

THINKING AND ACTING  
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SCIENTIST

TEACHER'S GUIDE

# Human Impact on My Community

What is the effect of human activities on  
my community's resources and environment?

GRADE 5

Earth & Space





# Human Impact on My Community

<b>Grade Level/ Content</b>	5/Earth and Space Science
<b>Lesson Summary</b>	In this lesson, students will gather information from secondary sources describing (1) environmental effects of a specific human activity, and (2) actions communities take to protect resources and the environment.
<b>Estimated Time</b>	3, 45-minute class sessions
<b>Materials</b>	One or more grade-appropriate books plus other materials about environmental effects of human activities, Internet access, <a href="#">Investigation Plan</a> , <a href="#">Observation Form</a> , journal
<b>Secondary Resources</b>	<a href="#">Evaluate the Quality and Credibility of Your Sources</a> <a href="#">Separating Fact and Fiction: Examining the Credibility of Information on the Internet</a> <a href="#">Synthesis</a> <a href="#">Finding Dulcinea: Synthesizing</a>
<b>NGSS Connection</b>	<b>5-ESS3-1</b> Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
<b>Learning Objectives</b>	<ul style="list-style-type: none"> <li>• Students will obtain and evaluate information from books and other reliable media.</li> <li>• Students will combine information from 2 or more reliable sources to be used as evidence to determine:             <ul style="list-style-type: none"> <li>◦ how a specific human activity (in agriculture, industry, or everyday life) affects resources and environment of their community.</li> <li>◦ how communities use scientific ideas to protect a given natural resource and its environment.</li> </ul> </li> </ul>
<b>Cross-Curricular Project Connections</b>	Green My School, Work in My Community

## What is the effect of human activities on my community's resources and environment?

Like all other living things, humans interact with their environment. Humans, however, have more control over their environment than most living things do. Human activities involved in agriculture, manufacturing, transportation, communication, and everyday life affect our environment. Humans and other organisms need resources to survive. As the world's human population grows, those effects—many of which are harmful—intensify.

Recognizing those effects and discovering ways to mitigate or balance them helps people serve as responsible stewards of the Earth. In this investigation, students begin that process by gathering and combining information and using it to describe effects of a human activity and the efforts a community makes to protect resources and the environment.

## Investigation is based on the Van Andel Education Institute (VAEI) Instructional Model for Inquiry-Based Science.

### In all investigations:



Students don't know the "answer" they are supposed to get.



Students play a driving role in determining the process for learning.



Teachers and students construct meaning together by journaling.



Students are working as hard as the teacher.

# Part 1

## INVESTIGATION SETUP

Gather appropriate materials from the school library, a public library, or your own collection. If it is possible to take the class to the school library, allow them to search for books and other sources as part of the investigation. Also allow access to Internet resources. Students will need the following:

- 1 or 2 books
- Internet access
- Access to one or more articles, videos, or slide shows
- [Investigation Plan](#)
- [Observation Form](#)
- Journal

# Part 2

## INVESTIGATION FACILITATION

Students will choose a specific topic to investigate. Before students develop their specific question, ask them to look around the classroom and name resources they see. Discuss ways students use resources in the class. Ask them about ways they can reduce the use of resources or manage resources better. Students may already be recycling paper from the class. Ask them what happens to the paper after it leaves the classroom. You might also have students consider why recycling does not take the place of resource management.



### Personal Knowledge

*Students capture what they already know about their local resources and environment and the human activities that may affect those resources.*

- Compile a class list of student thinking.
- Students then choose a human activity from the list to research the effects of that activity on their local resources and environment.

#### CREATIVE THINKING

Have students brainstorm a list of resources available in their environment (air, wind, water, soil, animals, vegetation). Then, have them brainstorm a list of human activities that may affect these local resources and environment. Make sure the list includes activities in a variety of fields, such as manufacturing, agriculture, transportation, and daily living.

#### STUDENT CHOICE

Have students take ownership of their learning by allowing them to choose a human activity (daily living, manufacturing, agriculture, transportation, etc.) to investigate.



### Question

*Students develop their own investigation question.*

**What is the effect of \_\_\_\_\_ on my community's resources and environment?**

#### CRITICAL THINKING

Have students pair up and develop their own investigation question based on the created class list.

#### Question example

What is the effect of driving a car on my community's resources and environment?



## Prediction

*Students communicate an expected outcome, based on prior knowledge.*

Have students use what they already know to predict what they will find in their investigation.

- Have each pair of students predict the effect that activity has on their community's resources and environment.
- Predictions are presented as *I predict \_\_\_\_\_ because \_\_\_\_\_.*

### RISK-TAKING

All of the students' predictions should be valued during the prediction stage. If any predictions are challenged, encourage students to revisit those predictions during the appropriate part of the investigation (when the analyzed data is explained).



## Secondary Knowledge

*Students use secondary sources to understand how to combine information from multiple sources and how to assess the reliability of media.*

- Use these resources (or your own) to develop students' understanding of collecting and combining information from reliable media:

[Evaluate the Quality and Credibility of Your Sources](#)

[Separating Fact and Fiction: Examining the Credibility of Information on the Internet](#)

[Synthesis](#)

[Finding Dulcinea: Synthesizing](#)

- After reviewing these resources, students should understand how to evaluate the reliability of a source and how to combine information from multiple sources.

### CRITICAL THINKING

Engage students in a class discussion of the secondary sources. Elicit criteria for determining reliability. Emphasize that reliable background information is important as a basis for scientific inquiry.



## Investigation Plan

*Students conduct a literature research to determine how their chosen human activity affects their community.*

- Point out and describe the research materials available. If possible, make a class visit to the school library to allow students to find their own materials.
- Give each pair the [Observation Form](#) and [Investigation Plan](#).
- Ask teams to follow the **Investigation Plan**.
- Allow plenty of class time for reading and evaluating research materials.
- Ask students to fill out the forms fully, using several different resources.

INVESTIGATION PLAN HUMAN IMPACT ON MY COMMUNITY	
1.	With your partner, choose one of the human activities from the class list.
2.	Together, find one or more sources of evidence about ways the activity affects our community's resources and environment. At least one of your sources should be a book.
3.	Divide the information sources between your partner and yourself.
4.	Read or watch the sources assigned to you. Use the <b>Observation Form</b> to record the information you get from each source.
5.	Exchange observation forms, and read your partner's information.
6.	Discuss with your partner what information is similar on the two forms and what information is different.

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**Investigation Plan**

*Continued*

### CRITICAL THINKING

Use the [Fair Test](#) checklist to help students think critically about the investigation plan. Help them understand that a good investigation plan must include a test that is repeatable, generates quality data, and minimizes error. The more critically students think about their investigation plan, the more confident they can be in their results.

### SELF-DIRECTION

Allow students to choose from the available research materials, as long as each pair chooses at least one book. Ask students: *Why is it important to use different sources? What things do you need to look for to make sure the information you are collecting is reliable?*



## Observation

*Students record the information they gather from the research materials.*

Students will record the information they collect from various sources on the **Observation Form**.

### INTEGRITY

Remind students to accurately record their information. Provide samples on the white board to help guide students through the data collection process.

OBSERVATION FORM HUMAN IMPACT ON MY COMMUNITY			
NAME _____		DATE _____	
Source and Page or URL	Data	If Found in Another Source, Which One?	Reliable? Why or Why Not?

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Observation Form

## Part 3

### INVESTIGATION ANALYSIS AND DEVELOPMENT OF CLAIM



## Data Analysis

*Students make sense of their data by organizing it and representing it visually.*

Have students analyze their data. They may wish to use the [Data Analysis](#) prompt as a guide.

- Have students **evaluate** their data for trustworthiness. Ask students:
  - *Are you confident in the data you collected?*
  - *Are you confident in the sources you used?*
- Then, have them analyze their data to find patterns and trends. They may **organize** the data and/or **represent** it visually to construct meaning.
- Have students **interpret** what the identified patterns or trends mean. Patterns or trends in the data may include information being repeated in different sources or information being in one source but not others.
- Ensure they have enough data that it can be used as evidence to support a claim.



## Explanation

Students write a claim and provide evidence and reasoning to support it.

- Have students use what they've discovered from their analyzed data to write an explanation that answers their investigation question. Students may wish to use the [Explanation](#) prompt as a guide. Have them write their explanation in their journal.

Have students develop a **Claim** to answer the question: What is the effect of \_\_\_\_\_ on my community's resources and environment?

- Then, have them add **Evidence** (the analyzed data) to support their claim.
- Finally, have them add **Reasoning** to their claim. Reasoning should include the information obtained from this investigation, as well as science principles they have learned.

### Claim

*We claim that the human activity of taking a shower affects water and energy resources in our community.*

### Evidence

*We compiled and analyzed our data and found that the water used in taking a shower goes down a drain and to a water treatment plant before being pumped back into a river and eventually into the ocean. This also takes energy to clean the water after we have used it. We also found that a faucet running for five minutes uses almost as much energy as lighting a 60-watt light bulb for 14 hours. Also, the hotter you have the shower, the more energy is needed for the hot water heater to keep that water hot.*

### Reasoning

*Investigation: We followed the investigation plan. One of us read and took notes on a book that cited sources. The other read and took notes on two articles from government websites. We used reliable sources. We used our analyzed data to make our claim.*

*Science: We learned from our readings and class discussions that human activities (such as taking a shower) affect our community's resources and environment.*

- Once the explanation is written, have students discuss their results using a [Present and Defend](#).

### DISCOURSE

Have students conduct a [Present and Defend](#) to develop presentation skills as well as audience participation. Research partners present a summary of their investigation to the class. The class analyzes the information presented and asks clarifying questions, challenges and/or supports the arguments made, and even presents alternative explanations as appropriate. Research teams defend their explanation with evidence and reasoning.



## Evaluation

Students reflect on the investigation.

- What surprised me about the research I conducted?
- How did this investigation help my understanding of human interactions with the environment?



**Application**

*Students demonstrate understanding that human activities affect the environment by researching scientific solutions to those effects.*

- Have students choose one of the effects from their researched human activities and conduct another investigation to develop a new question based on: How do communities use science to protect its resources and environment? (*Example: How do communities use science to protect its water supply?*)
- Have students apply their learning by creating a web graphic organizer that considers an environmental effect of their daily activities and branches to things they could do to reduce the effect of their activities.
- Have students suggest new actions their school community could take to protect resources.

**Assessment**

Evaluate each group's investigation on how well students:

- Obtained and evaluated information from books and other reliable media about how a specific human activity (in agriculture, industry, or everyday life) affects the Earth's resources and environment within their community.
- Combined information from two or more sources to use as evidence to determine how a specific human activity (in agriculture, industry, or everyday life) affects resources and environment in their community.
- Combined information from two or more sources to be used as evidence to determine how their community uses scientific ideas to protect a given natural resource and its environment.

## Take This Lesson Across the Curriculum

### Green My School

Your school probably already has measures in place to protect the environment. In this activity, you and your students will select and propose additional measures the school can adopt.

Reading/Language Arts	Math	Science	Social Studies
<p><b>Present an Option</b></p> <p>The class will brainstorm ways your school could use science ideas to protect resources and the environment. Pick one of the ways. Prepare and give a short, persuasive presentation in support of the plan.</p> <p>CCSS.ELA-Literacy.SL.5.4</p>	<p><b>Strength of Support</b></p> <p>After the votes have been counted, calculate the fraction of the class that voted for each plan.</p> <p>CCSS.MATH.CONTENT.5.NF.B.3</p>	<p><b>Human Impact on My Community</b></p> <p>Consider how school activities might affect the environment. Use what you learned about communities' actions to think of ways your school could protect resources and the environment.</p> <p>NGSS: 5-ESS3-1</p>	<p><b>Take Action</b></p> <p>Conduct a class vote on the plans suggested. Choose the best presentation in support of the winning plan. Have it repeated for the people who can approve the plan, such as the principal. Then, take turns making statements of support.</p> <p>NCSS: D2.Civ.2.3-5</p>

### Work in My Community

People in every community are working to protect resources and reduce human effects on the environment. In this activity, you and your students will learn more about what people are doing in your community.

Reading/Language Arts	Math	Science	Social Studies
<p><b>A Polite Request</b></p> <p>Write a letter to the leader of a local government or citizen group. Ask for information about the group's use of science ideas to protect resources and the environment. What are the results?</p> <p>CCSS.ELA-LITERACY.W.5.10</p>	<p><b>Shrinking Emissions</b></p> <p>Find out the amounts of various pollutants measured in your town, county, or state last year. Compare with amounts measured in an earlier year. Have the amounts gone up or down?</p> <p>CCSS.MATH.CONTENT.4.NBT.A.3</p>	<p><b>Human Impact on My Community</b></p> <p>Gather and combine information from letters, brochures, websites, and other sources. Work with your class to produce a summary of ways people in your community use science to protect resources and the environment.</p> <p>NGSS: 5-ESS3-1</p>	<p><b>Whose Job?</b></p> <p>Discuss the roles of citizens and governments in protecting resources and the environment.</p> <p>NCSS: D2.Civ.2.3-5</p>

For additional lessons or to customize this lesson, go to [www.nexgeninquiry.org](http://www.nexgeninquiry.org).



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# INVESTIGATION PLAN

## HUMAN IMPACT ON MY COMMUNITY

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2. Together, find one or more sources of evidence about ways the activity affects our community's resources and environment. At least one of your sources should be a book.
3. Divide the information sources between your partner and yourself.
4. Read or watch the sources assigned to you. Use the **Observation Form** to record the information you get from each source.
5. Exchange observation forms, and read your partner's information.
6. Discuss with your partner what information is similar on the two forms and what information is different.

OBSERVATION FORM  
**HUMAN IMPACT ON  
MY COMMUNITY**

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

<b>Source and Page or URL</b>	<b>Data</b>	<b>If Found in Another Source, Which One?</b>	<b>Reliable? Why or Why Not?</b>