification:	To alter; to change in form or character
Adapt:	Fit for a specific use or situation
Genetic Change:	Physical responses to stresses causing the body to change to adapt to its situation.

READ

3. View

Article:

Go to: http://www.desertusa.com/mar97/du_pupfish.html

Search: Desert Pup Fish

Locate: Desert Pup Fish

Read: As a class

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Desert Pup Fish

Locate: Life in a Desert System (approximate run time 20:00)

Article:

Go to: www.nationalgeographic.org

Search: Blind Cavefish

Locate: Blind Cavefish Can Produce Sighted Offspring

RESPOND

4. Visual Process.

Venn Diagram

Using a venn diagram compare and contrast an species adaption due to behavioral change and one due to genetic change.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

The Birds and the Beaks

Go to: www.PBS.org

Search: Animal Adaption Activity

Locate: The Birds and the Beaks

This activity will take two 45 minute class sessions.

It investigates adaptations animals have made for survival. The activity has an array of support material.

6. Discussion

Ask discussion questions that engage at many levels

Key Questions

- How are genetic mutations a factor in animal or species adaption?
- Why does it take many generations for an animal or organism to adapt due to genetic change?
- What other factors contribute to an animal's survival?
- What affect have humans influenced animal adaption?
- Do humans have a responsibility to aid animals that are struggling to adapt on their own—using technology to help reproduction etc.?

EXTEND

7. Write, Draw or Speak.

Science Journal:

Think about adaption's various different species have had to make over time. What are adaptations you or your family have had to make that you would consider a genetic adaptation? Why? What are behavioral adaptations you have had to make in order to have a job or be functional in society?

8. Close

Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
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HUMAN SCIENCE Video Notes



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6g6 Venn Diagram Chart

