

Science

SCI.III.5.4

Grade: 4th

**Strand:** Using Scientific Knowledge in Life Science  
- Ecosystems

**Standard:** All students will analyze how humans and the environment interact

**Benchmark:** Describe positive and negative effects of humans on the environment.

**Constructing and Reflecting:**

**SCI.I.1.1** - Generate reasonable questions about the world based on observation.

**SCI.I.1.2** - Develop solutions to problems through reasoning, observation, and investigation.

**SCI.II.1.1** - In the scientific world, decisions must be based on factual evidence that can be replicated.

**SCI.II.1.2** - Show how science concepts can be illustrated through creative expression such as language arts and fine arts.

**SCI.II.1.4** - Develop an awareness of and sensitivity to the natural world.

**Vocabulary / Key Concepts**

Human effects on the environment:

- garbage 3<sup>rd</sup> grade will cover this
- habitat destruction “

- waste water treatment
- land management
- renewable and non-renewable resources

4<sup>th</sup> grade will cover water treatment only.

**Context**

- household wastes
- school wastes
- waste water treatment
- habitat destruction due to community growth
- reforestation projects
- establishing parks or other green spaces
- recycling

## Knowledge and Skills

### Benchmark Clarification:

Humans have the ability to change the environment. Human actions such as development, construction, pollution, maintenance, and preservation affect the environment.

Students will:

- Analyze the effects of development (community growth/creating parks) on the environment
- Analyze the effects of construction (roads, malls, parking lots) on the environment
- Analyze the effects of pollution (garbage, waste water treatment) on the environment
- Analyze the effects of land management practices on the environment
- Analyze the effects of land preservation on the environment
- Analyze the effects of the use of renewable and non-renewable Natural Resources on the environment

Resources (continued from column on right)  
Reclaiming Mined Land – Bureau of Land Management – classroom activities include transforming an erosion landscape – FUN! - [http://www.blm.gov/education/00\\_resources/articles/mining/index.html](http://www.blm.gov/education/00_resources/articles/mining/index.html)

Gulf of Maine Aquarium / NASA – Human Impact on the Environment – Lots of NICE graphics, activities, interactives and info - <http://octopus.gma.org/surfing/human/>

## Resources

### Coloma Resources:

Scott Foresman Discover the Wonder  
Module B – B18-B19

### Other Resources:

“Waste Not” Sing the Science Standards with the Science Explosion Songbook

Community people (DNR, etc.), Books, Internet, Local Maps

Teacher’s Domain – Human Impact – video, images and documents -

[http://www.teachersdomain.org/3-5/sci/life/oate/subtopic\\_human.html](http://www.teachersdomain.org/3-5/sci/life/oate/subtopic_human.html)

The Everglades Ecosystem – Everglades National Park – LOTS of great ecosystem, habitat and species info. -

<http://www.nps.gov/ever/eco/index.htm>

Ecosystems in your Backyard – 16 activities for kids to explore ecology – LOTS of GREAT ideas for classroom exploration!

[http://www.blm.gov/education/00\\_resources/articles/understanding\\_ecosystem\\_management/classroom.html](http://www.blm.gov/education/00_resources/articles/understanding_ecosystem_management/classroom.html)

EEK – Environmental Education for Kids – 4-8 – Nice interactives and info – FUN – Nature Notes – Habitats

<http://www.dnr.state.wi.us/org/caer/ce/eeek/>

School City of Hobart, IN – article – Human impact on the Natural Environment – good general information -

<http://www.hobart.k12.in.us/jkousen/Biology/impact.html>

Instruction	Assessment
<p><b>Benchmark Question:</b> How do communities of living things change over a period of time?</p> <p><b>Focus Question:</b> How do community growth and pollution affect a frog?</p> <p>Students review <u>life requirements</u> of a frog.</p> <ol style="list-style-type: none"> <li>1. Students cut five 2" x 2" squares of each blue, green, yellow, and brown construction paper. Every student marks an 'x' on the back of one square.</li> <li>2. Each student represents a frog. The cards represent a frog's life requirements.</li> <li>3. Pile all of the squares in the center of the room. All students need to take 20 cards.</li> <li>4. Students predict which life requirements each color represents (blue = water, green = food, yellow = air, brown = space).</li> <li>5. Frogs live if they have one of every color. Living frogs remain standing and turn over water and space cards. If there is an 'x', they have died because of pollution and habitat destruction.</li> </ol> <p>Students summarize the effect of pollution and land development on a frog. Students evaluate areas of their community suitable for a nature park (frog habitat) and create a model.</p>	<p><u>Optional Assessment:</u> Students evaluate areas of the community suitable for a park and create a map. In writing, students justify their area selection and evaluate environmental influences in a multi-media presentation to the class. (Give rubric to students at time of the assignment so that those requirements are known.) Class votes for plan most suitable and presents it to local city council or other appropriate community governmental unit.</p> <p><i>(Give students the rubric before the activity.)</i></p> <p><b>SCORING RUBRIC</b></p> <p><b>Criteria: Completeness of habitat map</b>  <b>Apprentice</b> - Draws map with no key and no title.  <b>Basic</b> - Draws map that includes an incomplete key and/or an incomplete title.  <b>Meets</b> - Draws map that includes a complete key and a complete title.  <b>Exceeds</b> - Draws map that includes a complete key, a complete title, and an accurate scale.</p> <p><b>Criteria: Justification of area selection</b>  <b>Apprentice</b> - Writes one reason without supporting data.  <b>Basic</b> - Writes one reason with supporting data.  <b>Meets</b> - Writes two reasons with supporting data.  <b>Exceeds</b> - Writes three or more reasons with supporting data.</p> <p><b>Criteria: Explanation of influences</b>  <b>Apprentice</b> - Explains an influence without distinction of positive or negative.  <b>Basic</b> - Explains a positive or negative influence.  <b>Meets</b> - Explains one positive and one negative influence.  <b>Exceeds</b> - Explains two or more positive and two or more negative influences.</p> <p><b>Criteria: Accuracy of presentation</b>  <b>Apprentice</b> - Presents written and oral reports inaccurately.  <b>Basic</b> - Presents written and oral reports with one technology enhancement accurately.  <b>Meets</b> - Presents written and oral reports with more than one technology enhancement accurately.  <b>Exceeds</b> - Presents written and oral reports with more than one technology enhancement. Uses color and pictures accurately.</p>

**Teacher Notes:****Analyze how humans and the environment interact.**

Students need to learn the role that animals play in design of systems managed by humans. Students should describe the positive and negative effects that humans have on the environment. They should understand the systems that best encourage the growth of plants and animals and then can be managed by humans. Finally, they should describe more positive and negative effects that humans have on the environment. Students in middle school should be able to explain how humans benefit from the use of plant and animal materials. In middle school, students should be able to describe ways in which humans change the environment. In high school, they should be able to explain the effects that agriculture and urban development have on ecosystems.