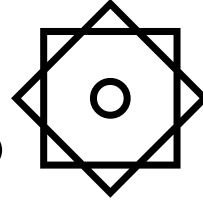


Elementary PLUS



(Performance Learning and
Understanding in Science)



You Are My Sunshine

An Early Childhood Unit

Study of the Sun/Earth System



You Are My Sunshine

Study of the Sun/Earth System

Teacher's Guide Containing All Student Materials

Written by

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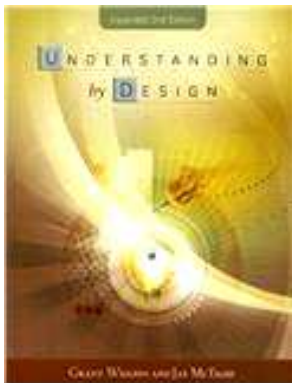
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Introduction to Elementary PLUS

Elementary PLUS is part of a series of **Performance Learning and Understanding in Science**. These units represent an innovative approach to the design of curriculum and instructional materials in which there is an effort to create research-based, contemporary, and exemplary materials to teach science. All PLUS units are designed from national science standards, as called for in both the National Science Education Standards (NRC, 1996) and the Benchmarks for Scientific Literacy (AAAS, 1993). The Elementary PLUS units engage students in stimulating, authentic, and contemporary problem-based life science scenarios involving not only the life sciences, but also including the natural connections among the physical, environmental, and earth/space sciences, technology, and engineering. Drawing from the best in contemporary pedagogy, the Elementary PLUS units provide students with the opportunity to learn age appropriate concepts, skills, processes, and to acquire science attitudes and “habits of mind.”

Elementary PLUS and Understanding by Design (UbD)

All units within Elementary PLUS have been designed (backward-planning) using principles of *Understanding by Design* (Wiggins and McTighe, 1998). *Understanding by Design (UbD)* is a



well-known curriculum design process used to write units of instruction in a three-stage process –Desired Results, Assessment Evidence, and the Learning Plan. Many state departments of education, colleges and universities, and school systems advocate the use of *Understanding by Design* as a contemporary planning process for teaching and assessing state and national standards.

Understanding by Design (UbD) is a research supported framework for improving student achievement through standards-driven curriculum development, instructional design, assessment, and professional development. Developed by internationally recognized educators Grant

Wiggins and Jay McTighe and produced by the Association for Supervision and Curriculum Development (ASCD), *Understanding by Design* is based on the following key tenets:

1. A primary goal of education is the development and deepening of student understanding.
2. Evidence of student understanding is revealed when students apply knowledge and skills within authentic contexts (performance-based).
3. Effective curriculum development reflects a three-stage design process called “backward design.” This process helps to avoid the twin problems of “textbook coverage” and “activity-oriented” teaching in which no clear priorities and purposes are apparent.
4. Regular reviews of curriculum and assessment designs, based on design standards, are needed for quality control, to avoid the most common design mistakes and disappointing results. A key part of a teacher’s job is ongoing action research for continuous improvement. Student and school performance gains are achieved through regular reviews of results (achievement data *and* student work) followed by targeted adjustments to curriculum and instruction.

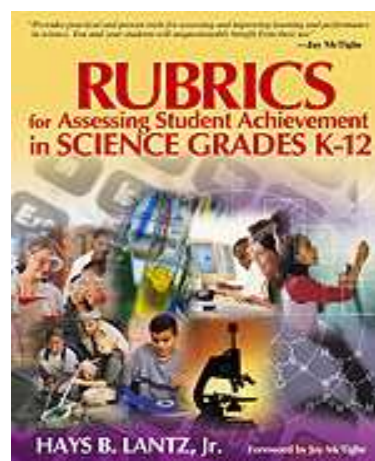
- Teachers provide opportunities for students to **explain, interpret, apply, shift perspective, empathize, and self-assess**. These “six facets” provide conceptual lenses through which students reveal their understanding.
- Teachers, schools, and districts benefit by “working smarter”—using technology and other approaches to collaboratively design, share, and critique units of study.

Performance-based Teaching, Learning, and Assessing

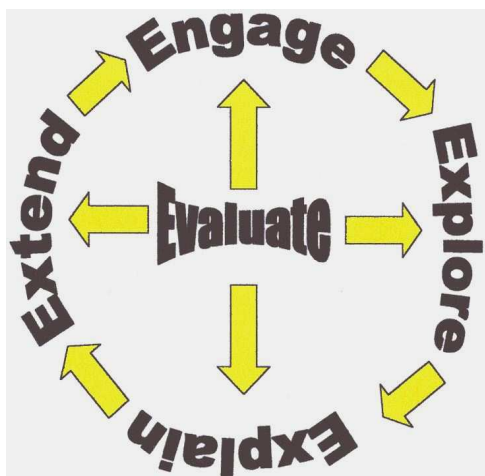
Many authors, among them Reeves (2003), Marzano, Pickering, and McTighe (1993), Lantz (2004), and the Educators in Connecticut’s Pomperaug Regional School District 15 (1996), have been proponents of performance-based teaching, learning, and assessing in which students must demonstrate what they know and can do through the completion of meaningful performance tasks. All units within Elementary PLUS present opportunities for students to engage in multiple performance-based tasks and assessments, along with more traditional forms of assessment, such as selected response items.

Formative and summative performance-based activities and assessments have been thoughtfully sequenced and scaffolded to provide ample opportunities for students, teachers, parents, and others to assess student progress. An end of unit summative assessment contains selected and constructed response items.

Extensive rubrics are provided for open-ended, performance-based questions and other performances that cannot be scored using typical right or wrong multiple choice items. Each activity within the units is accompanied by scoring tools, including a variety of field-tested and National Science Teachers Association (NSTA) endorsed performance list, holistic, and analytical rubrics (Lantz, 2004).

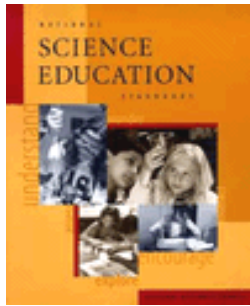


The Five E Teaching, Learning, and Assessing Cycle

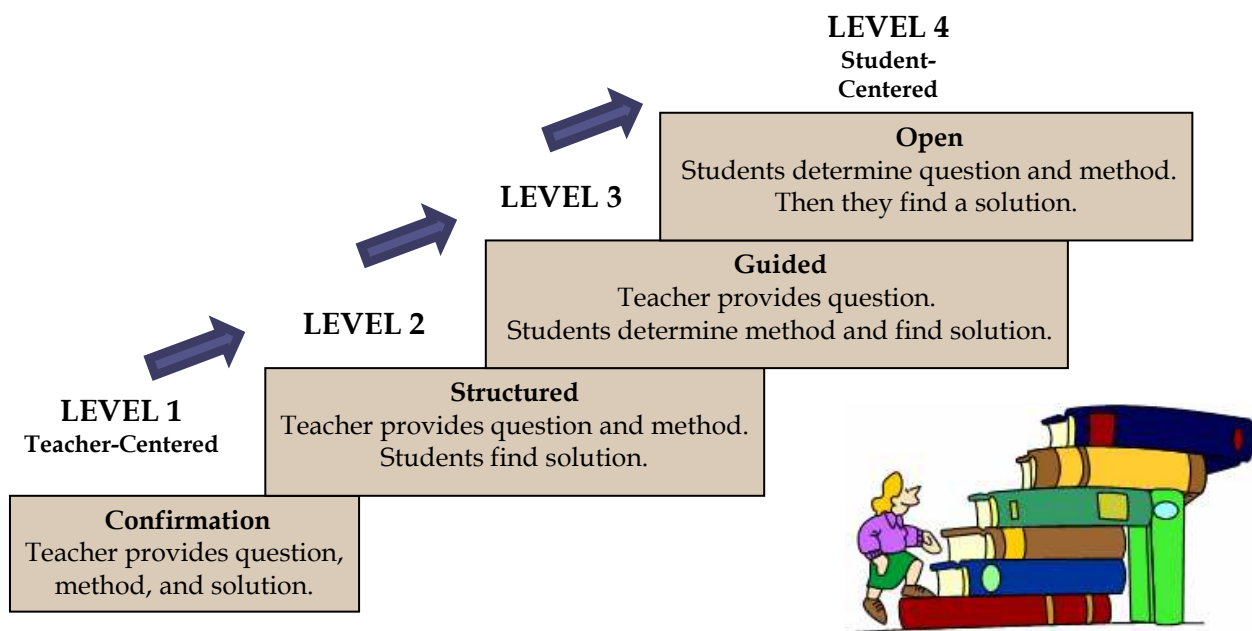


A modified 5E teaching, learning, and assessing cycle, incorporated into all PLUS units, is based upon research findings about how students learn science. These findings indicate that students learn best when they have an opportunity to **engage** in explorations in a hands-on/minds-on environment in which they make and pose **explanations** for their discoveries. **Engagement, Exploration, Explanation, Elaboration, and Evaluation** are the recursive phases of the 5E teaching, learning, and assessing cycle. All Elementary PLUS units contain many explorations, followed by explanations in which students must demonstrate an understanding of the concepts and skills being taught. The 5E cycle or modifications (such as 6E or 7E) are often used in many contemporary science materials and textbooks.

A Standards-Driven Curriculum Using Inquiry



The National Science Education Standards (NRC, 1996), the Benchmarks for Scientific Literacy (AAAS, 1993) the National Council of Teachers of Mathematics Standards (NCTM 1989 and 2000), the National Education Technology Standards for Students (ISTE, 1998, 2007)), and the Standards for Technological Literacy (ITEA, 2007) call for teaching, implementing, and assessing student understanding of inquiry throughout the curriculum. As a result, four scaffolded levels of inquiry (illustrated below) are included in most PLUS units, starting with the most structured form -confirmatory inquiry, moving on to structured inquiry, then to guided inquiry, and finally to open inquiry. As students learn the skills and processes, and the content of inquiry, they are challenged by activities that become increasingly more open.



This Teacher's Guide (TG) provides much detail about implementing PLUS units. A listing of the standards used to develop this unit, consisting of the National Science Education Standards (NRC, 1996) and the Benchmarks for Scientific Literacy (AAAS, 1993), is provided for the teacher. Enduring understandings, essential questions, unit questions, general implementation hints, background information for the unit, and a detailed learning plan are provided as well.

This Elementary PLUS Teacher' Guide (TG) is available in two digital formats - Microsoft Word and a PDF file. The PDF files are smaller and easier to open and print. PDF files require Acrobat Reader. Changes to the PDF files cannot be made without Adobe Acrobat software; however, changes can be made in the Word documents.

Teacher -Friendly Units

Every effort has been made to design the PLUS units to be as teacher-friendly as possible, whether the teacher is a novice or an expert in teaching science. The novice teacher can pick up

the unit and teach it exactly as it was designed and in the process provide a high quality instructional program. Activities are written with much detail, are very descriptive, and are highly structured for both the student and teacher alike. As a result, lesson planning has been greatly enhanced and simplified for the teacher. The expert teacher who knows about additional resources, materials, and instructional techniques can incorporate them into the unit, as everything is provided in a digital format and is easily modified for both present and future use.

All early childhood units (grades K-2) are scripted for the teacher to allow for ease of implementation. Throughout the Elementary PLUS Teacher's Guide, the early childhood teacher is prompted to DO and SAY for implementation of the unit.

Significant portions of the units within Elementary PLUS have been field-tested and reviewed by classroom teachers within the metropolitan Washington, DC and Baltimore areas, with their feedback being used to make final revisions.

General Implementation Hints for Teachers for PLUS Units

What is the philosophical, theoretical, and classroom-proven foundation for the UbD designed PLUS units? How do I use this foundation for teaching and assessing student progress?

- This unit has been designed using concepts from *Understanding by Design* (Wiggins and McTighe, 1998) and particularly the backward mapping and WHERETO techniques advocated by the authors.
- This unit has been back-mapped from the National Science Education Standards (NRC, 1996), and the Benchmarks for Scientific Literacy, (AAAS, 1993).
- This unit has been designed using a **modified 5E** (Engage, Explore, Explain, Elaborate, and Evaluate) teaching, learning, and assessing cycle (Trowbridge, Bybee, and Powell, 2000). The 5E teaching, learning, and assessing cycle within this unit is not linear in design but is recursive. There will be many Explorations coupled with specific Explanations, with fewer Elaborations; therefore, not every E will necessarily be in every lesson. However, every lesson should contain an Engagement and an Evaluation, with other E's "sandwiched" between.
- A typical one-day lesson follows an "**Engage – Other E's – Evaluate**" format using the activities and assessment/evaluation tools within the unit. For closure to each day's lesson, assess (Evaluate) student achievement either through self assessment, peer assessment, or teacher assessment. It is not necessary that the classroom teacher formally assesses and scores each activity.
- Problem-based learning is used to Engage the student in this unit and is then revisited in the Unit Elaboration.
- Two types of Engagement activities are advocated within this unit – a unit Engagement (tells the student where the unit is headed and what is expected of them) and a Daily Lesson Engagement (relates each lesson to the Unit Engagement).

- The unit Engagement is developed using GRASPS (**G**oal, **R**ole, **A**udience, **S**etting, **P**roduct/**P**erformance, and **S**tandards for evaluating student work).
- Each unit contains many lessons (many Explorations and Explanations) and will vary in length, depending upon student progress and their understanding of science concepts and development of skills and processes.
- Begin each lesson within the unit with a Lesson Engagement which would include: review of the work of the previous lesson as it relates to the unit engagement, statement of the objective for the lesson (which includes the assessment of the lesson), pre-assessment of student understanding, and any pre-teaching and modeling which students might need to be successful on the lesson to follow. Some lessons will need more teacher-direction than others.
- Both formative and summative assessments are an integral part of this unit The focus is on collecting evidence, including artifacts and products (Carlson, Humphrey, and Reinhardt, 2003) of student understanding throughout the unit so that **assessment can be used to guide instruction.**
- Examine the performance vocabulary to identify the terms students will need to know in order to complete the tasks (e.g., describe, explain, illustrate, analyze, compare, predict, persuade). Teach students how to respond appropriately to these prompts.
- Teach students to determine the number of separate steps required to complete activities and how to keep track of each step as they work through the activity. Use the CUCC strategy as cues for reading and following directions:

Circle	Underline	Count	Check
		(1, 2, 3, etc.)	√

Circle the key direction words.

Underline the information that goes with direction word.

Count (1, 2, 3 etc.) by numbering each direction word in order to show the number of steps that need to be completed.

Check and complete each step that has been numbered.

A master copy of CUCC (pages 17-18) is included in this TG that may be copied for student use.

- Share with the students prior to, during, and after the activity any non-task specific assessment/evaluation tools (rubrics and checklists) to identify the characteristics of excellent responses. “Paint the target.”
- Use textbooks, audiovisuals, and other expository materials primarily during and after the Explanation phase of each activity. Almost without exception, use these materials only after the Exploration phase.

- Use the units to illustrate the characteristics of performance assessment tasks (e.g., call for thoughtful applications of knowledge in "authentic" contexts and use established criteria to evaluate student products and performances).
- Use these units as models for planning and developing new UbD units.
- Use lower grade-level (easier) units with students to familiarize them with the requirements of performance-based instruction and assessment. Using lower level units minimizes the content difficulty and allows students to focus on the process.
- Allow students to use the criteria to select examples ("anchors") of student responses that meet and do not meet the criteria.
- Teach students how to use the assessment/evaluation tools to evaluate and revise their own work. Have them work in groups to give each other feedback (peer response) based upon the identified criteria.
- Periodically, impose a reasonable time limit for the student to respond to task activities. This will give students some preparation for the time constraints of state-mandated summative testing/assessment.



Elementary PLUS

(Performance Learning and Understanding in Science)

Unit Overview

Title of Unit: You are My Sunshine

Recommended Grade Levels: Early Childhood – Grade 1

Time Frame: Ten - twelve 45-minute class periods

Brief Description of Unit:

You Are My Sunshine is an inquiry-based unit that introduces the students to our closest star, the sun. Students complete a variety of exploration activities to learn about the usefulness of the sun; as a source of light and heat. They also learn about how sunlight can be harmful. At the end of the unit, students design a poster (culminating performance task) that tells one way the sun is useful and one way the sun is harmful.

Enduring Understandings for Unit:

1. The sun affects the Earth in many significant and important ways –among them are light, heat, shadows, time, and direction.
2. Relative size is often used to compare bodies in the universe such as planets, stars, comets, our sun, moons, etc. Our sun is much larger than Earth.
3. The sun is a star we see during the daytime because it is Earth's closest star.
4. Many of the effects of the sun are beneficial, but some effects of the sun can be harmful.
5. Science is the quest for answers to questions about our natural and man-made world.

Essential Question(s):

1. Why is the sun important to life on earth?
2. Why is relative size an important comparison of bodies in the universe?
3. What is a star and why is our sun a star?

4. What are some of the harmful effects of the sun on life on planet Earth?
5. What is science?

Unit Question(s):

1. Is our sun really a star?
2. Why is the sun so important to life on Earth?
3. How does the size of Earth compare to the sun?
4. What is the shape of our sun?
5. How was the sun portrayed by other cultures?
6. How are shadows formed?
7. How do we measure heat and temperature?
8. What are the attitudes, beliefs, understandings, and habits of mind that are at the core of the scientific enterprise?

You are My Sunshine– National Standards Addressed in Unit

National Science Education Standards Grades K-4, (NRC, 1996)

Standard A. As a result of activities in grades K-4, all students should develop abilities necessary to do scientific inquiry and understandings about scientific inquiry.



Abilities necessary to do scientific inquiry

4AS11.1 Ask a question about objects, organisms, and events in the environment. This aspect of the standard emphasizes students asking questions that they can answer with scientific knowledge, combined with their own observations. Students should answer their questions by seeking information from reliable sources of scientific information and from their own observations and investigations.

4AS11.2 Plan and conduct an investigation. In the earliest years, investigations are largely based on systematic observations. As students develop, they may design and conduct simple experiments to answer questions. The idea of a fair test is possible for many students to consider by fourth grade.

4AS11.3 Employ simple equipment and tools to gather data and extend the senses. In early years, students develop simple skills, such as how to observe, measure, cut, connect, switch, turn on and off, pour, hold, tie, and hook. Beginning with simple instruments, students can use rulers to measure the length, height, and depth of objects and materials; thermometers to measure

temperature; watches to measure time; beam balances and spring scales to measure weight and force; magnifiers to observe objects and organisms; and microscopes to observe the finer details of plants, animals, rocks, and other materials. Children also develop skills in the use of computers and calculators for conducting investigations.

4AS11.4 Use data to construct a reasonable explanation. This aspect of the standard emphasizes the students' thinking as they use data to formulate explanations. Even at the earliest grade levels, students should learn what constitutes evidence and judge the merits or strength of the data and information that will be used to make explanations. After students propose an explanation, they will appeal to the knowledge and evidence they obtained to support their explanations. Students should check their explanations against scientific knowledge, experiences, and observations of others.

4AS11.5 Communicate investigations and explanations. Students should begin developing the abilities to communicate, critique, and analyze their work and the work of other students. This communication might be spoken or drawn as well as written.

Understandings about Scientific Inquiry

4AS12.1 Scientific investigations involve asking and answering a question and comparing the answer with what scientists already know about the world.

4AS12.3 Simple instruments such as magnifiers, thermometers, rulers, provide more information than scientists obtain using only their senses.

4AS12.4 Scientists develop explanations using observations (evidence) and what they already know about the world (scientific knowledge). Good explanations are based on evidence from investigations.

Standard B. As a result of activities in grades K-4, all students should develop an understanding of properties of objects and materials, position and motion of objects, and light, heat, electricity, and magnetism.

Properties of objects and materials

4BPS1.1 Objects have many observable properties, including size, weight, shape, color, temperature, and the ability to react with other substances. Those properties can be measured using tools, such as rulers, balances and thermometers.

Position and motion of objects

4BPS2.1 The position of an object can be described by locating it relative to another object or the background.

4BPS2.2 An object's motion can be described by tracing and measuring its position over time.

Light, heat, electricity, and magnetism

4BPS3.1 Light travels in a straight line until it strikes an object. Light can be reflected by a mirror, refracted by a lens, or absorbed by the object.

4BPS3.2 Heat can be produced in many ways, such as burning, rubbing, or mixing one substance with another. Heat can move from one object to another by conduction.

Objects in the sky

4DESS2.1 The sun, moon, stars, clouds, birds and airplanes all have properties, locations, and movements that can be observed and described.

4DESS2.2 The sun provides the light and heat necessary to maintain the temperature of the earth.

Changes in the earth and sky

4DESS3.3 Objects in the sky have patterns of movement. The sun, for example, appears to move across the sky in the same way every day, but its path changes slowly over the seasons. The moon moves across the sky on a daily basis much like the sun. The observable shape of the moon changes from day to day in a cycle that lasts about a month.

Standard E. As a result of activities in grades K-4, all students should develop abilities of technological design, understanding about science and technology, and abilities to distinguish between natural objects and objects made by humans.

Abilities of technological design

4EST1.1 Identify a simple problem. In problem identification, children should develop the ability to explain a problem in their own words and identify a specific task and solution related to the problem.

4EST1.2 Propose a solution. Students should make proposals to build something or get something to work better; they should be able to describe and communicate their ideas. Students should recognize that designing a solution might have constraints, such as cost, materials, time, space, or safety.

4EST1.3 Children should develop abilities to work individually and collaboratively and to use suitable tools, techniques, and quantitative measurements when appropriate. Students should demonstrate the ability to balance simple constraints in problem solving.

4EST1.4 Evaluate a product or design. Students should evaluate their own results or solutions to problems, as well as those of other children, by considering how well a product or design met the challenge to solve a problem. When possible, students should use measurements and include constraints and other criteria in their evaluations. They should modify designs based on the results of evaluations.

4EST1.5 Student abilities should include oral, written, and pictorial communication of the design process and product. The communication might be show and tell, group discussions, short written reports, or pictures, depending on the students' abilities and the design project.

Understanding about science and technology

4EST2.1 People have always had questions about their world. Science is one way of answering questions and explaining the natural world.

4EST2.2 People have always had problems and invented tools and techniques (ways of doing something) to solve problems. Trying to determine the effects of solutions helps people avoid some new problems.

4EST2.4 Women and men of all ages, backgrounds, and groups engage in a variety of scientific and technological work.

4EST2.5 Tools help scientists make better observations, measurements, and equipment for investigations. They help scientists see, measure, and do things that they could not otherwise see, measure and do.

Abilities to distinguish between natural objects and objects made by humans

4EST3.1 Some objects occur in nature; others have been designed and made by people to solve human problems and enhance the quality of life.

4EST3.2 Objects can be categorized into two groups, natural and designed.

Standard F. As a result of activities in grades K-4, all students should develop understanding of personal health, characteristics and changes in populations, types of resources, changes in environment, and science and technology in local challenges.

Personal health

FSPSP1.1 Safety and security are basic needs of humans. Safety involves freedom from danger, risk, or injury. Security involves feelings of confidence and lack of anxiety and fear. Student understandings include following safety rules for home and school, preventing abuse and neglect, avoiding injury, knowing whom to ask for help, and when and how to say no.

4FSPSP1.2 Individuals have some responsibility for their own health. Students should engage in personal care - dental hygiene, cleanliness, and exercise - that will maintain and improve health. Understandings include how communicable diseases, such as colds, are transmitted and some of the body's defense mechanisms that prevent or overcome illness.

Types of resources

4FSPSP3.1 Resources are things that we get from the living and nonliving environment to meet the needs and wants of a population.

4FSPSP3.2 Some resources are basic materials, such as air, water, and soil; some are produced from basic resources, such as food, fuel, and building materials; and some resources are nonmaterial, such as quiet places, beauty, security, and safety.

Changes in environments

NSMF4.1 Science influences society through its knowledge and world view. Scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others and the environment. The effect of science on society is neither entirely beneficial nor entirely detrimental.

4FSPSP4.2 Changes in environments can be natural or influenced by humans. Some changes are good, some are bad, and some are neither good nor bad. Pollution is a change in the environment that can influence the health, survival, or activities of organisms, including humans.

Science and technology in local challenges

4FSPSP5.1 People continue inventing new ways of doing things, solving problems, and getting work done. New ideas and inventions often affect other people; sometimes the effects are good and sometimes they are bad. It is helpful to try to determine in advance how ideas and inventions will affect other people.

Standard G. As a result of activities in grades K-4, all students should develop understanding of science as human endeavor.

Science as a human endeavor

4GHNS1.1 Science and technology have been practiced by people for a long time.

4GHNS1.2 Men and women have made a variety of contributions throughout the history of science and technology.

4GHNS1.3 Although men and women using scientific inquiry have learned much about the objects, events, and phenomena in nature, much more remains to be understood. Science will never be finished.

Benchmarks for Scientific Literacy (AAAs, 1993)

A. The Scientific Worldview

By the end of the 2nd grade, students should know that

- When a science investigation is done the way it was done before, we expect to get a very similar result.
- When a science investigation is done again in a different place, we expect to get a very similar result.

B. Scientific Inquiry

By the end of the 2nd grade, students should know that

- People can often learn about things around them by just observing those things carefully, but sometimes they can learn more by doing something to the things and noting what happens.
- Tools such as thermometers, magnifiers, rulers, or balances often give more information about things than can be obtained by just observing things unaided.
- Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.

C. The Scientific Enterprise

By the end of the 2nd grade, students should know that

- Everybody can do science and invent things and ideas.
- In doing science, it is often helpful to work with a team and to share findings with others.

3. The Nature of Technology

A. Technology and Science

By the end of the 2nd grade, students should know that

- Tools are used to do things better or more easily and to do some things that could not otherwise be done at all. In technology, tools are used to observe, measure, and make things.
- When trying to build something or to get something to work better, it usually helps to follow directions if there are any or to ask someone who has done it before for suggestions.

4. The Physical Setting

A. The Universe

By the end of the 2nd grade, students should know that

- There are more stars in the sky than anyone can easily count, but they are not scattered evenly, and they are not all the same in brightness or color.
- The sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day. The sun, moon, and stars all appear to move slowly across the sky.

E. Energy Transformations

By the end of the 2nd grade, students should know that

- The sun warms the land, air, and water.

11. Common Themes

A. Systems

By the end of the 2nd grade, students should know that

- Most things are made of parts.
- Something may not work if some of its parts are missing.
- When parts are put together, they can do things that they couldn't do by themselves.

B. Models

By the end of the 2nd grade, students should know that

- A model of something is different from the real thing but can be used to learn something about the real thing.
- One way to describe something is to say how it is and isn't like something else.

D. Scale

By the end of the 2nd grade, students should know that

- Things in nature and things people make have very different sizes, weights, ages, and speeds.

Teacher Resources for Implementing Unit

Websites for Teachers and Students

The websites listed below contain much background information on the concepts taught within the unit and are appropriate for both the teacher as well as the students. *However, these websites should always be reviewed by the classroom teacher prior to their use with students.*

<http://www.epa.gov/sunwise/> - The SunWise Program is an environmental and health education program that aims to teach the public how to protect themselves from overexposure to the sun through the use of classroom, school, and community-based components.

<http://info.cancerresearchuk.org/healthyliving/sunsmart/schools/usefullinks/> - SunSmart is the UK's national skin cancer prevention campaign. They provide evidence-based information about skin cancer and sun protection for both the public and professionals.

www.sunspot.noao.edu – This website is from the National Solar Observatory and provides excellent up-to-date photographs of the sun and other resources.

<http://www.stevespangler.com/archives/teaching-moments/kids-are-looking-at-the-sun/> - This website offers several teaching suggestions on UV light and the sun.

http://www.efn.org/~jack_v/teaching.html - This site offers many excellent links for teachers on teaching about the sun, including building a scale model solar system.

<http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html> - This is the link to StarChild, a learning center for young astronomers.

Literature Connections

Arrow to the Sun by Gerald McDermott

The Day the Sun Was Stolen by Jamie Oliviero

Following the Sun by Jenny Stow

Grandmother Spider Brings the Sun: A Cherokee Story by Geri Keams & James Bernadin

Maui and the Sun: A Maori Tale by Gavin Bishop

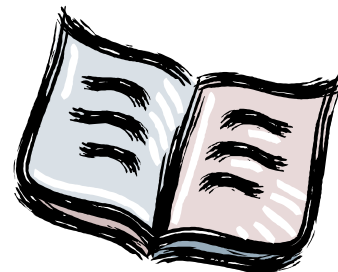
The Mouse Who Owned the Sun by Sally Derby

Rupa Raises the Sun by Marsha Wilson Chall

The Sun by Seymour Simon

Sun Up, Sun Down by Gail Gibbons

The Sun Girl and the Moon Boy by Yangsook Choi



Equipment/Materials/Resources Needed

Engagement

For each student:

8 1/2" x 11" sheet of black construction paper
1 sun (in Teacher's Guide)
scotch tape
scissors

Activity 1

For the teacher:

1 BB taped on an index card and labeled "Earth"
1 basketball labeled "Sun"
chart paper

For each student:

scissors

Activity 2

For the teacher:

lamp (with shade removed)
screen
lamp

For each pair of students:

1 paper plate
1 straw
1 ball of clay

For each student:

The Sun Is Always Shining Somewhere by Allan Fowler
glue
scissors

Activity 3

For the teacher:

2 thermometers (Celsius)
2 jars with lids (exactly the same)
2 tea bags
2 500 mL beakers, one labeled "sun" and one labeled "shade"
microwave oven

For each student:

The Sun by Brenda Parkes

Activity 4

For the teacher:

1 baseball hat
1 pair of sunglasses
1 bottle of sunscreen
1 white t-shirt
1 water bottle
1 clock

Activity 5

For each student:

1 11" x 18" sheet of construction paper
crayons
glue
scissors

How do I get students to follow and unlock written directions? Use the following CUCC strategy.

CUCC Strategy for Reading and Following Written Directions

Students often have difficulty in “Reading to Perform a Task.” The following mnemonic device could be used to assist them in their efforts to analyze fully all the components of a set of directions.

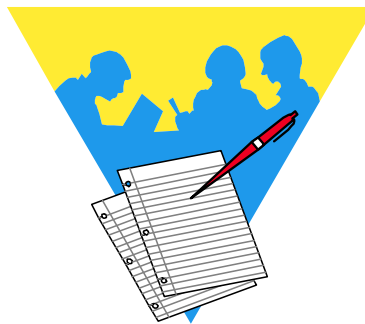
Circle
Underline
Count
Check

Circle the key direction words.

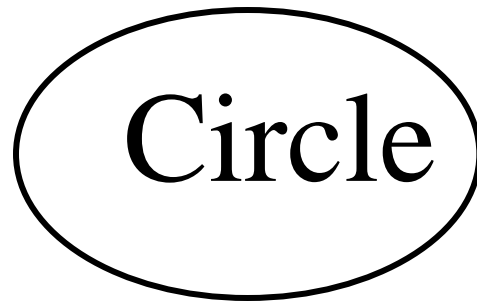
Underline the information that goes with the direction word.

Count (1, 2, 3 etc.) by numbering each direction word in order to show the number of steps that need to be completed.

Check ✓ and complete each step that has been numbered.



CUCC Strategy for Reading and Following Written Directions



Underline

Count (1, 2, 3, etc.)

Check ✓

References

Educators in the Connecticut's Pomperaug Regional School District 15 (1996). Performance-based learning and assessment. ASCD, Alexandria, VA.

International Society for Technology in Education – ISTE (1998, 2007). *National education technology standards for students*. ISTE. Washington, DC.

International Technology Education Association - (ITEA, 2007). *Standards for technological literacy*. Reston, VA.

Lantz, H (2004). *Rubrics for assessing student achievement in science grades K-12*. Thousand Oaks, CA. Corwin Press.

Marzano, Pickering, and McTighe (1993), *Assessing student outcomes: performance assessment using the dimensions of learning model*. ASCD, Alexandria, VA.

McTighe, J. (1999). *Developing performance tasks: tools and templates for designers*. Columbia, MD. Maryland Assessment Consortium.

National Council of Teachers of Mathematics (1989). *Principles and standards for school mathematics*. NCTM. Reston, VA

National Research Council (1996). *National science education standards*. Washington, DC: National Academy Press.

Project 2061, American Association for the Advancement of Science (1993). *Benchmarks for science literacy*. New York: Oxford University Press.

Reeves, D. (2003). *Making standards work: how to implement standards-based assessments in the classroom, school, and district*. Advanced Learning Press, Englewood, CO.

Schlecthty, Phillip (2001). *Shaking up the school house*. San Francisco, CA. Jossey-Bass – A Wiley Company.

Treagust, D., Jacobowitz, R., Gallagher, J., and Parker, J. (2003). *Embed assessment in your teaching*. Arlington, VA. National Science Teachers Association.

Trowbridge, L.W.; Bybee, R.W. and Powell, J.C. 2000. *Teaching Secondary School Science*, Chapter 15, "Models for Effective Science Teaching," Merrill/Prentice Hall, Upper Saddle River, NJ.

Wiggins, G. and McTighe, J. (1998). *Understanding by design*. Alexandria, VA: Association for Supervision and Curriculum Development.