# May Grade 5 Unit 4:The Earth, Moon and Stars

Content Area: **Science**
Course(s):
Time Period: **May**
Length: **4-6 Weeks**
Status: **Published**

## Unit Overview

In this unit, students will learn about what gravity does, why the sun is brighter than all the other stars, and why we have day and night. They will explore how shadows change during the day and year, how stars seem to move during the night and year and how the moon seems to move and change shape. They will about the tools scientists use to observe space.

## Enduring Understandings

**Gravity** is a force pulling together all matter (which is anything you can physically touch). The more matter, the more **gravity**, so things that have a lot of matter such as planets and moons and stars pull more strongly.

The sun is brighter than all the other stars because it is closer to earth.

Rotation of the earth causes day and night.

Shadows change during the day and the year because of the sun.

Stars and the moon seem to move as the earth rotates.

The moon appears to change shape as the earth rotates.

Scientists use specialized tools to observe space.

## Essential Questions

What does gravity do?

Why is the sun brighter than all the other stars?

Why do shadows change during the day and year?

Why is there day and night?

Do the stars really move?

Does the moon really move and change shape?

What tools do scientists use to observe space?

## Instructional Strategies & Learning Activities

TEACHERS: THIS UNIT IS HOT LINKED BY CHAPTERS/QUESTIONS BELOW TO THE TCI SCIENCE ALIVE PROGRAM

What Does Gravity Do?

Students investigate the effect of gravity. Using evidence from tests and images, they support an argument that the gravitational force of Earth is directed toward Earth's center.

Reading Further: Your Mission Explore Other Planets

- 2

Why Is the Sun Brighter Than Other Stars?

Students explore how distance affects how bright a flashlight appears. Using this model as evidence, they construct an argument about how the brightness of stars varies depending on their distance from Earth. (optional)

Reading Further: The Life and Death of a Star

- 3

Why Is There Day and Night?

Students use a globe and lamp to model the relationship between Earth and the sun. They analyze the model to understand how Earth's rotation causes day and night.

Reading Further: Hang onto Your Hat

- 4

How Do Shadows Change During the Day and Year?

Students observe a model to see how Earth's rotation causes shadows to change length and direction. Then they build and use a sundial. (optional)

Reading Further: Ancient Skywatchers

- 5

How Do Stars Seem to Move During the Night and Year?

Students learn how the stars appear to change position over the course of a year. Field trip to the planetarium to view night sky.

Reading Further: Animal Navigators

- 6

How Does the Moon Seem to Move and Change Shape?

Students observe a moon rise and predict how the moonrise time and moon's phase will change. Trip to planetarium to view moon cycle.

Reading Further: Apollo 8's Journey to the Far Side

- 7

What Tools Do Scientists Use to Observe Space?

Students design and build telescopes to practice the engineering design process.

Reading Further: The Best Place for a Telescope

## Integration of Career Exploration, Life Literacies, and Key Skills

Students work in cooperative groups

Students will use research strategies to complete labs.

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| 9.2.5.CAP | Career Awareness and Planning |
| | An individual's passions, aptitude and skills can affect his/her employment and earning potential. |
| 9.2.5.CAP.1 | Evaluate personal likes and dislikes and identify careers that might be suited to personal likes. |
| 9.2.5.CAP.2 | Identify how you might like to earn an income. |
| 9.2.5.CAP.3 | Identify qualifications needed to pursue traditional and non-traditional careers and occupations. |
| 9.2.5.CAP.4 | Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements. |
| 9.4.5.DC.4 | Model safe, legal, and ethical behavior when using online or offline technology (e.g., 8.1.5.NI.2). |
| | Digital tools and media resources provide access to vast stores of information, but the information can be biased or inaccurate. |
| 9.4.5.IML.1 | Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources). |
| | Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas. |
| 9.4.5.IML.2 | Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). |
| 9.4.5.TL.3 | Format a document using a word processing application to enhance text, change page formatting, and include appropriate images graphics, or symbols. |
| CRP.K-12.CRP1 | Act as a responsible and contributing citizen and employee. |
| CRP.K-12.CRP2 | Apply appropriate academic and technical skills. |
| CRP.K-12.CRP4 | Communicate clearly and effectively and with reason. |
| CRP.K-12.CRP5 | Consider the environmental, social and economic impacts of decisions. |
| CRP.K-12.CRP6 | Demonstrate creativity and innovation. |
| CRP.K-12.CRP7 | Employ valid and reliable research strategies. |
| CRP.K-12.CRP8 | Utilize critical thinking to make sense of problems and persevere in solving them. |
| CRP.K-12.CRP9 | Model integrity, ethical leadership and effective management. |
| CRP.K-12.CRP10 | Plan education and career paths aligned to personal goals. |
| CRP.K-12.CRP11 | Use technology to enhance productivity. |
| CRP.K-12.CRP12 | Work productively in teams while using cultural global competence. |

## Technology and Design Integration

online textbook and applications

Generation Genius

Kahoot

Crash Course Kids

Bill Nye

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| 8.2.5.ED.1 | Explain the functions of a system and its subsystems. |
| 8.2.5.ED.2 | Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. |
| 8.2.5.ED.3 | Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. |
| 8.2.5.ED.4 | Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints). |
| 8.2.5.ED.5 | Describe how specifications and limitations impact the engineering design process. |
| 8.2.5.ED.6 | Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process. |
| 8.2.5.ITH.1 | Explain how societal needs and wants influence the development and function of a product and a system. |

## Interdisciplinary Connections

Students will use art to show moon phases.

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| LA.RI.5.1 | Quote accurately from a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text. |
| LA.RI.5.2 | Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. |
| LA.RI.5.3 | Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. |
| LA.RI.5.4 | Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. |
| LA.RI.5.5 | Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts. |
| LA.RI.5.6 | Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. |
| LA.RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. |
| LA.RI.5.8 | Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). |
| LA.RI.5.9 | Integrate and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) information from several texts on the same topic in order to write or speak about the subject knowledgeably. |

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| LA.RI.5.10 | By the end of year, read and comprehend literary nonfiction at grade level text-complexity or above, with scaffolding as needed. |
| LA.RF.5.3 | Know and apply grade-level phonics and word analysis skills in decoding and encoding words. |
| LA.RF.5.4 | Read with sufficient accuracy and fluency to support comprehension. |
| LA.W.5.2 | Write informative/explanatory texts to examine a topic and convey ideas and information clearly. |
| LA.W.5.4 | Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) |
| LA.W.5.5 | With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. |
| LA.W.5.6 | With some guidance and support from adults and peers, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting. |
| LA.W.5.7 | Conduct short research projects that use several sources to build knowledge through investigation of different perspectives of a topic. |
| LA.W.5.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. |
| LA.W.5.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. |
| LA.SL.5.1 | Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. |
| LA.SL.5.2 | Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally). |
| LA.SL.5.3 | Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence. |
| LA.SL.5.4 | Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. |
| LA.SL.5.5 | Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. |
| LA.SL.5.6 | Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. |
| LA.L.5.1 | Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. |
| LA.L.5.2 | Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. |
| LA.L.5.3 | Use knowledge of language and its conventions when writing, speaking, reading, or listening. |
| LA.L.5.4 | Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies. |
| LA.L.5.6 | Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition). |

## Differentiation

- Understand that gifted students, just like all students, come to school to learn and be challenged.
- Pre-assess your students. Find out their areas of strength as well as those areas you may need to address before students move on.
- Consider grouping gifted students together for at least part of the school day.
- Plan for differentiation. Consider pre-assessments, extension activities, and compacting the curriculum.
- Use phrases like "You've shown you don't need more practice" or "You need more practice" instead of words like "qualify" or "eligible" when referring to extension work.
- Encourage high-ability students to take on challenges. Because they're often used to getting good grades, gifted students may be risk averse.

- **Definitions of Differentiation Components**:

    - Content – the specific information that is to be taught in the lesson/unit/course of instruction.
    - Process – how the student will acquire the content information.
    - Product – how the student will demonstrate understanding of the content.
    - Learning Environment – the environment where learning is taking place including physical location and/or student grouping

**Differentiation occurring in this unit:**

Utilize differentiation suggestions in the TCI Science Alive! program for enrichment and support.

## Modifications & Accommodations

Refer to QSAC EXCEL SMALL SPED ACCOMMOCATIONS spreadsheet in this discipline.

**Modifications and Accommodations used in this unit:**

utilize 504 and IEP accommodations where required

## Benchmark Assessments

**Benchmark Assessments** are given periodically (e.g., at the end of every quarter or as frequently as once per month) throughout a school year to establish baseline achievement data and measure progress toward a standard or set of academic standards and goals.

**Schoolwide Benchmark assessments:**

Aimsweb benchmarks 3X a year

Linkit Benchmarks 3X a year

DRA

**Additional Benchmarks used in this unit:**

end of sections games

unit tests

standardized state test

lab reports

## Formative Assessments

Assessment allows both instructor and student to monitor progress towards achieving learning objectives, and can be approached in a variety of ways. **Formative assessment** refers to tools that identify misconceptions, struggles, and learning gaps along the way and assess how to close those gaps. It includes effective tools for helping to shape learning, and can even bolster students' abilities to take ownership of their learning when they understand that the goal is to improve learning, not apply final marks (Trumbull and Lash, 2013). It can include students assessing themselves, peers, or even the instructor, through writing, quizzes, conversation, and more. In short, formative assessment occurs throughout a class or course, and seeks to improve student achievement of learning objectives through approaches that can support specific student needs (Theal and Franklin, 2010, p. 151).

**Formative Assessments used in this unit:**

TCI worksheets, quizzes

Discussion

Teacher observation

Labs and Hands on activities

## Summative Assessments

**Summative assessments** evaluate student learning, knowledge, proficiency, or success at the conclusion of an instructional period, like a unit, course, or program. Summative assessments are almost always formally graded and often heavily weighted (though they do not need to be). Summative assessment can be used to

great effect in conjunction and alignment with formative assessment, and instructors can consider a variety of ways to combine these approaches.

**Summative assessments for this unit:**

Unit assessments in the TCI program

## Instructional Materials

Materials for labs indicated in TCI program

## Standards

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| 5-ESS1 | Earth's Place in the Universe |
| 5-ESS1-1 | Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. |
| | Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage). |
| | Engaging in Argument from Evidence |
| | Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). |
| | Support an argument with evidence, data, or a model. |
| ESS1.A | The Universe and its Stars |
| | The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. |
| | Natural objects exist from the very small to the immensely large. |
| 5-ESS1-2 | Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. |
| | Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months. |
| | Assessment does not include causes of seasons. |
| | Analyzing and Interpreting Data |
| | Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. |
| | Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. |

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| ESS1.B | Earth and the Solar System |
| | The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. |
| | Patterns |
| | Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. |
| SCI.5-ESS1 | Earth's Place in the Universe |
| SCI.5-PS2 | Motion and Stability: Forces and Interactions |