

IT'S ABOUT TIME, HERFF-JONES EDUCATION DIVISION
INVESTIGATING EARTH SYSTEMS CORRELATION WITH
OKLAHOMA'S PRIORITY ACADEMIC STUDENT SKILLS (PASS)

Because of the nature of our guided-inquiry instructional design, in most cases students conduct investigations prior to reading the content. In some instances students learn about concepts while doing the activities and are formally introduced to the concepts afterwards while reading the content. The instructional approach used does *not* match the traditional one of reading and telling first (concept introduction), then completing worksheets and lab activities (concept practice). Our approach uses student-centered investigations to introduce the concept, with reading, group work, formal teacher/student presentations, and additional investigations as practice components.

SCIENCE
Grade 6-8
Standards for Inquiry and Earth/Space Science

The *Priority Academic Student Skills (PASS)* should be taught by investigating content, concepts, and principles of major themes in Physical, Life, and Earth/Space Sciences.

SCIENCE PROCESSES AND INQUIRY

Process Standard 1: Observe and Measure - Observing is the first action taken by the learner to acquire new information about an object or event. Opportunities for observation are developed through the use of a variety of scientific tools. Measurement allows observations to be quantified. The student will accomplish these objectives to meet this process standard.

Correlation Location:

RL: 15-28, 34-44, 45-51

DP: 8-21, 22-29

A: 15-25; **S:**1-5, 26-34

MM: 9-22; **W:** 21-31

RL: 15-28, 34-44, 45-51

DP: 8-21, 22-29

A: 15-25; **S:**1-5, 26-34

MM: 9-22; **W:** 21-31

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MM: 9-22; **W:** 21-31

1. Identify qualitative and quantitative changes given conditions (e.g., temperature, mass, volume, time, position, length) before, during, and after an event.

2. Use appropriate tools (e.g., metric ruler, graduated cylinder, thermometer, balances, spring scales, stopwatches) when measuring objects and/or events.

3. Use appropriate System International (SI) units (i.e., grams, meters, liters, degrees Celsius, and seconds); and SI prefixes (i.e., micro-, milli-, centi-, and kilo-) when measuring objects and/or events.

Process Standard 2: Classify - Classifying establishes order. Objects and events are classified based on similarities, differences, and interrelationships. The student will accomplish these objectives to meet this process standard.

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IT'S ABOUT TIME, HERFF-JONES EDUCATION DIVISION
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RL: 1-6, 7-14, 15-28, 29-33;

F: 8-18

S: 1-5, 6-11, 17-25, 26-34,
35-41,

MM: 1-8, 9-22, 23-32, 33-
46, 56-65

1. Using observable properties, place an object or event into a classification system.

RL: 1-6, 7-14, 15-28, 29-33;

F: 8-18

S: 1-5, 6-11, 17-25, 26-34,
35-41,

MM: 1-8, 9-22, 23-32, 33-
46, 56-65

2. Identify the properties by which a classification system is based.

Process Standard 3: Experiment - Experimenting is a method of discovering information. It requires making observations and measurements to test ideas. The student will accomplish these objectives to meet this process standard.

Correlation Location:

RL: 6,7-14, 15-28, 34-44,
45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

1. Ask questions about the world and design investigations that lead to scientific inquiry.

RL: 6,7-14, 15-28, 34-44,
45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

2. Evaluate the design of a scientific investigation.

RL: 6,7-14, 15-28, 34-44,
45-51, 52-57

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F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

3. Identify variables and/or controls in an experimental setup (i.e., tested, experimental, and measured variables).

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45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

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4. Identify a testable hypothesis for an experiment.

IT'S ABOUT TIME, HERFF-JONES EDUCATION DIVISION
INVESTIGATING EARTH SYSTEMS CORRELATION WITH
OKLAHOMA'S PRIORITY ACADEMIC STUDENT SKILLS (PASS)

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

RL: 6,7-14, 15-28, 34-44,
45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

RL: 15-28, 29-33; **DP:** 8-
21, 22-29; **A:** 15-25;

S: 1-5, 12-16, 26-34; **O:** 1-8;

MM: 9-12; **W:** 21-31; **ER:**
1-9

5. Design and conduct experiments.

6. Recognize potential hazards and practice safety procedures in all science activities.

Process Standard 4: Interpret and Communicate - Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.

Correlation Location:

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45-51, 52-57

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F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

RL: 7-14, 15-28,

DP: 8-21, 22-29,30-40,

A: 1-4, 15-25, 26-32, 33-45

S: 1-5, 6-11, 26-34

O: 29-38; **MM:** 9-22

W: 21-31; **ER:** 10-20

RL: 6,7-14, 15-28, 34-44,
45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

1. Report data in an appropriate method when given an experimental procedure or data.

2. Interpret data tables, line, bar, trend, and/or circle graphs.

3. Evaluate data to develop reasonable explanation, and/or predictions.

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W: 21-31; **ER:** 1-9;

CW: 1-7

4. Accept or reject hypotheses when given results of an investigation.

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45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

5. Communicate scientific procedures and explanations.

Process Standard 5: Inquiry - Inquiry can be defined as the skills necessary to carry out the process of scientific or systemic thinking. In order for inquiry to occur, students must have the opportunity to ask a question, formulate a procedure, and observe phenomena. The student will accomplish these objectives to meet this process standard.

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45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

1. Use systematic observations, make accurate measurements, and identify and control variables.

RL: 6,7-14, 15-28, 34-44,
45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

2. Use technology to gather data and analyze results of investigations.

RL: 6,7-14, 15-28, 34-44,
45-51, 52-57

DP: 1-7, 8-21, 22-29, 30-40

F: 1-7; **A:** 1-4, 15-25

S: 1-5, 6-11, 12-16, 26-34

O: 1-8; **MM:** 9-22;

W: 21-31; **ER:** 1-9;

CW: 1-7

3. Review data, summarize data, and form logical conclusions.

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W: 21-31; **ER:** 1-9;

CW: 1-7

4. Formulate and evaluate explanations proposed by examining and comparing evidence, pointing out statements that go beyond evidence, and suggesting alternative explanations.

Earth/Space Science
Grade 6

Standard 5: Structures of the Earth and the Solar System - The earth is mostly rock, three-fourths of its surface is covered by a relatively thin layer of water, and the entire planet is surrounded by a relatively thin blanket of air, and is able to support life. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:

Correlation Location:

A: viii-ix; **CW:** viii-ix

DP: viii-ix; **ER:** viii-ix

F: viii-ix; **MM:** viii-ix

O: viii-ix; **RL:** viii-ix

S: viii-ix; **W:** viii-ix

1. Earth has four main systems that interact: the atmosphere, the hydrosphere, the biosphere, and the geosphere.

CW: 54-58; **W:** 21-31

2. Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the water cycle.

A: 33-38; **ER:** 49-60;

O: 24-27

3. The sun provides the light and heat necessary to maintain life on Earth and is the ultimate source of energy (i.e., producers receive their energy from the sun).

IT'S ABOUT TIME, HERFF-JONES EDUCATION DIVISION
INVESTIGATING EARTH SYSTEMS CORRELATION WITH
OKLAHOMA'S PRIORITY ACADEMIC STUDENT SKILLS (PASS)

Grade 7

Standard 5: Structures of the Earth System - The earth is mostly rock, three-fourths of its surface is covered by a relatively thin layer of water, and the entire planet is surrounded by a relatively thin blanket of air, and is able to support life. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:

Correlation Location:

CW: 4-13, 69-78, 79-86

O: 19-28

1. Global patterns of atmospheric movement influence local weather such as oceans' effect on climate.

2. Clouds, formed by the condensation of water vapor, affect local weather and climate.

CW: 1-13, 48-59

Standard 6: Earth and the Solar System - The earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as, asteroids and comets. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:

Correlation Location:

A: 9, 12-13, 19, 22-24, 39-40

1. Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.

2. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of the day.

A: 26-32, 39-40

Grade 8

Standard 4: Structures and Forces of the Earth and Solar System - The earth is mostly rock, three-fourths of its surface is covered by a relatively thin layer of water, and the entire planet is surrounded by a relatively thin blanket of air, and is able to support life. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:

Correlation Location:

DP: 8-21, 22-29, 30-40, 41-50, 51-60, 61-69

O: 39-46; RL: 15-27

S: 35-41

1. Landforms result from constructive forces such as crustal deformation, volcanic eruption, and deposition of sediment and destructive forces such as weathering and erosion.

IT'S ABOUT TIME, HERFF-JONES EDUCATION DIVISION
INVESTIGATING EARTH SYSTEMS CORRELATION WITH
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ER: 40-48; **F:** 8-18
RL: 1-6, 7-14

2. The formation, weathering, sedimentation, and reformation of rock constitute a continuing "rock cycle" in which the total amount of material stays the same as its form changes.

A: 22-24; **S:** 10

3. Gravity is the force that governs the motion of the solar system and holds us to the earth's surface.

Standard 5: Earth's History - The Earth's history involves periodic changes in the structures of the earth over time. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:

Correlation Location:

CW: 69-78; **DP:** 41-50
F: 57-61

1. Earth's history has been punctuated by occasional catastrophic events, such as the impact of asteroids or comets, enormous volcanic eruptions, periods of continental glaciation, and the rise and fall of sea level.

CW: 69-78;
F: 1-7, 8-18, 35-39, 46-47

2. Fossils provide important evidence of how life and environmental conditions have changed.