Utah State Office of Education

2010 K-2 Science Core Curriculum Booklet can be found and downloaded at:

http://www.schools.utah.gov/CURR/science/Core-Standards/K2ScienceCore.aspx

For more information about the K-2 State Science Core:

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A Need for Better Science

•The National Academies, the country's leading advisory group on science and technology, warned in 2005 that unless the United States improved the quality of math and science education, at all levels, it would continue to lose economic ground to foreign competitors.

•According to a follow-up report published last month, the academies found that the United States ranks 27th out of 29 wealthy countries in the proportion of college students with degrees in science or engineering.

•More than half the patents awarded here last year were given to companies from outside the United States. In American graduate schools, nearly half of students studying the sciences are foreigners; while these students might once have spent their careers here, many are now opting to return home.

•The academies call on federal and state governments to improve early childhood education, strengthen the public school math and science curriculum, and improve teacher training in these crucial subjects. It calls on government and colleges to provide more financial and campus support to students who excel at science.

•Too often, science curriculums are grinding and unimaginative, which may help explain why more than half of all college science majors quit the discipline before they earn their degrees. The science establishment has long viewed a high abandonment rate as part of a natural winnowing.

FOUNDATIONAL KNOWLEDGE & CONCEPTUAL CHANGE (READY, SET, SCIENCE)

- ***Young children begin school with…***
  - ***rich knowledge of the natural world.***
  - ***the ability to reason.***
  - ***an understanding of the principles of cause and effect.***
  - ***foundations for modeling.***
  - ***the ability to consider ideas and beliefs***
  - ***an eagerness to participate in learning.***

Instructional Framework

- The core is organized to assist teachers in understanding and teaching scientific concepts through process skills, utilizing big ideas, and making application to technology and society.

K-2 Instructional Framework

The K-2 Science Cores each consist of four standards which are all the same.

The K-2 Instructional Framework

Earth and Space Science
Earth Materials
Celestial Movement
Weather
(Standard 2)

Physical Science
Forces and Motion
Properties of Materials
(Standard 3)

Life Science
Changes in Organisms Over Time
Nature of Living Things
(Standard 4)

….taught through….

Processes of generating and communicating scientific evidence framed by Big Ideas
(Standard 1)

K-2 2010 Science Core

Standard 2: Earth and Space Science

Objective 1: Earth materials

Objective 2: Celestial Movement

Objective 3: Weather

Standard 3: Physical Science

Objective 1: Forces and Motion

Objective 2: Properties of Materials

Standard 4: Life Science

Objective 1: Changes in Organisms over Time

Objective 2: Nature of Living Things

(Standard 1: Intended Learning Outcomes)

(Process skills designed to be integrated while teaching the three content standards.)

Standards, Objectives, Indicators and Intended Learning Outcomes

- Standard: A broad statement of what students are expected to understand.
- Objective: A more focused description of what students need to know and be able to do at the completion of instructions.
- Indicator: A measurable or observable student action that enables one to judge whether a student has mastered a particular objective.
- Intended Learning Outcome: Describes a goal students should learn as a result of science instruction.

Standard 1
Intended Learning Outcomes

Students will be able to apply scientific processes, communicate scientific ideas effectively, and understand the nature of science.

It contains three objectives:

- Objective 1: Generating Evidence

  Using the processes of scientific investigation

  - 5 indicators
    1. Framing questions
    2. Designing investigations
    3. Conducting investigations
    4. Collecting data
    5. Drawing conclusions

(Standard 1 is not a stand-alone piece of learning, but is designed to be integrated while teaching the three content standards.)

Standard 1
Intended Learning Outcomes

- Objective 2: Communicating Science

  Communicating effectively using science language reasoning

  - 4 indicators
    1. Developing social interactions skills with peers
    2. Sharing ideas with peers
    3. Connecting ideas with evidence
    4. Using multiple methods of communicating evidence

- Objective 3: Knowing in Science

  Knowing in science

  - 4 indicators
    1. Ideas are supported by reasons
    2. There are limits to ideas in science
    3. Differences in conclusions are best settled through additional observations and investigations
    4. Communication of ideas in science is important for helping to check the reasons for ideas

Standard 1 is not a stand-alone piece of learning, but is designed to be integrated while teaching the three content standards.

Standards 2, 3 and 4

These standards reflect the disciplines of science. These standards are consistent across all three grades. However, the objectives are not specifically written the same for each grade allowing for progression of learning from grade to grade in the same standard and objective. As a grade teaches a specific objective, the next grade can continue on with the same theme with a higher level of expectation.

Standard 2
Earth and Space Science

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

- Objective 1 (Earth Materials)
  - K--Investigate non-living things (3 indicators)
  - 1st--Investigate the natural world-rocks, soil, water (3 indicators)
  - 2nd--Describe the characteristics of different rocks (3 indicators)
- Objective 2 (Celestial Movement)
  - K--Observe and describe changes in day and night (3 indicators)
  - 1st--Observe and describe the changes and appearance of the sun and moon during daylight (2 indicators)
  - 2nd--Observe and record recognizable objects and patterns in the night sky (2 indicators)
- Objective 3 (Weather)
  - K--Compare changes in weather over time (3 indicators)
  - 1st--Compare and contrast seasonal weather changes (3 indicators)
  - 2nd--Observe, describe, and measure seasonal weather patterns and local variations (2 indicators)

Standard 3
Physical Science

Students will gain an understanding of Physical Science through the study of the forces of motion and the properties of materials.

- Objective 1 (Forces and Motion)
  - K--Identify how non-living things move (2 indicators)
  - 1st--Analyze changes in the movement of non-living things (3 indicators)
  - 2nd--Communicate observations about falling objects (2 indicators)
- Objective 2 (Properties of Materials)
  - K--Describe parts of non-living things (2 indicators)
  - 1st--Analyze objects and record their properties (3 indicators)
  - 2nd--Compare and contrast the differences in how different materials respond to change (2 indicators)

Standard 4
Life Science

Students will gain an understanding of Life Science through the study of changes in organisms over time and the nature of living things.

- Objective 1 (Changes in Organisms Over Time)
  - K--Investigate living things (3 indicators)
  - 1st--Communicate observations about the similarities and differences between offspring and between populations (2 indicators)
  - 2nd--Tell how external features affect an animals' ability to survive in its environment (3 indicators)
- Objective 2 (Nature of Living Things)
  - K--Describe the parts of living things (3 indicators)
  - 1st--Living things change and depend upon their environment to satisfy their basic needs (3 indicators)
  - 2nd--Identify basic needs of living things (plants and animals) and their abilities to meet their needs. (3 indicators)

The Objective Instruction Pages

- You may have noticed that you skipped a few pages when going to each standard. These pages are the **Objective Instruction Pages.**
- There is one Objective Instruction Page for each objective of every standard for each grade, therefore having seven Objective Instruction Pages in all: **Standard Two** having 3 objectives to teach; **Standard Three** having 2 objectives teach; **Standard Four** having 2 objectives to teach.
- These seven Objective Instruction Pages give you ideas on how to teach each objective by:
  - Showing the Big Ideas to be taught.
  - Showing how to integrate specific Intended Learning Outcomes.
  - Showing how technology and tools can be used.
  - Showing suggested strategies that can be used to teach the concepts.
  - Science words students should know about the objective.
  - Showing how the concepts learned can be applied and implemented to the real world.
- These Objective Instruction Pages are specific to your particular grade's core curriculum.

Standard 2
Earth and Space Science

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

- Objective 1 (Earth Materials)
  - K--Investigate non-living things (3 indicators)
  - 1st--Investigate the natural world-rocks, soil, water (3 indicators)
  - 2nd--Describe the characteristics of different rocks (3 indicators)
- Objective 2 (Celestial Movement)
  - K--Observe and describe changes in day and night (3 indicators)
  - 1st--Observe and describe the changes and appearance of the sun and moon during daylight (2 indicators)
  - 2nd--Observe and record recognizable objects and patterns in the night sky (2 indicators)
- Objective 3 (Weather)
  - K--Compare changes in weather over time (3 indicators)
  - 1st--Compare and contrast seasonal weather changes (3 indicators)
  - 2nd--Observe, describe, and measure seasonal weather patterns and local variations (2 indicators)

The Objective Instruction Pages

Standard 2--Earth and Space Science

Kindergarten

- Standard 2 Objective Instruction Pages (11-13)
  - Objective 1: Investigate non-living things--page 11
  - Objective 2: Observe and describe changes in day and night--page 12
  - Objective 3: Compare the changes in weather over time--page 13

1st Grade

- Standard 2 Objective Instruction Pages (14-16)
  - Objective 1: Investigate the natural world including rocks, soil, and water--page 14
  - Objective 2: Observe and describe changes in the appearance of the sun and moon during the daylight--page 15
  - Objective 3: Compare and contrast the seasonal weather changes--page 16

2nd Grade

- Standard 2 Objective Instruction Pages (17-19)
  - Objective 1: Describe the characteristics of different rocks--page 17
  - Objective 2: Observe and record the recognizable objects and patterns in the night sky--page 18
  - Objective 3: Observe, describe and measure seasonal weather patterns and local variations--page 19

Standard 3
Physical Science

Students will gain an understanding of Physical Science through the study of the forces of motion and the properties of materials.

- Objective 1 (Forces and Motion)

  K--Identify how non-living things move (2 indicators)

  1st--Analyze changes in the movement of non-living things (3 indicators)

  2nd--Communicate observations about falling objects (2 indicators)

- Objective 2 (Properties of Materials)

  K--Describe parts of non-living things (2 indicators)

  1st--Analyze objects and record their properties (3 indicators)

  2nd--Compare and contrast the differences in how different materials respond to change (2 indicators)

The Objective Instruction Pages

Standard 3--Physical Science

Kindergarten

- Standard 3 Objective Instruction Pages (22-23)
  - Objective 1: Identify how non-living things move--page 22
  - Objective 2: Describe parts of non-living things--page 23

1st Grade

- Standard 3 Objective Instruction Pages (24-25)
  - Objective 1: Analyze changes in the movement of non-living things--page 24
  - Objective 2: Analyze objects and record their properties--page 25

2nd Grade

- Standard 3 Objective Instruction Pages (26-27)
  - Objective 1: Communicate observations about falling objects--page 26
  - Objective 2: Compare and contract how different materials respond to change--page 27

Standard 4
Life Science

Students will gain an understanding of Life Science through the study of changes in organisms over time and the nature of living things.

- Objective 1 (Changes in Organisms Over Time)
  - K--Investigate living things (3 indicators)
  - 1st--Communicate observations about the similarities and differences between offspring and between populations (2 indicators)
  - 2nd--Tell how external features affect an animals' ability to survive in its environment (3 indicators)
- Objective 2 (Nature of Living Things)
  - K--Describe the parts of living things (3 indicators)
  - 1st--Living things change and depend upon their environment to satisfy their basic needs (3 indicators)
  - 2nd--Identify basic needs of living things (plants and animals) and their abilities to meet their needs. (3 indicators)

The Objective Instruction Pages

Standard 4--Life Science

Kindergarten

- Standard 4 Objective Instruction Pages (30-31)
  - Objective 1: Investigate living things--page 30
  - Objective 2: Describe the parts of living things--page 31

1st Grade

- Standard 4 Objective Instruction Pages (32-33)
  - Objective 1: Communicate observations about the similarities and differences between offspring and between populations--page 32
  - Objective 2: Observe how living things change and depend upon their environment to satisfy their basic needs--page 33

2nd Grade

- Standard 4 Objective Instruction Pages (34-35)
  - Objective 1: Describe how external features affect an animal's ability to survive in its environment--page 34
  - Objective 2: Identify basic needs of living things (plants and animals) and their abilities to meet their needs--page 35

The Objective Instruction Pages

Here is an overall look of where the Objective Instruction Pages are found in your booklet of each standard for your grade:

- Kindergarten
  - Standard 2--Objectives 1, 2, and 3--pages 11, 12, 13
  - Standard 3--Objectives 1 and 2--pages 22, 23
  - Standard 4--Objectives 1 and 1--pages 30, 31
- 1st Grade
  - Standard 2--Objectives 1, 2, and 3--pages 14, 15, 16
  - Standard 3--Objectives 1 and 2--pages 24, 25
  - Standard 4--Objectives 1 and 2--pages 32, 33
- 2nd Grade
  - Standard 2--Objectives 1, 2, and 3--pages 17, 18, 19
  - Standard 3--Objectives 1 and 2--pages 26, 27
  - Standard 4--Objectives 1 and 2--pages 34, 35

The Objective Instruction Pages

- Look at Standard 2, Objective 1 for your grade. (Page 11, 14, or 17)
  - Subject, Grade, Standard and Objective are listed at the top of each Objective Instruction Sheet (first highlighted bar)
- There are particular **content and process skills** that need to be taught for each objective. (second and third highlighted bars)

  (The letters by each idea identifies and tracks the contents or process skills within the objective.)
  - Content Big Ideas
  - Intended Learning Outcomes Big Ideas
  - Science, Technology, and Society Big Ideas
  - Indicators (of the objective--same as found on page 9)
  - Science language students should be able to use correctly (different for each objective)

The Objective Instruction Pages

- Guidance for Combining Content and Process (fourth highlighted bar)
  - Suggested Strategies
    - Ideas to combine content with processes with connections to other subjects.
- Guidance for Combining Science, Technology, and Society (fourth highlighted bar)
  - Ideas to incorporate these things into your lessons for application.
    - By each one are letters to identify which application you are using.

Lesson Plans

- Lesson plans for most objectives were developed in the 2010 Summer Core Academy for the K-2 New Science Core.
- Other lesson plans have been extracted from the Summer Core Academy books from 2003 through 2009 that fit (some loosely) with the new K-2 New Science Core.
- The USOE plans on developing more lesson plans through future Summer Core Academies.

Lesson Plans

- Today, you will be given the 2010 Summer Core Academy lesson plans and the extracted lesson plans that fit the core for all the standards and most the objectives.
- Physical science (standard 3) is an area that has not been part of the past K-2 core. It is the one that has the least lesson plans.
- When more lesson plans are written, one lesson plan copy for each lesson plan will be sent to each grade in each school. The school will need to make copies for all the teachers.
- If more lesson plans are written by USOE and put on line, I will send a message to your principal to give you the information that they are available.
- If you find other lesson plans, please email me the websites or books they can be found in and I will share them with all the respective K-2 teachers in the district.

Missing Lesson Plans

Kindergarten:

- Standard 2, Objective 1

- First Grade
  - Standard 4, Objective 1

- Second Grade
  - Standard 3, Objective 2

Page Numbering

- The code at the bottom of each page tells three things:
  1. The grade
  2. The standard and objective

     2-3 means second standard, third objective.
  3. The page number

     2.4 means second activity, page 4

Science Specialist Help

Paul Nance can do the following with a scheduled appointment:

- Meet with you individually or as a team to discuss the new science core implementation.
- Understanding science concepts.
- Strategy ideas for teaching science.
- Do model teaching of the activities.
  - One class at a time.
  - Back to back teaching.
- Help in your classrooms (during science)
- Meet in your PLCs.