10th Grade Science

Goal	ISAT%	Objective Description (with content limits)
		Standard 1: Nature of Science
1.1: Understand Systems, Order, and Organization		9-10.B.1.1.1 Explain the scientific meaning of system, order, and organization. (648.01a) CL: E Content Limit: Students should be able to identify the components of a system and how the components interact to allow the system to function. Suitable systems to test include the structure of an electric motor, the Earth-Moon system, the solar system, the respiratory system, and the cell as a system.
1.1: Understand Systems, Order, and Organization		9-10.B.1.1.2 Apply the concepts of order and organization to a given system. (648.01a) CL: E Content Limit: Students should be able to identify the components of a system and the role each component has in the system's function.
1.2: Understand Concepts and Processes of Evidence, Models, and Explanations		9-10.B.1.2.1 Use observations and data as evidence on which to base scientific explanations. (648.02a) CL: E Content Limit: When presented observations and data (including different cell types, genetic traits, or environmental changes over time), students will be able to select the most reasonable explanation from a list of possibilities.
1.3: Understand Constancy, Change, and Measurement		9-10.B.1.3.1 Measure changes that can occur in and among systems. (648.03b) CL: E Content Limit: Students should be able to explain changes that occur in systems. Topics may include heart rate, breathing rate, dilation of pupils, cells, ecosystems, biogeochemical cycles, and chemical reactions.
1.3: Understand Constancy, Change, and Measurement		9-10.B.1.3.2 Analyze changes that can occur in and among systems. (648.03b) CL: E Content Limit: Students should be able to analyze changes that take place in system performance due to external or environmental changes. Topics may include heart rate, breathing rate, and dilation of pupil changes.
1.3: Understand Constancy, Change, and Measurement		9-10.B.1.3.3 Measure and calculate using the metric system. (648.03c) CL: C Content Limit: Students should be able to use metric units to record and analyze data.
1.4: Understand the Theory that Evolution is a Process that Relates to the Gradual Changes in the Universe and of Equilibrium as a Physical State		

10th Grade Science

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1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills		9-10.B.1.6.1 Identify questions and concepts that guide scientific investigations. (649.01a) CL: E Content Limit: When presented a number of questions, students will be able to identify questions that can be investigated.
1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills		9-10.B.1.6.2 Utilize the components of scientific problem solving to design, conduct, and communicate results of investigations. (649.01b) CL: E Content Limit: Items should address experimental design.
1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills		9-10.B.1.6.3 Use appropriate technology and mathematics to make investigations. (649.01c) CL: C Content Limit: Students should be able to identify suitable forms of technology and mathematics needed to solve a problem presented in the question stem.
1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills		9-10.B.1.6.5 Analyze alternative explanations and models. (649.01e) CL: E Content Limit: When offered a variety of possible explanations, students should be able to identify the most logical option to fit with the question stem.
1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills		9-10.B.1.6.6 Communicate and defend a scientific argument. (649.01f) CL: D Content Limit: When offered a variety of possible explanations, students should be able to identify the option that will fit with the question stem.
1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills		9-10.B.1.6.7 Explain the differences among observations, hypotheses, and theories. (649.01g) CL: D Content Limit: Students should be able to distinguish between observations, hypotheses, and theories.
1.8: Understand Technical Communication	39-42%	9-10.B.1.8.1 Analyze technical writing, graphs, charts, and diagrams. (658.02a) CL: E Content Limit: Students should be asked to derive information from graphs, charts, and diagrams.
		Standard 2: Physical Science
2.2: Understand Concepts of Motion and Forces		8-9*.PS.2.2.1 Explain motion using Newton's Laws of Motion. (650.04 b) CL: E Content Limit: Items should cover the relationship between force, mass, and acceleration. Inertia, balanced and unbalanced forces, action and reaction should also be addressed.
2.3: Understand the Total Energy in the Universe is Constant		8-9.PS.2.3.1* Explain that energy can be transformed but cannot be created nor destroyed. (650.05a) CL: D Content Limit: Items can address energy conversions including the impact of friction on the total amount of energy available.

10th Grade Science

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2.3: Understand the Total Energy in the Universe is Constant		8-9. PS.2.3.2* Classify energy as potential and/or kinetic and as energy contained in a field. (650.05b) CL: C Content Limit: Items should be able to distinguish between different forms of potential and kinetic energy. The relationship between magnetic fields and electrical fields can be addressed. The structure or organization of the electromagnetic spectrum can also be addressed.
2.4: Understand the Structure of Atoms		8-9.PS.2.4.1 Describe the properties, function, and location of protons, neutrons, and electrons. (650.01a) CL: D Content Limit: Items can address electrical charges, locations in the atom of each particle and relative mass of each particle. For an atom, students should know that the proton determines the element, the neutron determines the isotope, and the electron determines the chemical properties.
2.4: Understand the Structure of Atoms		8-9 PS.2.4.2. Explain the processes of fission and fusion. (650.01b) CL: D Content Limit: Both processes release energy. Fission results in smaller particles. Fusion results in larger particles.
2.4: Understand the Structure of Atoms		8-9.PS.2.4.3 Describe the characteristics of isotopes. (650.01c) CL: D Content Limit: Items should address that isotopes are atoms of the same element that have a different number of neutrons.
2.4: Understand the Structure of Atoms		8-9.PS.2.4.4 State the basic electrical properties of matter. (650.01d) CL: B Content Limit: Items should address that like charges repel and opposite charges attract, and that some forms of matter are insulators and others are conductors.
2.4: Understand the Structure of Atoms		8-9.PS.2.4.5 Describe the relationships between electricity and magnetism. CL: D Content Limit: Items should address how generators and motors work.
2.5: Understand Chemical Reactions	14-16%	8-9.PS.2.5.1 Explain how chemical reactions may release or consume energy while the quantity of matter remains constant. (650.03a) CL: D Content Limit: Items should address the law of conservation of mass and exothermic and endothermic reactions.
		Standard 3: Biology
3.1: Understand the Theory of Biological Evolution		9-10.B.3.1.1 Use the theory of evolution to explain how species change over time. (652.01a) CL: D Content Limit: Items could address isolation of sub-populations within a species.

10th Grade Science

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3.1: Understand the Theory of Biological Evolution		9-10.B.3.1.2 Explain how evolution is the consequence of interactions among the potential of a species to increase its numbers, genetic variability, a finite supply of resources, and the selection by the environment of those offspring better able to survive and reproduce. (652.01a) CL: D Content Limit: Items should address genetic variability in a species, competition for environmental resources within a species, and environmental natural selection.
3.2: Understand the Relationship between Matter and Energy in Living Systems		9-10.B.3.2.1 Explain how matter tends toward more disorganized states (entropy). (653.01a) CL: D Content Limit: Items should probe the concept of entropy.
3.2: Understand the Relationship between Matter and Energy in Living Systems		9-10.B.3.2.2 Explain how organisms use the continuous input of energy and matter to maintain their chemical and physical organization. (653.01b) CL: E Content Limit: Food webs would be an appropriate way to probe this understanding.
3.2: Understand the Relationship between Matter and Energy in Living Systems		9-10.B.3.2.3 Show how the energy for life is primarily derived from the Sun through photosynthesis. (653.01c) CL: D Content Limit: The basic photosynthetic reaction should be covered in depth.
3.2: Understand the Relationship between Matter and Energy in Living Systems		9-10.B.3.2.4 Describe cellular respiration and the synthesis of macromolecules. (653.01d) CL: D Content Limit: Students should understand and be responsible for the basic reaction, the exchange/production of oxygen and carbon dioxide for respiration, and the steps involved in production of macromolecules by living cells.
3.2: Understand the Relationship between Matter and Energy in Living Systems		9-10.B.3.2.5 Show how matter cycles and energy flows through the different levels of organization of living systems (cells, organs, organisms, communities and their environment). (653.01h) CL: D Content Limit: Energy flow through food webs can be used to assess this objective.
3.3: Understand the Cell is the Basis of Form and Function for All Living Things		9-10.B.3.3.1 Identify the particular structures that underlie the cellular functions. (651.01a) CL: D Content Limit: Items should probe the function of organelles including chloroplasts, the nucleus, and vacuoles.
3.3: Understand the Cell is the Basis of Form and Function for All Living Things		9-10.B.3.3.2 Explain cell functions involving chemical reactions. (651.01b) CL: D Content Limit: Items should probe the function of organelles including chloroplasts, the nucleus, and vacuoles.

10th Grade Science

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3.3: Understand the Cell is the Basis of Form and Function for All Living Things		9-10.B.3.3.3 Explain how cells use DNA to store and use information for cell functions. (651.01c) CL: D Content Limit: Items should address DNA replication and mitosis as the mechanism for transferring DNA to the next generation of cells.
3.3: Understand the Cell is the Basis of Form and Function for All Living Things	14-16%	9-10.B.3.3.4 Explain how selective expression of genes can produce specialized cells from a single cell. (651.01e) CL: D Content Limit: Items should address the role genes play in differentiation.
		Standard 4: Earth & Space Systems
4.1: Understand Scientific Theories of Origin and Subsequent Changes in the Universe and Earth Systems		8-9.ES.4.1.1* Explain the current scientific theory that suggests that the solar system formed from a nebular cloud of dust and gas. (654.01a) CL: B Content Limit: Items should address current theories of the formation of the solar system.
4.1: Understand Scientific Theories of Origin and Subsequent Changes in the Universe and Earth Systems		8-9.ES.4.1.2* Identify methods used to estimate geologic time. (654.01b) CL: B Content Limit: Items should include the Law of Superposition and radioactive decay.
4.1: Understand Scientific Theories of Origin and Subsequent Changes in the Universe and Earth Systems		8-9.ES.4.1.3* Show how interactions among solid earth, oceans, atmosphere, and organisms have changed the earth system over time. (650.01c) CL: D Content Limit: Items should address continental drift, ice ages, global warming, and fossil fuel formation.
4.2: Understand Geo-Chemical Cycles and Energy in the EarthSystem	14-16%	8-9.ES.4.2.1* Explain the internal and external energy sources of the earth. (654.02a) CL: D Content Limit: Items should address the impact of solar heating, radioactivity, and geothermal activity.
		Standard 5: Personal & Social Perspectives; Technology
5.1:Understand Common Environmental Quality Issues, Both Natural and Human Induced		9-10.B.5.1.1 Analyze environmental issues such as water and air quality, hazardous waste, forest health, and agricultural production. (656.01a) CL: E Content Limit: Issues relevant to Idaho should be addressed: stream degradation, logging, mining, dams, and wind turbines.
5.2: Understand the Relationship between Science and Technology		9-10.B.5.2.1 Explain how science advances technology. (655.01a) CL: E Content Limit: Use scientists whose discoveries have significance and ramifications in today's world to frame items.

10th Grade Science

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5.2: Understand the Relationship between Science and Technology		9-10.B.5.2.2 Explain how technology advances science. (655.01a) CL: E Content Limit: Use common pieces of technology (lenses, electricity, computers, etc.) as the foundation for items that lead students to see the role technology has in advancing science.
5.2: Understand the Relationship between Science and Technology		9-10.B.5.2.3 Explain how science and technology are pursued for different purposes. (656.01b) CL: E Content Limit: Items should address the role of technology in applying science to improve some aspect of human life, and the role of science in answering questions and extending knowledge.
5.3: Understand the Importance of Natural Resources and the Need to Manage and Conserve Them	14-16%	9-10.B.5.3.1 Describe the difference between renewable and nonrenewable resources. (656.03a) CL: D Content Limit: Topics like oil, metallic ores, and wood products are suitable for consideration.

*Depends upon when content is taught.

B: Memorize
C: Perform procedures
D: Demonstrate understanding
E: Conjecture, generalize, prove
F: Solve non-routine problems, make connections