Unit 6: Objects and Patterns in the Sky

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Belleville Public Schools

Curriculum Guide

Science: Grade 1

Unit 6: Objects and Patterns in the Sky

Belleville Board of Education

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Unit Overview

Kids are born scientists. They want to know WHY: Is the sun a star? How do magnets work? It's our job to encourage their curiosity, creativity, and exploration while preparing them for careers in science, technology, engineering, and math.

Unit 6 Performance Expectations:

ESS1-1 Use observations of the sun, moon, and stars to describe patterrns that can be predicted.

ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.

Throught Unit 6, students will develop skills to

- identify and describe objects in the sky.
- use evidence to describe predictable patterns of the sun, moon and stars.
- observe and model patterns of the moon's phases.
- use observations to describe characteristics of each season.
- predict patterns of change that take place from season to season.
- use observations to compare the amount of daylight from season to season.
- explore how seasons affect people and animals.

Unit Vocabulary: star, sun, moon, phases, season

Unit Project: Explore the Moon's Phases

Lesson 1:

In Lesson 1, students focus on observing, describing, and predicting patterns in the way the sun, moon, and stars appear to move across the sky. They will make observations of objects in the daytime sky and the nighttime sky and use those observations to answer questions about the motion of the objects they see in the sky. In the process, students will explore the apparent motion of these objects as examples of natural events that are repeated through time and learn to make assumptions about phenomena using observed repetitions as evidence.

Essential Question: How do objects in the sky seem to change?

Can You Explain It? (Lesson 1 Engagement Question): How do objects in the sky seem to change?

Hands-On Activity: Observe the Pattern of the Sun

Lesson 2:

In Lesson 2, students focus on how the amount of daylight in a day is related to the time of year. After an introduction to the seasons, students will observe, describe, and predict seasonal patterns of sunrise and sunset. They will observe how seasonal changes affect plants and animals. They will explore these patterns through a variety of interactions and one hands-on activity.

Essential Question: What are patterns of daylight?

Can You Solve It? (Lesson 2 Engagement Question): You want to plant flowers in seasons with the most daylight. Which seasons would you choose?

Hands-On Activity: Observe Patterns of Sunset

Online Interactive Activity: Eyes on the Sky!

Enduring Understanding

Unit 6 Performance Task: Students will observe the growth patterns of plants exposed to different amounts of sunlight, and collect and analyze data that explains how seasonal patterns of daylight affect plant growth.

(Refer to Scoring Rubric TE page 313)

By the end of Lesson 1, students will identify and describe objects in the sky and observe and describe predictable patterns of the sun, moon, and stars.

By the end of Lesson 2, students will make observations at different times of year to relate the amount of daylight to the time of year.

Assessments

Pre-Assessment

Assessment Guide, Unit Pretest

Formative Assessment

Interactive Worktext, Apply What You Know, Lesson Check and Self Check

Summative Assessment

Assessment Guide, Interactive Worktext, Lesson Quiz and Unit Test

Online Assessment

Essential Questions

Essential Questions for Unit 6 Project:

Students can be prepared for their Unit 6 Project by asking the following questions:

- Why do we see the moon in the sky at night?
- Does the moon actually change?
- Why does it seem like the moon changes?
- How could you build a model that can show the cause for the moon's phrases?

Essential Questions:

- How do objects in the sky seem to change?
- What are patterns of daylight?

- Which seasons would you choose to plant flowers in with the most daylight?

Exit Skills

By the end of Grade 1, Science Unit 6, the students should be able to:

- describe how some objects change in the sky
- provide examples of the changes they describe
- identify why the changes are patterns
- describe the pattern of sunlight
- compare the amount of sunlight during the different seasons
- effectively explain how the change of sunlight relates to the seasons

New Jersey Student Learning Standards (NJSLS-S)

SCI.1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted.
SCI.1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year.

Interdisciplinary Connections

Lesson 1:

Connections to Math

1.G.A.3 Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

Connections to English Language Arts

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Lesson 2:

Connections to Math

MP.2 Reason abstractly and quantitatively.

1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem.

Connections to English Language Arts

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

LA.W.1.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
MA.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
MA.1.OA.A.1	Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
MA.K-12.2	Reason abstractly and quantitatively.

Learning Objectives

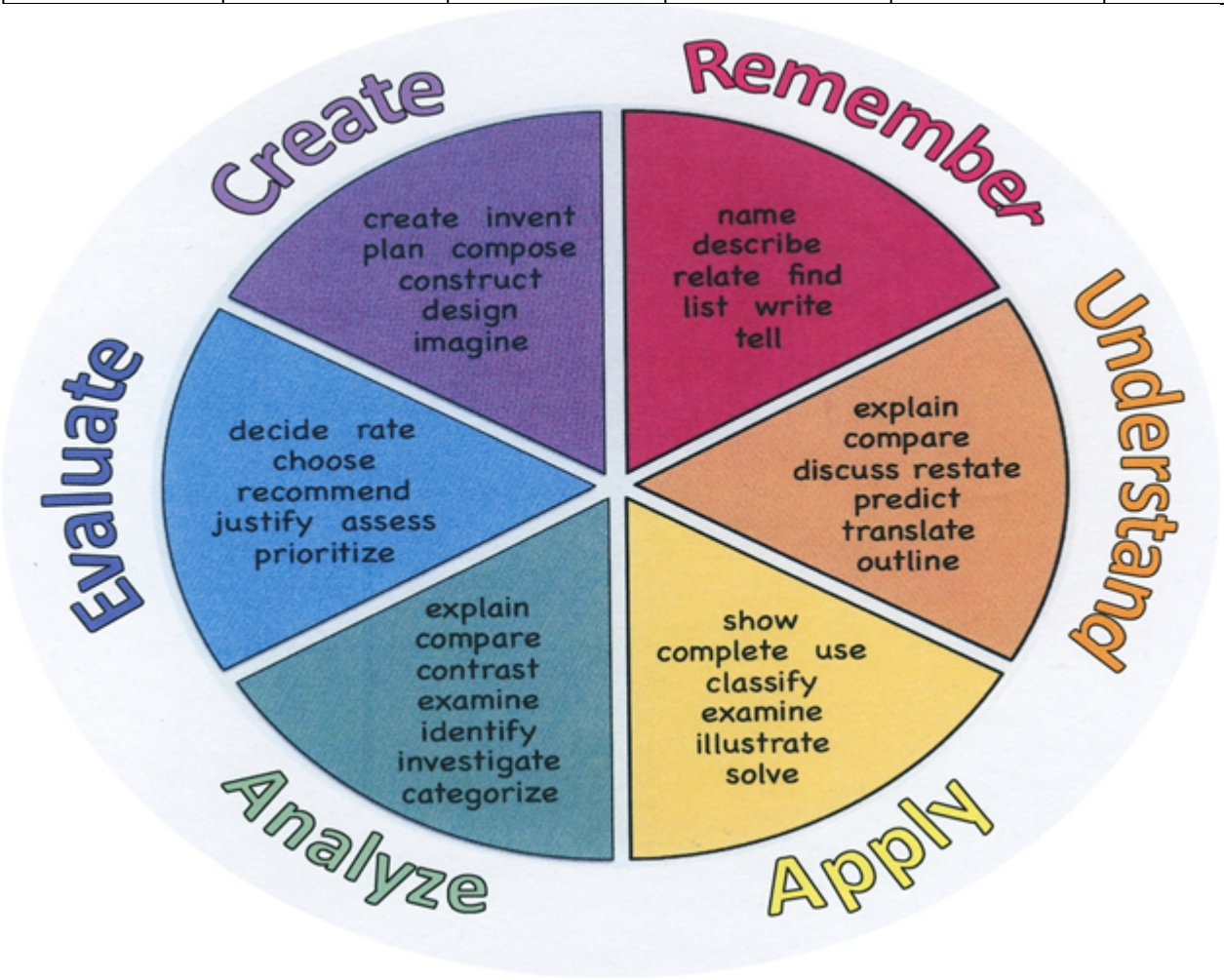
Effective Learning Objectives Used in Lesson Planning:

- SWDAT identify and describe objects in the sky
- SWDAT observe and describe predictable patterns of the sun, moon, and stars
- SWDAT explore the sun's apparent movement across the daytime sky
- SWDAT use their observations to make a claim that answers their question
- SWDAT make observations at different times of year to relate the amount of daylight to the time of year
- SWDAT compare what time the sun sets in three different seasons
- SWDAT make a claim about how the time of sunset changes from season to season

Action Verbs: Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive
Outline	Represent	Calculate	Diagram	Support	Devise
Point	Restate	Change	Discriminate	Test	Generate
Quote	Rewrite	Classify	Illustrate		Integrate
Recall	Select	Complete	Outline		Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct
Reproduce	Tell	Divide			Revise
	Translate	Examine			Rewrite
	Associate	Graph			Transform
	Compute	Interpolate			

	Convert Discuss Estimate Extrapolate Generalize Predict	Manipulate Modify Operate Subtract			



Suggested Activities

Vocabulary Game- Show the Word

Hands-On Activities: Observe the Pattern of the Sun & Observe Patterns of Sunset

Interactive Activity: Eyes on the Sky!

Unit Project

Take It Further

- Space Technology
- The Midnight Sun

Evidence of Student Learning - Checking for Understanding (CFU)

In addition to the assessments provided with the Houghton Mifflin Harcourt Science Series, teachers may use different formative and informative assessments to guide their instruction. Below is a checklist of possible assessment strategies to be used to check for understanding in Science.

- 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 Text

Professional Development Video

Equipment Kits (includes consumable and non-consumable materials)

Safety Kit

The Science and Engineering Practices Online Handbook

Science and Engineering Leveled Readers (On Level, Extra Support, Enrichment)

HMH Player app

Home Letters (Online)

Ancillary Resources

Safety in Science Rules

Online Resources

Technology Infusion

www.hmhco.com/classroom/classroom-solutions/digital-and-mobile-learning/ed

3D Evaluation Rubric

Computer-Based Assessments

HMH Field Trips

Online Videos and Animations

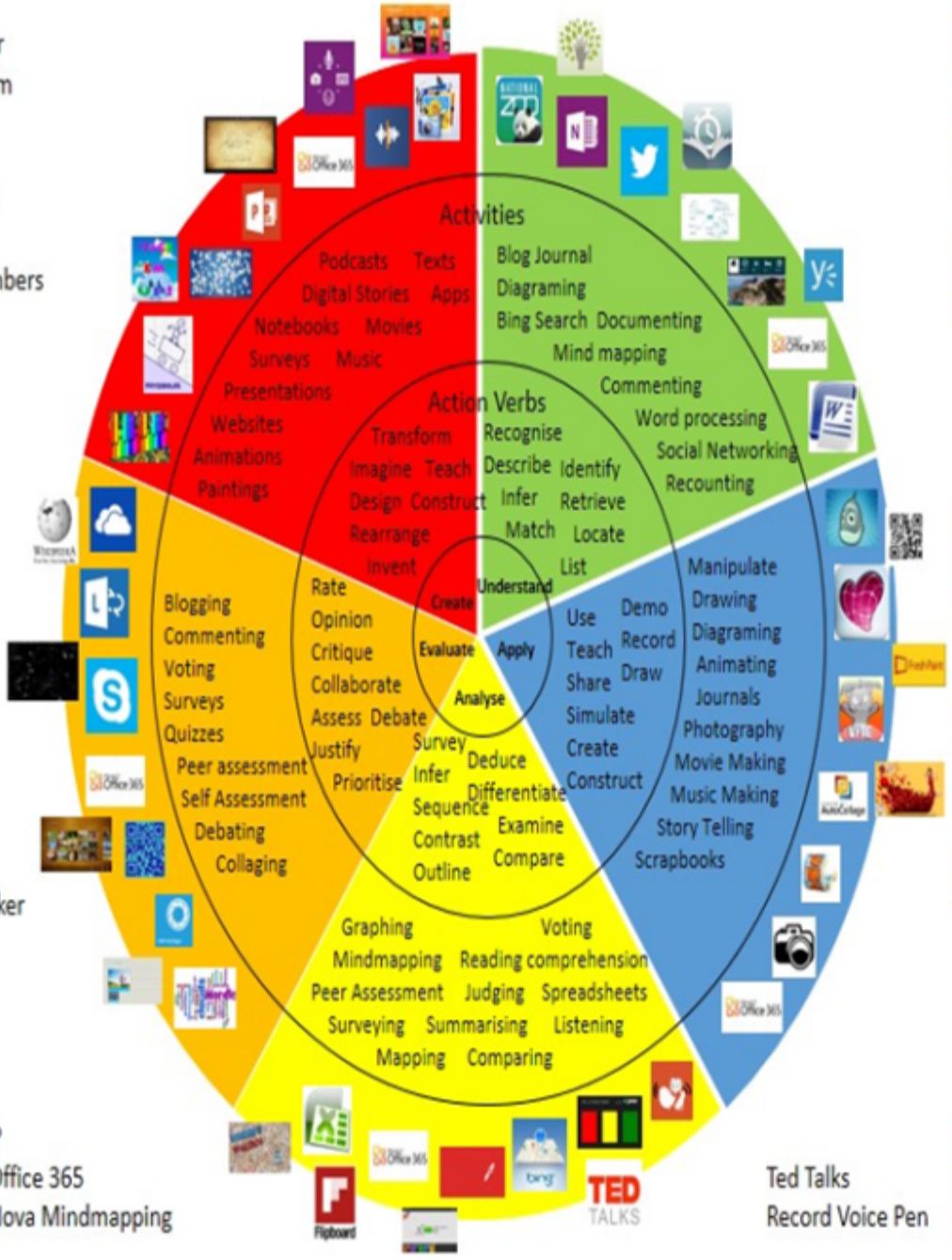
Online access to Science and Engineering Leveled Readers (includes On Level, Extra Support, and Enrichment)

Online Glossary

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 Office 365
Flipboard 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

- English Language Arts; Creativity and Innovation
- Mathematics; Critical Thinking and Problem Solving
- Science and Scientific Inquiry (Next Generation); Critical Thinking and Problem Solving
- Social Studies, including American History, World History, Geography, Government and Civics, and Economics; Information Literacy
- World languages; Information Literacy
- Technology; Life and Career Skills
- Visual and Performing Arts; Creativity and Innovation

21st Century/Interdisciplinary Themes

Connection to Physical Science: Electromagnetic Radiation

Explain to students that the moon does not actually give off its own light.

Connection to Life Science: Information Processing

Discuss with students that plants need sunlight to live and grow. Ask students why plants grow toward sunlight.

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

21st Century Skills

Collaboration (Build on Prior Knowledge, Small Groups, Whole Class, and Think, Pair, Share)

Claims, Evidence, and Reasoning

People in Science & Engineering (Dr. Sarah Ballard)

Careers in Science & Engineering (Circadian Biologist)

- 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

Lesson Vocabulary (star, sun, moon, phases)

Leveled Readers (On Level, Extra Support, Enrichment)

Reinforce Vocabulary- To help students remember the vocabulary words, choose two objects and have students tell what the difference is between them. Invite students to make up riddles for others to solve. For example, "You can see me in the daytime sky. What am I?"

RTI/Extra Support- Use a light bulb to represent a star. Use a ball wrapped in aluminum foil to represent the moon. Show how light from the light bulb reflects off the ball, as the sun's light reflects off the moon.

Extension- Research the names of some of the bright stars or constellations in the nighttime sky and share them with the class.

ELL- Point out and reinforce words associated with times of day including *daytime, nighttime, early morning, noon,* and *late afternoon*. To help students put these words into context, talk with them about what they might be doing at each time of day.

(ELL support resources include a glossary in English and Leveled Readers in Spanish and English)

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 workpresented 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 clarif
- 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 workpresented 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

Sample Lesson

Unit Name: Objects and Patterns in the Sky

NGSS: 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted

Interdisciplinary Connection: Math (identifying patterns in the daytime sky)

Statement of Objective: SWDAT identify and describe objects in the sky and observe and describe predictable patterns of the sun, moon, and stars

Anticipatory Set/Do Now: Show lesson video. Ask students to record their initial thoughts about how the objects in the sky seem to change; discuss responses

Learning Activity: Have students list objects they see in the sky; write each object on the board as students say it; students will then work in small groups to sort the objects into those they see during the day and those they see at night; discuss results; read aloud pages 278-282; ask guided questions.

Student Assessment/CFU's: Complete "Apply What You Know" in Evidence Notebook; match pictures of the position of the sun and of shadows in each picture to the time of day (early morning, noon, late afternoon)

Materials: Lesson video, laptop, SMART TV or SMART Board, text book, board, markers

21st Century Themes and Skills: Communication and Collaboration, Critical Thinking and Problem Solving

Differentiation/Modifications: Lesson video, visuals, small group assistance

Integration of Technology: Lesson video; explore online to find out more about how the sun appears to move across the daytime sky