



**Grade 7 Science – Course 2**  
**Unit # 2 – Earth and Space Science**  
**Topic 7 Human Impacts on the Environment – 17 Days**

**Unit Overview** - Course 2 Unit 2 Earth and Space Science consists of two topics: Distribution of Natural Resources (Topic 6) and Human Impacts on the Environment (Topic 7). In Topic 6 students will explore the diversity of nonrenewable energy sources and investigate the differences between renewable and non-renewable resources, benefits of energy sources, and methods to reduce fossil fuel use. In Topic 7 students will learn about human population growth and the impact it has on the Earth's systems along with the causes of air pollution, long-term impacts air pollution has on Earth's systems, and efforts to reduce air pollution around the world.

**Topic Essential Question:** How does human activity impact Earth's systems?

**Lessons**

- Topic Launch/Quest Kickoff
- Lesson 1 Population Growth and Resource Consumption
- Lesson 2 Air Pollution
- Lesson 3 Impacts on Land
- Lesson 4 Water Pollution
- Topic Close – Assessment, Quest Findings

**NYSSLS Performance Expectations**

**MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. [Clarification Statement: Examples of evidence could include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts could include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]**

**Topic Opener**

**PE:** MS-ESS3-4

**SEP:** Engaging in Argument from Evidence; Constructing Explanations and Designing Solutions

**DCI:**

**ESS3.C – Human Impacts on Earth Systems**

- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3- 3),(MS-ESS3-4)

**Savvas**

**Highlighted labs are important to the understanding of the instructional concepts in this lesson and must be completed during Science instructional time.**

- Topic Readiness Test
- **uConnect Lab – Finding a Solution for Your Pollution**
- Quest Kickoff Video – How can you help your school reduce its impact on Earth's systems?

**CLRI Connections:**

- [Rachel Carson Article \(Gale Database\)](#)

Rachel Carson was a scientist, an environmentalist, and a writer. She is most remembered for her book Silent Spring, published in 1962, which called attention to the dangers of pesticides. Carson became an activist, testifying on environmental issues before the US Congress, and is credited with inspiring environmental movements that continue to this day.

**Lesson 1 – Population Growth and Resource**

**Consumption**

**PE:**MS-ESS3-4

**SEP:** Engaging in Argument from Evidence

**DCI:**

**ESS3.C – Human Impacts on Earth Systems**

- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3- 3),(MS-ESS3-4)

**CCC:** Cause and Effect

**Savvas**

**Guiding Objectives:**

- Students will analyze data to determine: How the human population has changed since 1750; that the current rate of population growth is exponential.
- Students will evaluate textual evidence to describe a chain of reasoning that includes the ideas that: Increased human population leads to greater consumption of natural resources; scarcity of natural resources limits human activity; strategies can help address the effects of population growth on the consumption of natural resources.

**Literacy Connection**

- Determine Conclusions

**Vocabulary**

- birth rate
- death rate
- exponential growth
- pollution
- overpopulation
- conservation
- sustainable use

**Academic Vocabulary**

- estimate
- constraints

**Connect - TE/SB p.338**

- Connect It!
- Quest Connection
- Inquiry Warm-Up Lab – Growth Spurt

**Investigate - TE/SB pp.339-343**

- **Investigate Lab – Doubling Time\***
- Video – Population Growth and Resource Consumption
- Interactivity – Modern Life
- Interactivity – Human Population Growth
- Math Toolbox (p.341)
- Question It! (p.342)
- Literacy Connection (p.343)
- Reading Checks (pp.341; 343)

**Synthesize - TE/SB pp. 344-345**

- Interactivity – Sources of Resources
- Quest Check-In Interactivity – More Trash, Less Space
- Quest Check-In
- Reading Check (p.344)

**Demonstrate – TE/SB p.345**

- Lesson 1 Check
- Lesson Quiz 1

\*Denotes accompanying lab video

**Lesson 2 – Air Pollution**

**PE:** MS-ESS3-4

**SEP:** Engaging in Argument from Evidence

**DCI:**

**ESS3.C – Human Impacts on Earth Systems**

- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3- 3),(MS-ESS3-4)

**CCC:** Cause and Effect

**Savvas**

**Guiding Objectives:**

- Students will identify and describe evidence that air pollution: Can occur naturally and through human activities; is harmful to living things and their environment.
- Students will cite textual evidence to support claims that air pollution caused by: Emissions can affect weather patterns and climate; smog can cause health problems in humans; acid rain can pollute soil and water resources, including drinking water and habitats.
- Students will analyze cause-and-effect relationships to describe how efforts to reduce emissions, energy use, and chlorofluorocarbons (CFCs) protect the ozone layer.

**Literacy Connection**

- Cite Textual Evidence

**Vocabulary**

- point source
- emissions
- acid rain
- nonpoint source
- ozone

**Academic Vocabulary**

- primary

**Connect - TE/SB p. 346**

- Connect It!
- Quest Connection
- Inquiry Warm-Up Lab: How Does the Scent Spread?

**Investigate - TE/SB pp. 347-352**

- Video – Air Pollution
- Investigate Lab – It’s All in the Air**

- Interactivity – Damage From the Skies
- Reading Check (pp.347; 349; 350; 351)
- Math Toolbox (p.352)
- Literacy Connection (p.350)

**Synthesize - TE/SB pp. 353-354**

- Interactivity – Air Pollution Sources and Solutions
- Quest Check-In Lab – Trash vs. Water
- Model It! (p.353)
- Reading Check (p.353)
- Quest Check-In

**Demonstrate – TE/SB p.354**

- Lesson 2 Check
- Lesson 2 Quiz

**CLRI Connections:**

- Article: [“How does air pollution affect people differently?”](#)

Bad air quality is a problem all over the world. In the U.S., air quality is often worse in places where people of color live. There are many different sources of air pollution, like fireplaces, factories, cars, and power plants. Using data from the US Census and an air quality model, the results showed that people of color are exposed to more air pollution from almost every type of pollution source.

**Lesson 3 – Impacts on Land**

**PE:** MS-ESS3-4

**SEP:** Engaging in Argument from Evidence

**DCI:**

**ESS3.C – Human Impacts on Earth Systems**

- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3- 3),(MS-ESS3-4)

**Savvas**

**Guiding Objectives:**

- Students will identify and describe evidence that natural resources include anything we use that occurs naturally in the environment, such as organisms, water, sunlight, minerals, and soil.
- Students will cite textual evidence to explain how some resources are not easily replaced.
- Students will analyze cause-and-effect relationships to describe how use of resources, without conservation, can lead to negative impacts on the ecosystem.

**Literacy Connection**

- Cite Textual Evidence

**Vocabulary**

- natural resource
- nonrenewable resource
- erosion
- sustainable
- renewable resource
- deforestation
- desertification

**Academic Vocabulary**

- resource

**Connect - TE/SB p.356**

- Connect It!
- Quest Connection
- Write: Using Land

**Investigate - TE/SB pp. 357-364**

- **uInvestigate Lab – Mining Matters\***
- Video – Where is Away?
- Interactivity – Farming Lessons
- Virtual Lab – Electricity Usage
- Plan It! (p.359)
- Reading Check (pp.358; 361; 362; 363)
- Math Toolbox (p.361)
- Literacy Connection (p.363)

**Synthesize - TE/SB pp. 365-367**

- Interactivity – Ride the Light-Rail
- Quest Check-In Interactivity – Life of a Landfill
- Reading Check (p.366)
- Quest Check-In

**Demonstrate – TE/SB p.367**

- Lesson 3 Check
- Lesson 3 Quiz

\*Denotes accompanying lab video

**CLRI Connections:**

- Article: “[Do hot neighborhoods affect everyone equally?](#)”

In a city, where there are lots of buildings and roads, it can get hotter than the countryside. Satellite data from about 175 big cities in the United States showed that people of color have higher exposure to this urban heat island effect than white people in all but six of these cities! Poor people also usually have higher exposure.

## **Lesson 4 – Water Pollution**

**PE:** MS-ESS3-4

**SEP:** Engaging in Argument from Evidence

**DCI:**

**ESS3.C – Human Impacts on Earth Systems**

- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3- 3),(MS-ESS3-4)

**CCC:** Cause and Effect

### **zSpace Activities (code)**

#### **How Does Living = Destruction? (A060)**

##### [How Does Living = Destruction? - Teacher Activity Plan](#)

Have you heard of the Great Pacific Garbage Patch? 80% of the debris found in the Great Pacific Garbage Patch comes from land activities in Asia and North America. By living as we do today, we are slowly destroying Earth as we know it. In this activity, students will learn how we are impacting Earth through pollution, debris, and invasive species.

##### [How Does Living = Destruction - Student Worksheet](#)

##### [How does Living = Destruction? - Student Worksheet](#)

##### [GoogleDoc](#)

## **Savvas**

### **Guiding Objectives:**

- Students will identify and describe evidence that: 97.5% of water on Earth is undrinkable because it contains salt; more than half of the freshwater is frozen solid in the polar ice sheets, leaving only about 0.5% of all the water on the planet as drinkable.
- Students will cite textual evidence to support that water pollution is caused by farming wastes, household pollutants, industrial waste, and trash which can end up in the water supply.
- Students will analyze cause-and-effect relationships in order to describe efforts to: Reduce water pollution by limiting the amounts of pesticides and fertilizers they use on their home gardens and lawns; reduce their use of plastics and recycling plastics they do use.

### **Literacy Connection**

- Draw Evidence

### **Vocabulary**

- sewage
- sediment
- thermal pollution

### **Academic Vocabulary**

- distributed

### **Connect - TE/SB p.370**

- Connect It!
- Quest Connection
- Poll: How You Use Water

### **Investigate - TE/SB pp. 371-377**

- **Investigate Lab – Getting Clean**
- Video – Water Pollution
- Interactivity – Water Cycle Interrupted
- Interactivity – Mutation Mystery
- Reading Check (pp.371; 373; 375)
- Math Toolbox (p.375)
- Literacy Connection (p.373)

### **Synthesize - TE/SB pp. 377-378**

- Interactivity – Research Water Pollution
- Quest Check-In Lab – Reducing Waste
- Reading Check (p.377)
- Plan It! (p.377)
- Quest Check-In

### **Demonstrate – TE/SB p.378**

- Lesson 4 Check
- Lesson 4 Quiz

<p><b>Topic Close</b></p> <ul style="list-style-type: none"> <li>● Topic 7 Assessment and Remediation TE/SB pp. 380-383</li> <li>● Quest Finding and Reflection TE/SB p. 383</li> </ul>	<p><b>Topic 7 Enrichment</b></p> <p><b>Topic 7 - Lesson 1 Enrichment</b></p> <ul style="list-style-type: none"> <li>● Enrichment – Human Population Growth</li> </ul> <p><b>Topic 7 - Lesson 2 Enrichment</b></p> <ul style="list-style-type: none"> <li>● Enrichment – Ozone in the Air</li> <li>● Global-to-Local – Working together to Reduce Air Pollution (p.355)</li> </ul> <p><b>Topic 7 - Lesson 3 Enrichment</b></p> <ul style="list-style-type: none"> <li>● Enrichment – Fracking for Oil and Gas</li> <li>● Case Study – Nothing Goes to Waste (pp.368-369)</li> </ul> <p><b>Topic 7 - Lesson 4 Enrichment</b></p> <ul style="list-style-type: none"> <li>● Enrichment – The Great Barrier Reef</li> <li>● Engineering Design Notebook – Buying Water Once and Using it Twice</li> </ul>
<p><b>English Language Learners (ELL) Enhancements</b> To access <a href="#">hyperlinked</a> material, you must be logged into your BPS Google Drive</p>	<p><b>Listening</b></p> <ul style="list-style-type: none"> <li>● <b><u>Cross- Linguistic Practices</u></b>: Gives students opportunities to make connections between what they hear and their home language (For example, allow students to listen to a passage and identify cognates).</li> <li>● <b><u>Activating Prior Knowledge</u></b> Activating prior knowledge means both eliciting from students what they already know and building initial knowledge that they need in order to access upcoming content.</li> <li>● <b><u>Visuals</u></b> - GIFs, pictures- will assist students in understanding what they are listening to. Use <b><u>visual thinking strategies</u></b> to set the lens for learning.</li> <li>● Video to review or introduce a topic – use <b><u>closed captioning</u></b> to help students see the words and pronunciations while they listen to the content.</li> <li>● <b><u>Word stretching / Vowel stretching</u></b> when instructing allows students to listen closely to the pronunciation of the word.</li> <li>● <b><u>Performance Level Descriptors</u></b> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of listening. Scroll for grade 7.</li> </ul> <p><b>Speaking</b></p> <ul style="list-style-type: none"> <li>● <b><u>Sentence Stems/Frames</u></b> - to begin a sentence - such as <i>Evolution is...</i> or <i>I think that evolution is...</i></li> <li>● <b><u>Academic Conversation Starters</u></b>: Have a visual of a list of academic sentence starters that students can refer to in a discussion.</li> <li>● <b><u>Choral Reading</u></b> - To build fluency, self-confidence and motivation with <b><u>reading/speaking</u></b>.</li> <li>● Create <b><u>movement</u></b> to go with the word. Movement can be a motivating factor, as well as a kinesthetic tool for conceptualizing the rhythm and flow of fluent reading while triggering brain function for optimal learning.</li> <li>● <b><u>Performance Level Descriptors</u></b> This document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of speaking. Scroll for grade 7.</li> </ul>

	<p><b><u>Reading</u></b></p> <ul style="list-style-type: none"> <li>● Supplementary Text to help reinforce concepts.</li> <li>● <b><u>Visual Aids</u></b> - Pictures or models to support vocabulary words and concepts</li> <li>● Video to review or introduce a topic - use <b><u>closed captioning</u></b> to help students read along while they listen to the content.</li> <li>● <b><u>4 Square / Frayer models</u></b> to help students gain a deeper understanding of vocabulary.</li> <li>● <b><u>Highlighting</u></b> important text to assist students in answering questions after the reading.</li> <li>● <b><u>Chunking</u></b>-Break reading of text into chunks or paragraphs</li> <li>● <b><u>Vocabulary Morphology</u></b>- Morphology relates to the segmenting of words into affixes (prefixes and suffixes) and roots or base words, and the origins of words. Understanding that words connected by meaning can be connected by spelling can be critical to expanding a student’s vocabulary.</li> <li>● <b><u>Performance Level Descriptors</u></b> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of reading. Scroll for grade 7.</li> </ul> <p><b><u>Instructional Accommodations (depending on the student’s needs)</u></b></p> <ul style="list-style-type: none"> <li>● <b>Extended time</b> for tests in class, projects and assignments</li> <li>● <b>Directions read.</b> Broken down as necessary</li> <li>● <b>Model</b> how to complete the activity in the lesson</li> <li>● <b>Oral simplification</b> of directions or questions</li> <li>● <b>Translated version</b> of test when available. Student may have both version English and native language version</li> <li>● Use of <b><u>approved bilingual glossaries</u></b> from NYS in each subject</li> </ul>
<p><b>Special Education Modifications</b></p> <p>Special Education students must have accommodations as per Individual Educational Plan (IEP)</p>	<p><b><u>Instructional</u></b></p> <ul style="list-style-type: none"> <li>● <b>Pre-teach</b> vocabulary</li> <li>● Use <b>picture vocabulary</b></li> <li>● Scaffold <b>Depth of Knowledge</b> questions</li> <li>● Provide copy of notes/<b>notes in “cloze”</b> form</li> <li>● Use of <b>Think, Pair, and Share</b> strategy to help process information</li> <li>● <b>Scaffold</b> written assignments with the use of <b>graphic organizers</b></li> <li>● Allow for <b>multiple ways to respond</b> (verbal, written, response board)</li> <li>● Provide <b>model of performance task</b></li> <li>● <b>Modify informational text</b> to fit the needs of the students</li> <li>● Provide a digital or paper <b>interactive notebook</b></li> <li>● Present complex <b>tasks in multiple ways</b></li> <li>● Provide <b>mnemonic strategies</b> for scientific concepts</li> </ul> <p><b><u>Technology:</u></b></p> <ul style="list-style-type: none"> <li>● <b>Audio</b> reading of text</li> <li>● <b>Text to type</b> functions</li> <li>● <b>Videos</b> to clarify/visualize science concepts</li> <li>● <b>Record class lecture/discussions</b> and make accessible to student</li> <li>● <b>Nearpod</b>- interactive presentations of notes</li> </ul> <p><b><u>In Class Assessments</u></b></p> <ul style="list-style-type: none"> <li>● Provide <b>multiple options</b> for projects</li> <li>● <b>Use of timer</b> in class</li> <li>● Break all complex tasks into chunks</li> </ul>

Grade 7 Unit 2 Earth and Space Science

<p><b>Step Up to Writing</b> Step Up to Writing Materials can be found in BPS Science K-12 Schoology Folder □ Grade 5 Resources □ Grade 5 SUTW materials</p>	<ul style="list-style-type: none"><li>● Easy Two-Column Notes</li><li>● Breaking Down Definitions</li><li>● Paragraph Frame- What I Learned</li><li>● <a href="#">Performance Level Descriptors</a> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of writing. Scroll for grade 7.</li></ul>
<p><b>Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom</b></p>	<ul style="list-style-type: none"><li>● Materials, resources, and/or discussions address diverse cultural backgrounds and real-world applications</li><li>● Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population</li><li>● All students are given an opportunity to engage in science discourse</li><li>● Teacher demonstrates high expectations for all students</li></ul>