

Unit 5: System in Space

Content Area: **Science**
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Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

Science, Grade 5

Unit 5: Systems in Space

Belleville Board of Education

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Board Approved: August 30, 2017

Unit Overview

In Unit 5 students will:

- use evidence to explain that Earth's orbit, the moon's orbit and earth's rotation cause predictable patters.
- explain why the sun appears so large and bright from Earth
- explain that Earth is a sphere and that gravity pulls objects toward Earth's center

Enduring Understanding

- Support an argument that the gravitational force exerted by Earth on objects is directed down
- Support an argument that differences in the apparent brightness of the sun compared to other stars are due to their relative distances from Earth
- 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

Essential Questions

How does gravity affect matter on Earth?

What daily patterns can be observed?

What patterns can be observed in a year?

What is the sun?

Exit Skills

By the end of Grade 5, Unit 5, students should be able to:

- discuss how gravity affects all matter on Earth
- describe patterns caused by interactions between Earth, the sun and the stars
- describe monthly and seasonal patterns of the sun, moon, and stars

New Jersey Student Learning Standards (NJSL-S)

| | |
|-------------------|---|
| SCI.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. |
| 5-PS2-1.7.1 | Support an argument with evidence, data, or a model. |
| 5-PS2-1.PS2.B.1 | The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. |
| 5-PS2-1.2.1 | Cause and effect relationships are routinely identified and used to explain change. |
| 5-ESS1-1.7.1 | Support an argument with evidence, data, or a model. |
| 5-ESS1-1.ESS1.A.1 | 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. |
| 5-ESS1-1.3.1 | Natural objects exist from the very small to the immensely large. |
| 5-ESS1-2.4.1 | Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. |
| 5-ESS1-2.ESS1.B.1 | 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. |
| 5-ESS1-2.1.1 | Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. |
| SCI.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. |
| SCI.5-PS2-1 | Support an argument that the gravitational force exerted by Earth on objects is directed down. |

Interdisciplinary Connections

Mathematics and Language Arts

| | |
|------------|--|
| LA.5.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.5.W.5.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. |

| | |
|----------------|---|
| MA.K-12.2 | Reason abstractly and quantitatively. |
| MA.K-12.4 | Model with mathematics. |
| MA.5.5.MD.A.1 | Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. |
| LA.5.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.5.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.5.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. |
| MA.5.5.G.A.2 | Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. |
| LA.5.W.5.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons and information. |
| MA.5.5.NBT.A.2 | Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. |

Learning Objectives

Lesson 1: gather evidence to explain that the gravity of Earth pulls objects toward the planet's center. Through the development and use of models, students will use evidence to explain that Earth is a sphere and that gravity causes objects to move toward Earth's center

Lesson 2: explore daily patterns caused by interactions of bodies in the solar system; collect and analyze data to detect patterns, including the path of the sun across the day sky, the movement of constellations in the night sky, and hours of sunlight

Lesson 3: gather evidence to explain how Earth orbits around the sun and the moon orbits around the Earth. Through the collection and analysis of data, students will use to explain that Earth's orbit and the moon's orbit causes predictable patterns.

Lesson 4: Learn that the sun appears larger and brighter than other stars due to its distance from Earth through models that show scale, proportion, and quantity and through analyzing and interpreting the data throughout the lesson

Suggested Activities

You Solve it: Measuring Shadows (virtual lab)

Evidence of Student Learning - Checking for Understanding (CFU)

- Admit Tickets
- Anticipation Guide
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit tests

Primary Resources & Materials

HMH Science Dimensions

Technology Infusion

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not

needed or used.

What **Technology Infusion** and/or strategies are integrated into this unit to enhance learning? Please list all hardware, software and strategies. Please find a technology pedagogy wheel for assistance while completing this section.

Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts
 Photostory 3
 Kid Story Builder
 Music Maker Jam
 Paint A Story
 Office 365
 MS PowerPoint
 Stack 'Em Up
 NqSquared Numbers
 Physamajig
 Xylophone 8

Wikipedia
 Skydrive
 Lync
 SkyMap
 Skype
 Office 365
 Puzzle Touch
 Easy QR
 Memorylage
 Life Moments
 Word Cloud Maker

Where's Waldo?
 MS Excel
 Flipboard
 Office 365
 Nova Mindmapping

Ted Talks
 Record Voice Pen



Originally taken from <http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg>
 And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

Alignment to 21st Century Skills & Technology

21st Century/Interdisciplinary Themes

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

21st Century Skills

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

Please list only the **21st Century Skills** that will be incorporated into this unit.

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

Differentiation

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives

- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Cubing activities
- Exploration by interest

- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

Intervention Strategies

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Special Education Learning

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan

- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

English Language Learning

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

