

Grade 4

Science Standards Correlations

For the

SRP Power In-Service Workshops and Tour

Please note: Science standards correlations are based upon the Arizona Department of Education's Science Standard Crosswalk

www.ade.state.az.us/standards/science/articulated.asp

Strand 1: Inquiry Process

Concept 1: Observations, Questions, and Hypotheses

Observe, ask questions, and make predictions.

PO 2. Formulate a relevant question through observations that can be tested by an investigation. (See M04-S2C1-01)

PO 3. Formulate predictions in the realm of science based on observed cause and effect relationships.

PO 4. Locate information (e.g., book, article, website) related to an investigation. (See W04-S3C6-01 and R04-S3C1-05)

Concept 2: Scientific Testing (Investigating and Modeling)

Participate in planning and conducting investigations, and recording data.

PO 2. Plan a simple investigation that identifies the variables to be controlled.

PO 3. Conduct controlled investigations (e.g., related to erosion, plant life cycles, weather, magnetism) in life, physical, and Earth and space sciences.

PO 4. Measure using appropriate tools (e.g., ruler, scale, balance) and units of measure (i.e., metric, U.S. customary). (See M04-S4C4-03 and M04-S4C4-07)

PO 5. Record data in an organized and appropriate format (e.g., t-chart, table, list, written log). (See W04-S3C2-01 and W04-S3C3-01)

Concept 3

PO 2. Formulate conclusions based upon identified trends in data. (See M04-S2C1-03)

PO 3. Determine that data collected is consistent with the formulated question.

PO 4. Determine whether the data supports the prediction for an investigation.

PO 5. Develop new questions and predictions based upon the data collected in the investigation.

Concept 4: Communication

Communicate results of investigations.

PO 1. Communicate verbally or in writing the results of an inquiry. (See W04-S3C3-01)

PO 3. Communicate with other groups or individuals to compare the results of a common investigation.

Strand 2: History and Nature of Science

Concept 1: History of Science as a Human Endeavor

Identify individual and cultural contributions to scientific knowledge.

PO 1. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations

PO 2. Describe science-related career opportunities.

Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

PO 1. Explain the role of experimentation in scientific inquiry.

PO 2. Describe the interaction of components in a system (e.g., flashlight, radio).

PO 3. Explain various ways scientists generate ideas (e.g., observation, experiment, collaboration, theoretical and mathematical models).

Strand 3: Science in Personal and Social Perspectives

Concept 1: Changes in Environments

Describe the interactions between human populations, natural hazards, and the environment.

- PO 1. Describe how natural events and human activities have positive and negative impacts on environments (e.g., fire, floods, pollution, dams).
- PO 2. Evaluate the consequences of environmental occurrences that happen either rapidly (e.g., fire, flood, tornado) or over a long period of time (e.g., drought, melting ice caps, the greenhouse effect, erosion).

Concept 2: Science and Technology in Society

Understand the impact of technology.

- PO 1. Describe how science and technology (e.g., computers, air conditioning, medicine) have improved the lives of many people.
- PO 2. Describe benefits (e.g., easy communications, rapid transportation) and risks (e.g., pollution, destruction of natural resources) related to the use of technology.
- PO 3. Design and construct a technological solution to a common problem or need using common materials.

Strand 4: Life Science

Concept 3: Organisms and Environments

Understand the relationships among various organisms and their environment.

- PO 1. Describe ways various resources (e.g., air, water, plants, animals, soil) are utilized to meet the needs of a population.
- PO 2. Differentiate renewable resources from nonrenewable resources.
- PO 3. Analyze the effect that limited resources (e.g., natural gas, minerals) may have on an environment.

Strand 5: Physical Science

Concept 3: Energy and Magnetism

Investigate different forms of energy.

- PO 1. Demonstrate that electricity flowing in circuits can produce light, heat, sound, and magnetic effects.
- PO 2. Construct series and parallel electric circuits.
- PO 3. Explain the purpose of conductors and insulators in various practical applications.
- PO 4. Investigate the characteristics of magnets (e.g., opposite poles attract, like poles repel, the force between two magnet poles depends on the distance between them).
- PO 5. State cause and effect relationships between magnets and circuitry.

Grade 5

Science and Social Studies Standards Correlations

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Strand 1: Inquiry Process**Concept 1: Observations, Questions, and Hypotheses**

Formulate predictions, questions, or hypotheses based on observations. Locate appropriate resources.

- PO 1. Formulate a relevant question through observations that can be tested by an investigation. (See M05-S2C1-01)
 PO 2. Formulate predictions in the realm of science based on observed cause and effect relationships.
 PO 3. Locate information (e.g., book, article, website) related to an investigation. (See W05-S3C6-01 and R05-S3C1-05)

Concept 2: Scientific Testing (Investigating and Modeling)

Design and conduct controlled investigations.

- PO 2. Plan a simple investigation that identifies the variables to be controlled.
 PO 3. Conduct simple investigations (e.g., related to forces and motion, Earth processes) based on student-developed questions in life, physical, and Earth and space sciences.
 PO 4. Measure using appropriate tools (e.g., ruler, scale, balance) and units of measure (i.e., metric, U.S. customary). (See M05-S4C4-01)
 PO 5. Record data in an organized and appropriate format (e.g., t-chart, table, list, written log) .(See W05-S3C2-01 and W05-S3C3-01)

Concept 3: Analysis and Conclusions

Analyze and interpret data to explain correlations and results; formulate new questions.

- PO 1. Analyze data obtained in a scientific investigation to identify trends and form conclusions. (See M05-S2C1-03)
 PO 2. Analyze whether the data is consistent with the proposed explanation that motivated the investigation.
 PO 3. Evaluate the reasonableness of the outcome of an investigation.
 PO 4. Develop new investigations and predictions based on questions that arise from the findings of an investigation.
 PO 5. Identify possible relationships between variables in simple investigations (e.g., time and distance; incline and mass of object).

Concept 4: Communication

Communicate results of investigations.

- PO 1. Communicate verbally or in writing the results of an inquiry. (See W05-S3C3-01)
 PO 3. Communicate with other groups or individuals to compare the results of a common investigation.

Strand 2: History and Nature of Science**Concept 2: Nature of Scientific Knowledge**

Understand how science is a process for generating knowledge.

- PO 1. Provide examples that support the premise that science is an ongoing process that changes in response to new information and discoveries (e.g., space exploration, medical advances).

Strand 3: Science in Personal and Social Perspectives**Concept 1: Changes in Environments**

Describe the interactions between human populations, natural hazards, and the environment.

- PO 1. Explain the impacts of natural hazards on habitats (e.g., global warming, floods, asteroid or large meteor impacts).

Concept 2: Science and Technology in Society

Develop viable solutions to a need or problem.

PO 1. Describe the relationship between science and technology.

PO 2. Explain how scientific knowledge, skills, and technological capabilities are integral to a variety of careers.

Strand 5: Physical Science**Concept 1: Properties and Changes of Properties in Matter**

Understand physical and chemical properties of matter.

PO 1. Identify that matter is made of smaller units called:

- molecules (e.g., H₂O, CO₂)
- atoms (e.g., H, N, Na)

Grade 6

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Strand 1: Inquiry Process**Concept 1: Observations, Questions, and Hypotheses**

Formulate predictions, questions, or hypotheses based on observations. Locate appropriate resources.

PO 1. Differentiate among a question, hypothesis, and prediction.

PO 2. Formulate questions based on observations that lead to the development of a hypothesis. (See M06-S2C1-01)

PO 3. Locate research information, not limited to a single source, for use in the design of a controlled investigation. (See W06-S3C6-01, R06-S3C1-06, and R06-S3C2-03).

Concept 2: Scientific Testing (Investigating and Modeling)

Design and conduct controlled investigations.

PO 2. Design an investigation to test individual variables using scientific processes.

PO 3. Conduct a controlled investigation using scientific processes.

PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers). (See M06-S4C4-02)

PO 5. Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs. (See W06-S3C2-01 and W06-S3C3-01)

Concept 3: Analysis and Conclusions

Analyze and interpret data to explain correlations and results; formulate new questions.

PO 1. Analyze data obtained in a scientific investigation to identify trends. (See M06-S2C1-03)

PO 6. Formulate new questions based on the results of a completed investigation.

Concept 4: Communication

Communicate results of investigations.

PO 2. Display data collected from a controlled investigation. (See M06-S2C1-02)

PO 3. Communicate the results of an investigation with appropriate use of qualitative and quantitative information. (See W06-S3C2-01)

PO 5. Communicate the results and conclusion of the investigation. (See W06-S3C6-02)

Strand 2: History and Nature of Science**Concept 1: History of Science as a Human Endeavor**

Identify individual, cultural, and technological contributions to scientific knowledge.

PO 2. Describe how a major milestone in science or technology has revolutionized the thinking of the time.

PO 3. Analyze the impact of a major scientific development occurring within the past decade.

PO 4. Describe the use of technology in science-related careers.

Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

PO 1. Describe how science is an ongoing process that changes in response to new information and discoveries.

PO 2. Describe how scientific knowledge is subject to change as new information and/or technology challenges prevailing theories.

PO 3. Apply the following scientific processes to other problem solving or decision making situations:

- observing
- questioning
- communicating
- comparing
- measuring
- classifying
- predicting
- organizing data
- inferring
- generating hypotheses
- identifying variables

Strand 3: Science in Personal and Social Perspectives**Concept 2: Science and Technology in Society**

Develop viable solutions to a need or problem.

PO 1. Propose viable methods of responding to an identified need or problem.

PO 2. Compare possible solutions to best address an identified need or problem.

PO 3. Design and construct a solution to an identified need or problem using simple classroom materials.

PO 4. Describe a technological discovery that influences science.

Strand 5: Physical Science**Concept 3: Transfer of Energy**

Understand that energy can be stored and transferred.

PO 1. Identify various ways in which electrical energy is generated using renewable and nonrenewable resources (e.g., wind, dams, fossil fuels, nuclear reactions).

PO 2. Identify several ways in which energy may be stored.

PO 3. Compare the following ways in which energy may be transformed:

- mechanical to electrical
- electrical to thermal

Grade 7

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www.ade.state.az.us/standards/science/articulated.asp**Concept 1: Observations, Questions, and Hypotheses**

Formulate predictions, questions, or hypotheses based on observations. Locate appropriate resources.

- PO 1. Formulate questions based on observations that lead to the development of a hypothesis. (See M07-S2C1-01)
- PO 2. Select appropriate resources for background information related to a question, for use in the design of a controlled investigation. (See W07-S3C6-01, R07-S3C1-06, and R07-S3C2-03)
- PO 3. Explain the role of a hypothesis in a scientific inquiry.

Concept 2: Scientific Testing (Investigating and Modeling)

Design and conduct controlled investigations.

- PO 2. Design an investigation to test individual variables using scientific processes.
- PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers).
- PO 5. Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs. (See W07-S3C2-01 and W07-S3C3-01)

Concept 3: Analysis and Conclusions

Analyze and interpret data to explain correlations and results; formulate new questions.

- PO 1. Analyze data obtained in a scientific investigation to identify trends. (See M07-S2C1-07 and M07-S2C1-08)
- PO 3. Analyze results of data collection in order to accept or reject the hypothesis.
- PO 5. Formulate a conclusion based on data analysis.
- PO 6. Refine hypotheses based on results from investigations.
- PO 7. Formulate new questions based on the results of a previous investigation.

Concept 4: Communication

Communicate results of investigations.

- PO 2. Display data collected from a controlled investigation. (See M07-S2C1-03)
- PO 3. Communicate the results of an investigation with appropriate use of qualitative and quantitative information. (See W07-S3C2-01)

Strand 2: History and Nature of Science**Concept 1: History of Science as a Human Endeavor**

Identify individual, cultural, and technological contributions to scientific knowledge.

- PO 1. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Rachel Carson [scientist], supports Strand 4; Luis Alvarez [scientist] and Walter Alvarez [scientist], support Strand 6; Percival Lowell [scientist], supports Strand 6; Copernicus [scientist], supports Strand 6).
- PO 2. Describe how a major milestone in science or technology has revolutionized the thinking of the time (e.g., global positioning system, telescopes, seismographs, photography).
- PO 3. Analyze the impact of a major scientific development occurring within the past decade.
- PO 4. Analyze the use of technology in science-related careers.

Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

PO 1. Describe how science is an ongoing process that changes in response to new information and discoveries.

PO 2. Describe how scientific knowledge is subject to change as new information and/or technology challenges prevailing theories.

PO 3. Apply the following scientific processes to other problem solving or decision making situations:

- observing
- questioning
- communicating
- comparing
- measuring
- classifying
- predicting
- organizing data
- inferring
- generating hypotheses
- identifying variables

Strand 3: Science in Personal and Social Perspectives**Concept 1: Changes in Environments**

Describe the interactions between human populations, natural hazards, and the environment.

PO 1. Analyze environmental risks (e.g., pollution, destruction of habitat) caused by human interaction with biological or geological systems.

PO 2. Analyze environmental benefits of the following human interactions with biological or geological systems:

- reforestation
- habitat restoration
- construction of dams

PO 3. Propose possible solutions to address the environmental risks in biological or geological systems.

Concept 2: Science and Technology in Society

Develop viable solutions to a need or problem.

PO 1. Propose viable methods of responding to an identified need or problem.

PO 4. Describe a scientific discovery that influences technology.

Strand 4: Life Science**Concept 3: Populations of Organisms in an Ecosystem**

Analyze the relationships among various organisms and their environment.

PO 4. Evaluate data related to problems associated with population growth (e.g., overgrazing, forest management, invasion of non-native species) and the possible solutions.

PO 5. Predict how environmental factors (e.g., floods, droughts, temperature changes) affect survival rates in living organisms.

Strand 6: Earth and Space Science**Concept 1: Structure of the Earth**

Describe the composition and interactions between the structure of the Earth and its atmosphere.

PO 4. Describe how the rock and fossil record show that environmental conditions have changed over geologic and recent time.

Grade 8

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Strand 1: Inquiry Process**Concept 1: Observations, Questions, and Hypotheses**

Formulate predictions, questions, or hypotheses based on observations. Locate appropriate resources.

PO 1. Formulate questions based on observations that lead to the development of a hypothesis.

(See M08-S2C1-01)

PO 2. Use appropriate research information, not limited to a single source, to use in the development of a testable hypothesis. (See W08-S3C6-01, R08-S3C1-06, and R08-S3C2-03)

PO 3. Generate a hypothesis that can be tested.

Concept 2: Scientific Testing (Investigating and Modeling)

Design and conduct controlled investigations.

PO 3. Conduct a controlled investigation to support or reject a hypothesis.

PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers).

PO 5. Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs. (See W08-S3C2-01 and W08-S3C3-01)

Concept 3: Analysis and Conclusions

Analyze and interpret data to explain correlations and results; formulate new questions.

PO 1. Analyze data obtained in a scientific investigation to identify trends. (See M08-S2C1-08)

PO 5. Explain how evidence supports the validity and reliability of a conclusion.

PO 8. Formulate new questions based on the results of a previous investigation.

Concept 4: Communication

Communicate results of investigations.

PO 1. Communicate the results of an investigation.

PO 3. Present analyses and conclusions in clear, concise formats. (See W08-S3C6-02)

PO 5. Communicate the results and conclusion of the investigation. (See W08-S3C6-02)

Strand 2: History and Nature of Science**Concept 1: History of Science as a Human Endeavor**

Identify individual, cultural, and technological contributions to scientific knowledge.

PO 3. Evaluate the impact of a major scientific development occurring within the past decade.

PO 4. Evaluate career opportunities related to life and physical sciences.

Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

PO 1. Apply the following scientific processes to other problem solving or decision making situations:

- observing
- questioning
- communicating
- comparing
- measuring
- classifying
- predicting
- organizing data
- inferring
- generating hypotheses
- identifying variables

Strand 3: Science in Personal and Social Perspectives**Concept 1: Changes in Environments**

Describe the interactions between human populations, natural hazards, and the environment.

PO 1. Analyze the risk factors associated with natural, human induced, and/or biological hazards, including:

- waste disposal of industrial chemicals
- greenhouse gases

PO 2. Analyze possible solutions to address the environmental risks associated with chemicals and biological systems.

Concept 2: Science and Technology in Society

Develop viable solutions to a need or problem.

PO 3. Design and construct a solution to an identified need or problem using simple classroom materials.