

# Earth and Space Sciences

## Role of the Sun

### Grade 5 Unit of Inquiry

#### **Planeteers Game-based Learning Platform**

Science and Technology, Arts, Math and Engineering

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## Outcomes and Content

### Science & Technology

**Curriculum Content Code: ACSSU078**

#### **Learning Outcomes**

Recognise the role of the sun as a provider of energy for the Earth

#### **Standards: Role of the Sun**

1. Why is sunlight important?
2. How do natural objects in the sky, such as the Sun, affect our daily lives?
3. What are the possible dangers of extreme sunlight exposure?
4. What are some safety measures that we can do to avoid harmful effects of the Sun's heat and light?
5. How do we take care of our natural surroundings?
6. What is the importance of the surroundings to people and other living things?
  - Explain the role of the sun as a provider of energy for the Earth
  - Communicate how the natural objects in the sky affect daily activities
  - Enumerate safety measures to avoid the harmful effects of the Sun's heat and light
  - Relate the importance of surroundings to people and other living things
  - Describe the natural objects found in the sky during daytime and nighttime

### Engineering & Mathematics

**STEAM Curriculum Code: EN 1.1 | EN 1.2 | EF1.3**

#### **Learning Outcomes**

Creates and manages simple, natural relationships

#### **Standards: Natural and Built Environment**

1. How will you decide whether an event is sure, likely, equally likely, unlikely, and impossible to happen in real-life situations?
  - Explore the local environment to meet immediate needs

### Arts & Photography

**STEAM Curriculum Code: AP1.1**

#### **Learning Outcomes**

Manipulates a camera and a journal

#### **Standards: Photography and Journal Writing**

1. How do you effectively take photos to capture natural objects found in the surroundings?
  - Demonstrate understanding of the use of camera and journal
  - Apply different techniques of taking photos such as using a camera flash, zoom, and shutter
  - Write captions for the photos taken

### Social Studies

#### **Learning Outcomes**

Creates awareness and develops a plan for protection from extreme sunlight and how to maximize it

#### **Standards: Environmental Awareness**

1. How do encourage the community to protect themselves from the sun and maximize the sunlight for their own benefit?
  - Develop community awareness about sun protection

## Unit Summary

**Grade:**

5

**Subject:**

Science & Technology

**Duration:**

1 week (50 minutes/day)

**Syllabus Mapping:**

- Earth and Space
- Photography
- Journal Writing
- Statistics and Propability

**Integration:**

- Science
- Mathematics
- Arts
- Engineering
- Technology

**Outcomes:**

ACSSU078

**Inquiry and Focus Questions:****Driving Question:**

The sunlight, air, water, and soil are important not only to us, but also to animals and plants. How do we effectively manage them and take care of our surroundings?

**Science & Technology:**

- Why is sunlight important?
- How do natural objects in the sky, such as the Sun, affect our daily lives?
- What are the possible dangers of extreme sunlight exposure?
- What are some safety measures that we can do to avoid harmful effects of the Sun's heat and light?
- How do we take care of our natural surroundings?
- What is the importance of the surroundings to people and other living things?

**Mathematics, Arts and Engineering:**

- How will you decide whether an event is sure, likely, equally likely, unlikely, and impossible to happen in real-life situations?
- How do you effectively take photos to capture natural objects found in the surroundings?

**Social Studies:**

- How do encourage the community to protect themselves from the sun and maximize the sunlight for their own benefit?

**Learning across the Curriculum:****Cross-curriculum priority**

- Sustainability
- Environmental Awareness

**General Capabilities**

- Teamwork & Collaboration
- Critical & Creative Thinking
- ICT Capability
- Numeracy
- Literacy
- Community Awareness

**Skills Focus:****Working Scientifically**

- Communicating
- Questioning and predicting

**Personal and Social Capability**

- Researching and planning
- Design and innovation
- Producing, implementing, testing, refining

**Skills Focus:**

This unit of investigation explores concepts from the core science standards for Earth and the Sun, with a focus on sunlight and the natural surroundings. Students use an individual inquiry-based approach to explore solutions to a multi-layered real-world question. They experiment with a number of in-game tasks to explore, survey and document natural objects found in the surroundings and their uses. They learn about sustainable practices in taking care of the natural things in the surroundings, including ways to protect themselves from the sun's heat and light. They take action in improving their own and others' social and environmental wellness.

# Teaching, Learning & Assessment Activities

NOTE: 'Quest Game Activity' describes activities that happen in-game while 'Unplugged' occur outside the game

## Lesson 1: Project Orientation and Research

**Summary:** Teacher explains the importance and the usefulness of sunlight and the surroundings to people and other living things. As part of the project based lesson, the teacher poses a challenge on the effects of extreme sunlight and the threats faced by our land, water and air. Students are tasked with researching environmental threats and their possible impact to our lives. Also, they are to research about ways to protect themselves from extreme exposure to sunlight, and ways protect the surroundings for a more sustainable future.

**Assessment:** Pre-test about sunlight and the natural surroundings (10 minutes)

**Unplugged Activity:** Driving Question (15 minutes) – Brainstorm (Guided)

*Begins with a discussion about the importance and effects of sunlight to all living things, the richness of our biodiversity, and the environmental threats faced by our surroundings.*

Teachers says “We need light in order to see things in our surroundings. Animals, plants and other organisms need sunlight to grow and live. Sunlight is very much a part of the richness of our biodiversity. Just like sunlight, the air, water, and land are also some of the natural things on Earth that make up our surroundings. They contribute to our existence on Earth. Without them, we cannot continue with our daily activities. Humans impact the surroundings in many different ways: overpopulation, pollution, and deforestation. For far too long, we’ve taken our surroundings for granted, exploiting our natural resources, and mindlessly taking from them without considering the repercussions.

*Teacher poses driving questions for the students to investigate and discover possible solutions:*

**Q.** The sunlight, air, water, and soil are important not only to us, but also to animals and plants. How do we effectively manage them and take care of our surroundings?

### **Science and Technology Inquiries:**

- Why is sunlight important?
- How do natural objects in the sky, such as the Sun, affect our daily lives?
- What are the possible dangers of extreme sunlight exposure?
- What are some safety measures that we can do to avoid harmful effects of the Sun’s heat and light?
- How do we take care of our natural surroundings?
- What is the importance of the surroundings to people and other living things?

### **Mathematics, Arts, and Engineering Inquiries:**

- How will you decide whether an event is sure, likely, equally likely, unlikely, and impossible to happen in real-life situations?
- How do you effectively take photos to capture natural objects found in the surroundings?

### **Social Studies Inquiries:**

- How do encourage the community to protect themselves from the sun and maximize the sunlight for their own benefit?

## Lesson 1: Project Orientation and Research (Continued)

### *Project Orientation (5 minutes)*

- Teacher introduces the project and relates it to the discussion outcomes
- Teacher divides the class in research groups (recommend 4-6)
- Provides project guide and overview of the timeline of activities and assessments to students (organized by lesson)

### *Research and Design Journal (20 minutes)*

- Students research, watch documentary videos, and read infographics about environmental threats caused by human activities, such as deforestation and pollution. They also read about the effects of sunlight and the importance of taking care of our natural surroundings, esp. the air, water, and land, not just for us, but for the next generation.

#### ***Science and Technology Inquiries:***

- Why is sunlight important?
- How do natural objects in the sky, such as the Sun, affect our daily lives?
- What are the possible dangers of extreme sunlight exposure?
- What are some safety measures that we can do to avoid harmful effects of the Sun's heat and light?
- How do we take care of our natural surroundings?
- What is the importance of the surroundings to people and other living things?

#### ***Mathematics, Arts, and Engineering Inquiries:***

- How will you decide whether an event is sure, likely, equally likely, unlikely, and impossible to happen in real-life situations?
- How do you effectively take photos to capture natural objects found in the surroundings?

#### ***Social Studies Inquiries:***

- How do encourage the community to protect themselves from the sun and maximize the sunlight for their own benefit?

- Students brainstorm, plan and draft their ideas on a sheet of paper or project journal\*\*

\*\* If teachers run out of time in the lesson to meaningfully allocate time for this exercise, students can be given the design plan as homework.

### ***Lesson 1 Assessment Ideas***

*Teachers should consider different assessment options throughout the project phases, including for example:*

1. Pre-test on sunlight and the natural surroundings
2. Quality of student research and project journal
3. Design assessment and reasoning, problem solving
4. Group skills, time management, collaboration
5. Project works (later lessons)
6. Photo Essay (later lessons)

## Lesson 2: Photo Survey and Documentation

### *Introduction to the Lesson*

Teacher guides the students in identifying and describing things found in the surroundings and their uses. Students explore, survey and take photos of the surroundings, especially during daytime when the Sun is up, within the game. The students may also survey the surroundings in the different continents of the game (i.e. Polar Cap, Savana, etc.). Based on their plan from lesson 1, students can start taking photos of the surroundings they listed in their plan.

### *Teacher-Led Unplugged Activity (10 minutes)*

- Teacher gives an overview of lesson goals, and reiterates the driving question.
- Teacher gives students the opportunity to ask questions before exploring in the game.

### *Guided Game Quest Activity (30 minutes)*

#### **In-Game Exploration:**

1. Students should survey the area and snap photos of the different things they see in the natural surroundings, such as land and water, and other living things (esp. during day time).
2. They may also survey other things found on other continents, such as the Polar Cap and Tropical Rainforest.
3. Using the game's Mission Journal, students should explain the photos they've taken.
4. They should name the photos in their journal and write about those things found in the surroundings.
5. In taking pictures, students would need to adjust their zoom for the perfect shot.
  - A close-up is great for detail, especially for animals, plants, and small creatures.
  - A mid shot is farther away than a close-up, and is used to capture a subject when they want a mix of the detail they get in a close up, and a picture that shows more of the character or characters.
  - If the students zoom out further to capture the character and more of their environment, that's called a full shot.
  - In taking pictures underwater, the students must be sure to master their diving skills so that they can adopt a stable position under water to take good shots.
  - They should set the camera's flash to "on" since there is less light in the deep, and look for close-up rather than mid shots and long shots to avoid water blur or distortion.

#### **Documentation using Game Camera and Mission Journal:**

- Using the game's Mission Journal, students should explain the photos they've taken.
- Students should add notes on their journal describing what they've seen in the game.

### *Lesson 2 Assessment Ideas*

Teachers should consider different assessment options throughout the project phases, including for example:

1. Quality of student research and project journal
2. Photography and literacy skills, specifically for the Mission Journal
3. Reasoning and storytelling
4. Time management, collaboration, problem-solving skills

## Lesson 3: Game Exploration

### *Introduction to the Lesson*

Students continue to explore the environment to survey things found in the surroundings. They learn about their importance to people and other living things. With consideration of the social and environmental impact to the community, students should conceptualize and devise a campaign about ways to protect oneself and the community from the sun's extreme heat and light, including ways to take care of the surroundings.

### *Teacher-Led Unplugged Activity (10 minutes)*

- Teacher gives an overview of lesson goals, and reiterates the driving question.
- Teacher gives students the opportunity to ask questions before continuing with exploration.

### *Guided Game Quest Activity (30 minutes)*

#### **Exploration using the Game Camera**

1. Students should continue to explore the area and take pictures of the different things they see in the natural surroundings,
2. In addition, they should snap photos of the natural objects found in the sky, within the game:
  - Ideally, natural objects found in the sky include the Sun.
  - Students should be able to capture things in the surrounding during daytime and in different continents in the game, such as the Savanna.
3. Using the game's Mission Journal, students should describe the natural things found in the sky and explain how they affect human's daily activities.

#### **Documentation using Game Camera**

- Using the game's Mission Journal, students should explain the photos they've taken.
- Students should add notes on their journal describing what they've seen in the game.

### *Lesson 3 Assessment Ideas*

Teachers should consider different assessment options throughout the project phases, including for example:

1. Quality of student research and project journal
2. Photography and literacy skills, specifically for the Mission Journal
3. Reasoning and storytelling
4. Time management, collaboration, problem-solving skills

## Lesson 4: Project Finalization

### *Introduction to the Lesson*

Teacher explains the social and environmental impact of protecting ourselves from the harmful effects of the Sun. Teacher also elaborates on the role of the Sun in providing energy for the Earth, and the importance of maximizing the Sunlight in the community for their own benefit, such as using solar panels for their homes. Teacher highlights the importance of taking care of the surroundings and mindfully managing natural resources for a more sustainable future, esp. for future generations.

### *Teacher-Led Unplugged Activity (10 minutes)*

- Teacher gives an overview of lesson goals.
- Teacher gives students the opportunity to ask questions before using the game to finalize their project.

### *Game Sandbox Activity (30 minutes)*

#### **Final Project**

1. Use the *Camera tool* to make any final documentation and photo capture of the things found in the surroundings.
2. In addition, students should make any final documentation of additional natural objects found in the sky.
3. Students should finalize any and all additional strategies in raising awareness about Sun protection and taking care of our natural surroundings, such as land, water, and air.

#### **Documentation using Game Camera**

- Students should take photos to illustrate and record final documentation of their surroundings.
- Later, in lesson 5, the photos will be used in their reflection and assessment i.e. they will create a photo essay about their project.

### *Lesson 4 Assessment Ideas*

Teachers should consider different assessment options throughout the project phases, including for example:

1. Quality of student research and project journal
2. Photography and literacy skills, specifically for the Mission Journal
3. Reasoning and storytelling
4. Time management, collaboration, problem-solving skills



## Lesson 5: Presentation and Reflection

### *Introduction to the Lesson*

Teacher asks the students to write about their project using the game's photo essay tools.

### **Game Sandbox Activity (30 minutes)**

#### **Photo Essay**

1. Using the game's *Mission Log*, students finalize their photo essay about the project.
2. In the photo essay, students should organize and name photos by activity and stage of the project, and insert them into their essay.
3. For example, some questions students might be asked to answer in their photo essay, may include:
  - Why is sunlight important?
  - How do natural objects in the sky, such as the Sun, affect our daily lives?
  - What are the possible dangers of extreme sunlight exposure?
  - What are some safety measures that we can do to avoid harmful effects of the Sun's heat and light?
  - How do we take care of our natural surroundings?
  - What is the importance of the surroundings to people and other living things?
  - What are the ways to show care for the environment in the homes and schools?
  - Why do we need to plant more trees in our surroundings?
  - How will you decide whether an event is sure, likely, equally likely, unlikely, and impossible to happen in real-life situations?
  - How do encourage the community to protect themselves from the sun and maximize the sunlight for their own benefit?
  - How do we encourage the community to take care of their surroundings?
  - What else would you have done, or do differently if you had more time?

**Assessment:** *Post-test about sunlight and the natural surroundings (10 minutes)*

#### **Final Assessment**

1. Photo essay
2. Post-test
3. Previous assessments made during the other lessons

## Teacher Handy Links and Resources

### *From Us to You!*

- The heat and light of the sun affects us in both positive and negative ways. For more information, [READ HERE.](#)
- See this infographic on how to be protected against extreme heat. [SEE HERE.](#)
- Read the 7 biggest threats to environmental health. [READ HERE.](#)
- How important is it to take care of our environment? [READ HERE.](#)
- Read this to know more about natural resources and the need for resource conservation and management. [READ HERE.](#)

### *Other Multimedia Resources*

- Penn Medicine talks about the facts and fiction regarding sun protection. [WATCH HERE.](#)
- Light and heat from the sun is now being used for solar energy. See how these technologies are making use of solar power. [WATCH HERE.](#)
- Why does the management of natural resources matter? The UN Environment Programme explains. [WATCH HERE.](#)
- Check out the threats in our environment and how they affect us by the numbers. [WATCH HERE.](#)
- Check out these 8 ways that kids can do to help their environment. [WATCH HERE.](#)

### *Other Reference Material*

- Australian Curriculum (ACARA) Science Sequence of Content F-6: Strand [READ](#)

### *Support & Help*

Please feel free to contact the STEAM Craft Edu team for any inquiries or support needs

**Email:** [education@steamcraftedu.com](mailto:education@steamcraftedu.com)