# Fifth Grade Course Content Checklist for Science

**CONTENT STANDARD 1.** Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations. (***Bold Vocabulary found on OPI's SCIENCE Vocabulary for 5th Grade Science)***

**ESSENTIAL VOCABULARY**:

- ☐ **control**
- ☐ **variable**
- ☐ **dependent variable**
- ☐ **graduated cylinder**
- ☐ **beaker**
- ☐ **balances**
- ☐ data tables
- ☐ **supported**
- ☐ **2-D**
- ☐ **legend/key**
- ☐ Salish
- ☐ Little Shell
- ☐ Pend d'Orelle
- ☐ **prediction**
- ☐ **testable question**
- ☐ Scientific method
- ☐ **scales**
- ☐ **digital probes**
- ☐ **metric units**
- ☐ **graphs**
- ☐ **not supported**
- ☐ **3-D**
- ☐ Gros Vetnre
- ☐ Kootenai
- ☐ Northern Cheyenne
- ☐ **hypothesis**
- ☐ **independent variable**
- ☐ **data table**
- ☐ **Celsius thermometers**
- ☐ **stop watch**
- ☐ model
- ☐ **hypothesis**
- ☐ **prediction**
- ☐ **computer simulations**
- ☐ Crow Blackfeet
- ☐ Assiniboine Sioux
- ☐ Chippewa Cree

**5 11.0 Identify a question, determine relevant variable and a control, formulate a testable hypothesis, plan and predict the outcome of an investigation, safely conduct scientific investigation, and compare and analyze data A. Recognize and select a testable question when presented with multiple choices.**

- ☐ .1 Write a testable question for an investigation
- ☐ .2 Identify a hypothesis
- ☐ .3 Explain the relationship between a testable question and a hypothesis
- ☐ .4 Plan an investigation to test a hypothesis
- ☐ .5 Identify the independent and dependent variable
- ☐ .6 Identify a control group and explain its purpose
- ☐ .7 List and follow appropriate safety procedures.
- ☐ .8 Conduct the investigation

Fifth Grade Science Course Content Checklist (cont.)

**5 12.0 Select and use appropriate tools including technology to make measurements (in metric units), gather, process and analyze data from scientific investigations.**

- ☐ .1 Collect data using observation and tools such as scale, balances, thermometer, beaker, digital probes, stop watch, graduated cylinder in metric units
- ☐ .2 Record data using data tables
- ☐ .3 Represent data using graphs

**5 13.0 Review, communicate and defend results of investigations, including considering alternative explanations.**

- ☐ .1 Compare data to hypothesis with guidance
- ☐ .2 Determine if hypothesis is supported or not supported with guidance
- ☐ .3 Communicate findings in written or oral format

**5 14.0 Create models to illustrate scientific concepts and use the model to predict change. (e.g., computer simulation, stream table, graphic representation).**

- ☐ .1 Explain the purpose of a model
- ☐ .2 List various types of models including 2-D, 3-D and computer simulations
- ☐ .3 Follow step-by-step directions to build a model

**5 15.0 Identify strengths and weakness in an investigation design.**

Benchmark is addressed in grades MS science course work: Earth Science, Life Science, Physical Science

**5 16.0 Compare how observations of nature form an essential base of knowledge among the Montana American Indians**.
(go to www.opi.mt.gov/IndianEd for Science Model Lessons)

- ☐ .1 Identify examples of Montana American Indians using observation to create knowledge of nature
- ☐ .2 Explain how Montana American Indians have used observation to explain processes of nature

Fifth Grade Science Course Content Checklist (cont.)

**CONTENT STANDARD 2**. Students, through the inquiry process, demonstrate the knowledge of properties, forms, changes and Interactions of physical and chemical systems.

**ESSENTIAL VOCABULARY**: (***Bold Vocabulary found on OPI's SCIENCE Vocabulary for 5th Grade Science)***

| | | |
|---|---|---|
| ☐ **element** | ☐ **compound,** | ☐ **mixture** |
| ☐ **pure substance** | ☐ **mass** | ☐ **volume** |
| ☐ **chemical change** | ☐ **physical change** | ☐ **physical property** |
| ☐ **chemical property** | ☐ chemical reaction | ☐ **sublimation** |
| ☐ **evaporation** | ☐ **condensation** | ☐ **freezing point** |
| ☐ **melting point** | ☐ **boiling point** | ☐ **solid** |
| ☐ **liquid** | ☐ **gas** | ☐ **matter frequency** |
| ☐ **amplitude** | ☐ **pitch** | ☐ **wavelength** |
| ☐ **vibration** | ☐ **tension** | ☐ **medium** |
| ☐ **transmit** | ☐ **instrument** | ☐ **energy** |
| ☐ **electricity** | ☐ **circuits (simple, parallel, series)** | ☐ **battery** |
| ☐ **positive and negative charge conduction** | ☐ **convection** | ☐ **radiant energy (light)** |
| ☐ **heat transfer** | ☐ **temperature** | ☐ **heat** |
| ☐ **potential** | ☐ **kinetic** | ☐ **speed** |
| ☐ **mass** | ☐ **work** | ☐ **force** |
| ☐ **cell membrane** | ☐ **cell wall** | ☐ **nucleus** |
| ☐ **vacuoles** | ☐ **cytoplasm** | ☐ **mitochondria** |
| ☐ **chloroplast** | ☐ organelle | |

**Essential Vocabulary for Light is addressed in Physical Science course work**

**5 21.0 Classify, describe, and manipulate the physical models of matter in terms of: elements, and compounds, pure substances and mixtures, atoms, and molecules**

- ☐ .1 Identify common elements
- ☐ .2 Define elements and compounds as pure substances
- ☐ .3 Identify common compounds (water, carbon dioxide, salt)
- ☐ .4 Distinguish between substances and mixtures
- ☐ .5 Explain the relationship between elements, compounds and mixtures

Fifth Grade Science Course Content Checklist (cont.)

**5 22.0 Examine, describe, compare and classify objects and substances based on common physical properties and simple chemical properties.**

- ☐ .1 Define physical properties as properties that do not change the chemical nature of matter (i.e., color, smell, freezing point, boiling point, melting point, magnetism)
- ☐ .2 Define chemical properties as properties that do change the chemical nature of matter (i.e., combustion, rust, decompose)
- ☐ .3 Identify examples of chemical change (generating a gas, color change, rust)

**5 23.0 Describe energy and compare and contrast the energy transformations and the characteristics of light, heat, motion, magnetism, electricity, sound and mechanical waves.**

- ☐ .1 Identify that most matter can exist as a solid, liquid or gas depending on temperature.
- ☐ .2 Describe the processes of sublimation, condensation, and evaporation
- ☐ .3 Explain how sound is produced, transmitted, and received.
- ☐ .4 Describe how sound can be changed.
- ☐ .5 Design and construct instruments that produce sound
  (The effects of mechanical waves are applied in Standard 4 Benchmark 1)
- ☐ .6 Define electricity as the flow of energy
- ☐ .7 Distinguish the differences between simple, series, and parallel circuits
- ☐ .8 Model series and parallel circuits
- ☐ .9 Explain the flow of energy in a circuit.
- ☐ .11 Explain the three types of heat transfer

**5 24.0 Model and explain that states of matter are dependent upon the quantity of energy present in the system and describe what will change and what will remain unchanged at the particulate level when matter experiences an external force or energy change.**

This benchmark is addressed in Physical Science Course Content

**5 25.0 Describe and explain the motion of an object in terms of its position, direction, & speed as well as the forces acting upon it.**

- ☐ .1 Experiment with potential and kinetic energy, (i.e., cars/balls on ramp)
- ☐ .2 Explain the differences between kinetic and potential energy
- ☐ .3 Identify that work is movement following application of a force.
- ☐ .4 Demonstrate an example of work.

Fifth Grade Science Course Content Checklist (cont.)

**5 26.0 Identify, build, describe, measure, and analyze mechanical systems (e.g., simple and complex compound machines) and describe the forces acting within those systems.**

This benchmark is addressed in Physical Science Course Content

**5 27.0 Give examples and describe how energy is transferred and conserved (e.g. electric to light and heat [light bulb], chemical to mechanical [fuel to propulsion]).**

This benchmark is addressed in Physical Science Course Content

**CONTENT STANDARD 3**. Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.

**ESSENTIAL VOCABULARY**: (***Bold Vocabulary found on OPI's SCIENCE Vocabulary for 5th Grade Science)***

| | | |
|---|---|---|
| ☐ **chlorophyll** | ☐ **photosynthesis** | ☐ **oxygen** |
| ☐ **carbon dioxide** | ☐ **sugar** | ☐ **water** |
| ☐ **light energy** | ☐ **transpiration** | ☐ **water vapor** |
| ☐ **roots** | ☐ **leaves** | ☐ **xylem** |
| ☐ phloem | ☐ vascular | ☐ non vascular |
| ☐ carbon cycle | ☐ **symbiosis** | ☐ **ecosystems** |
| ☐ **population** | ☐ **community** | ☐ **environment** |
| ☐ **interdependence** | ☐ **diversity** | ☐ abiotic |
| ☐ biotic | ☐ biosphere | ☐ **dichotomous key** |
| ☐ **kingdom** | ☐ **phylum** | ☐ **class** |
| ☐ **vertebrate** | ☐ **invertebrate** | ☐ **cold-blooded** |
| ☐ **warm-blooded** | ☐ **mosses** | ☐ **ferns** |
| ☐ **flowering** | ☐ **non-flowering** | ☐ monocot |
| ☐ dicot | ☐ endotherm | ☐ ectotherm |

**5 31.0 Compare the structure and function of prokaryotic cells (bacteria) and eukaryotic cells (plant, animal, etc.) including the levels of organization of the structure and function, particularly with humans.**

- ☐ .1 Describe the basic structure and function of a cell.
- ☐ .2 Observe plant and animal cells using a microscope.
- ☐ .3 Compare plant and animals cells
- ☐ .4 Create model/diagram of an animal and/or plant cells.

Fifth Grade Science Course Content Checklist (cont.)

**5 32.0 Explain how organisms and systems of organisms obtain and use energy resources to maintain stable conditions (e.g., food webs, photosynthesis, respiration).**

- ☐ .1 Identify plant structures involved in photosynthesis and transpiration
- ☐ .2 Identify the compounds involved in photosynthesis and transpiration
- ☐ .3 Explain the process of photosynthesis and transpiration in terms of the key structures and compounds that are utilized.
- ☐ .4 Explain the relationship between photosynthesis and transpiration

**5 33.0 Communicate the differences in the reproductive processes of a variety of plants and animals using the principles of genetic modeling (e.g., Punnet squares).**

This benchmark is addressed in Life Science Course Content

**5 34.0 Investigate and explain the interdependent nature of populations and communities in the environment and describe how species in these populations adapt by evolving.**

- ☐ .1 Explore and compare symbiotic relationships
- ☐ .2 Define symbiosis
- ☐ .3 Identify the key characteristics of an ecosystem
- ☐ .4 Describe the interdependence between the parts of an ecosystem

**5 35.0 Create and use a basic classification scheme to identify plants and animals.**

- ☐ .1 Employ dichotomous key to separate a collection of basic objects
- ☐ .2 Identify the kingdoms
- ☐ .3 Know the difference between kingdom, phylum and class
- ☐ .4 Define vertebrate/invertebrate, warm blooded/cold blooded
- ☐ .5 Compare and contrast key characteristics of organisms in the animal kingdom
- ☐ .6 Classify plants by flowering, non-flowering, mosses, ferns

Fifth Grade Science Course Content Checklist (cont.)

**CONTENT STANDARD 4.** Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.

**ESSENTIAL VOCABULARY**: (***Bold Vocabulary found on OPI's SCIENCE Vocabulary for 5th Grade Science)***

- ☐ **glaciations**
- ☐ **plate tectonics**
- ☐ **earthquake**
- ☐ inner core
- ☐ **igneous**
- ☐ **mineral**
- ☐ mineral
- ☐ **relative age**
- ☐ **evaporation**
- ☐ **meteorologist**
- ☐ **air pressure**
- ☐ **air currents**
- ☐ **tilt**
- ☐ **light**
- ☐ equinox
- ☐ **sun**
- ☐ **phases of the moon**
- ☐ **erosion**
- ☐ **continental drift**
- ☐ **volcano**
- ☐ outer core
- ☐ **sedimentary**
- ☐ rock cycle
- ☐ **rock**
- ☐ **water cycle**
- ☐ **precipitation**
- ☐ **air mass**
- ☐ **warm front**
- ☐ **revolution**
- ☐ **axis**
- ☐ **year**
- ☐ **Earth**
- ☐ **moon**
- ☐ **deposition**
- ☐ **mountain**
- ☐ mantle
- ☐ crust
- ☐ **orbit**
- ☐ **metamorphic**
- ☐ **fossil**
- ☐ **condensation**
- ☐ **forecast**
- ☐ **front**
- ☐ **cold front**
- ☐ **rotation**
- ☐ **seasons**
- ☐ solstice
- ☐ **planet**
- ☐ **relative**

**5 41.0 Model and explain the internal structure of the earth and describe the formation and composition of earth's external features in terms of the rock cycle and plate tectonics and constructive and destructive forces.**

- ☐ .1 Describe Earth's physical features
- ☐ .2 Explain glaciations and weathering effects on the Earth's surface
- ☐ .3 Define the role that plate tectonics play in changing Earth's features
- ☐ .4 Explain the rock cycle

Fifth Grade Science Course Content Checklist (cont.)

**5 42.0 Differentiate between rocks types and minerals types and classify both by how they are formed and the utilization by humans.**

- ☐ .1 Differentiate between igneous, sedimentary, and metamorphic rocks
- ☐ .2 Identify that rock is composed of different kinds of minerals
- ☐ .3 Define minerals as the building blocks of rocks
- ☐ .4 Compare and contrast the differences between rocks and minerals

**5 43.0 Use fossils to describe the geological timeline.**

- ☐ .1 Explain how sedimentary rock layers represent a progression of time
- ☐ .2 Describe how the relative age of fossils can be determined from their position in sedimentary rock layers

**5 44.0 Describe the water cycle, the composition and structure of the atmosphere and the impact of oceans on large-scale weather patterns.**

- ☐ .1 Explain the water cycle and its application to weather
- ☐ .2 Identify different types of clouds and how they can be used to predict weather
- ☐ .3 Describe properties of air masses moving across the earth's surface
- ☐ .4 Discuss how interactions of air masses are used to forecast the weather
- ☐ .5 Interpret a weather map using correct symbols

**5 45.0 Describe and model the motion and tilt of earth in relation to the sun, and explain the concepts of day, night, seasons, year, and climatic changes.**

- ☐ .1 Compare and contrast revolution and rotation
- ☐ .2 Illustrate/model Earth's rotation in relation to the sun
- ☐ .3 Explain how the Earth's rotation causes day and night
- ☐ .4 Illustrate and model Earth's revolution in relation to the sun
- ☐ .5 Describe and model the causes of seasons and year due to the revolution and tilt of the Earth in relation to the sun

Fifth Grade Science Course Content Checklist (cont.)

**5 46.0 Describe the earth, moon, planets and other objects in space in terms of size, force of gravity, structure, and movement in relation to the sun.**

- ☐ .1 Identify the relationship between the Earth, the sun, and the moon
- ☐ .2 Explain how the moon is lighted by the sun
- ☐ .3 Model the relative movements of the moon, Earth and sun
- ☐ .4 Identify phases of the moon by how much of the lighted part of moon can be seen from Earth

**5 47.0 Identify scientific theories about the origin and evolution of the earth and solar system.**

This benchmark is addressed in Earth Science Course Content

**CONTENT STANDARD 5**. Through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies

**ESSENTIAL VOCABULARY**: (***Bold Vocabulary found on OPI's SCIENCE Vocabulary for 5th Grade Science)***

- ☐ **life science**
- ☐ **engineering**
- ☐ **science**
- ☐ **problem**
- ☐ **earth science**
- ☐ **technology**
- ☐ **current event**
- ☐ **environmental impact**
- ☐ **physical science**
- ☐ **occupations**
- ☐ **issue**

**5 51.0 Describe the specific fields of science and technology as they relate to occupations within those fields.**

- ☐ .1 Identify specific fields of science
- ☐ .2 Identify occupations within specific fields of science
- ☐ .3 Identify uses of technology unique to specific occupations within each field of science

**5 52.0 Apply scientific knowledge and process skills to understand issues and everyday events.**

- ☐ .1 Identify a local current event or problem involving science
- ☐ .2 Research and summarize the scientific issues relevant to that local current event or problem

**5 53.0 Simulate collaborative problem solving and give examples of how scientific knowledge and technology are shared with other scientists and the public.**

This benchmark is addressed in Earth Science Course Content

Fifth Grade Science Course Content Checklist (cont.)

**5 54.0 Use scientific knowledge to investigate problems and their proposed solutions and evaluate those solutions while considering environmental impacts.**

- ☐ .1 Identify a local issue with an environmental impact
- ☐ .2 List possible environmental impacts
- ☐ .3 Research and discuss proposed solutions

**5 55.0 Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures** (go to www.opi.mt.gov/IndianEd for Science Model Lessons).

- ☐ .1 Investigate how science and technology have an impact on Montana American Indians
- ☐ .2 Explain the impact of science and technology on Montana American Indians.

**CONTENT STANDARD 6**. Understand historical developments in science and technology.

**ESSENTIAL VOCABULARY**: (***Bold Vocabulary found on OPI's SCIENCE Vocabulary for 5th Grade Science)***

- ☐ **technology**
- ☐ **milestones**
- ☐ **scientific discoveries**
- ☐ **occupation**
- ☐ **advances**
- ☐ human endeavor

**5 61.0 Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific Essential understanding, including Montana American Indian examples** (go to www.opi.mt.gov/IndianEd for Science Model Lessons).

- ☐ .1 Identify examples of technological advances throughout history, including Montana American Indian examples
- ☐ .2 Identify and discuss scientific discoveries influenced by these technologies
- ☐ .3 Discuss how technology advances science understanding

**5 62.0 Identify major milestones in science that have impacted science, technology, and society.**

- ☐ .1 Chart the history of scientific milestones (see Earth Science Course Content)
- ☐ .2 Discuss how milestones have impacted society over time.

**5 63.0 Describe and explain science as a human endeavor and an ongoing process.**

- ☐ .1 Investigate occupations that use science
- ☐ .2 Identify the features of science that make it a human endeavor and an ongoing process.