IDAHO Cumulative Science Document (with limits)
GRADE 8-10
All Sciences

Cognitive level codes:

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

Objectives shaded in yellow should be assessed in the classroom, but not included on the ISAT assessment.

Standard 1: Nature of Science

Goals:	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6	Objective 7
Goal 1.1: Understand Systems, Order, and Organization	**9-10.B.1.1.1 Explain the scientific meaning of system, order, and organization.** **CL: D** **Content Limit: Students will be able to identify the components of a system and explain that components work together to allow the system to function as a whole. Suitable systems will be the systems identified by the 8-10 Science content.**	**9-10.B.1.1.2 Apply the concepts of order and organization to a given system.** **CL: E** **Content Limit: Students will be able to identify the components of a system and predict the role of each component in the system's function. Suitable systems will be the systems identified by the 8-10 Science content.**					

Goal 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.** **CL: E** **Content Limit: When presented observations and data drawn from the 8-10 Science content, students will be able to select from a list of possibilities the most reasonable explanation consistent with the data.**	**9-10.B.1.2.2 Develop models to explain concepts or systems.** **CL:** **Content Limit: Assessed in the classroom, not on the ISAT.**	**9-10.B.1.2.3 Develop scientific explanations based on knowledge, logic and analysis.** **CL:** **Content Limit: Assessed in the classroom, not on the ISAT.**				
Goal 1.3: Understand Constancy, Change, and Measurement	**9-10.B.1.3.1 Measure changes that can occur in and among systems.** **CL: D** **Content Limit: Students will be able to identify the changes that occur in systems over time, such as temperature, population, distance, size, etc… systems identified by the 8-10 Science content.**	**9-10.B.1.3.2 Analyze changes that can occur in and among systems.** **CL: E** **Content Limit: Students will be able to analyze changes in a system, and/or determine and predict cause and effect. Systems identified by the 8-10 Science content.**	**9-10.B.1.3.3 Measure and calculate using the metric system.** **CL: C** **Content Limit: Students will be able to measure, calculate, and perform single step conversions (involving the base unit) using metric units for length, volume, mass, temperature, including the prefixes centi, milli, and kilo.**				
Goal 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							

Goal 1.5: Understand Concepts of Form and Function	**No objectives at this grade level.**						
Goal 1.6: Understand Scientific Inquiry and Develop Critical Thinking Skills	**9-10.B.1.6.1 Identify questions and concepts that guide scientific investigations.** **CL: E** **Content Limit: When presented a list of questions, students will be able to identify questions that can be tested by a scientific method.**	**9-10.B.1.6.2 Utilize the components of scientific problem solving to design, conduct, and communicate results of investigations.** **CL: E** **Content Limit: Given a set of parameters, the student will design an experiment using a scientific method and effectively communicate results.**	**9-10.B.1.6.3 Use appropriate technology and mathematics to make investigations.** **CL: C** **Content Limit: Students will be able to identify suitable forms of technology, appropriate units for measurement precision and mathematics needed to solve a problem presented in the question stem.**	**9-10.B.1.6.4 Formulate scientific explanations and models using logic and evidence.** **CL: E** **Content Limit: Assessed in the classroom, not on the ISAT.**	**9-10.B.1.6.5 Analyze alternative explanations and models.** **CL: E** **Content Limit: When offered a variety of possible explanations, students will be able to identify the most probable option to fit with the question stem. Models should be based on 8-10 Science content.**	**9-10.B.1.6.6 Communicate and defend a scientific argument.** **CL: D** **Content Limit: When offered accepted scientific theory from the 8-10 Science content, students will be able to identify the best data in support of the theory. Students will be able to evaluate whether procedures, pieces of data and evidence will support an explanation of a 8-10 Science concept.**	**9-10.B.1.6.7 Explain the differences among observations, hypotheses, and theories.** **CL: D** **Content Limit: Students will be able to distinguish between observations, hypotheses, and theories.**
Goal 1.7: Understand That Interpersonal Relationships Are Important in Scientific Endeavors	**No objectives at this grade level.**						
Goal 1.8: Understand Technical Communication	**9-10.B.1.8.1 Analyze technical writing, graphs, charts, and diagrams.** **CL: E** **Content Limit: Students will derive meaning from graphs, charts, and diagrams.**						

Standard 2: Physical Science

Goals:	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Goal 2.1 Understand the Structure and Function of Matter and Molecules and Their Interactions	**No objectives at this grade level.**				
Goal 2.2 Understand the Concepts of Motion and Forces	**8-9*.PS.2.2.1 Explain motion using Newton's Laws of Motion.** **CL: E** **Content Limit: Students will be able to make predictions using the relationships between force, mass, and acceleration. Predictions should also involve inertia, balanced and unbalanced forces, action and reaction.**				
Goal 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.** **CL: D** **Content Limit: Students will be able to explain energy conversions and energy flow in a system.**	**8-9. PS.2.3.2* Classify energy as potential and/or kinetic and as energy contained in a field.** **CL: C** **Content Limit: Students will be able to identify different forms of potential and kinetic energy and energy contained in electric, magnetic, or gravitational fields and can identify the organization of the electromagnetic spectrum.**			

***Depends upon when content is taught.**

Goal 2.4: Understand the Structure of Atoms	**8-9.PS.2.4.1 Describe the properties, function, and location of protons, neutrons, and electrons.** **CL: D** **Content Limit: Student should be able to describe the structure of an atom. Students will know that the number of protons determines the element, the neutron count determines the isotope, and that electrons determine the chemical properties.**	**8-9 PS.2.4.2. Explain the processes of fission and fusion.** **CL: D** **Content Limit: Students will recognize that both processes release energy and that fission results in smaller particles and fusion results in larger particles.**	**8-9.PS.2.4.3 Describe the characteristics of isotopes.** **CL: D** **Content Limit: Items The student should be able to identify that isotopes are atoms with the same number of protons that have a different number of neutrons.**	**8-9.PS.2.4.4 State the basic electrical properties of matter.** **CL: D** **Content Limit: Students will identify positively and negatively charged particles and that like charges repel and opposite charges attract, and that some forms of matter are insulators and others are conductors.**	**8-9.PS.2.4.5 Describe the relationships between electricity and magnetism.** **CL: D** **Content Limit: Students will be able to describe the relationship between changing electric and magnetic fields, and how generators and motors work.**
Goal 2.5: Understand Chemical Reactions	**8-9.PS.2.5.1 Explain how chemical reactions release or consume energy while the quantity of matter remains constant.** **CL: D** **Content Limit: Students will explain the law of conservation of mass and identify exothermic and endothermic reactions from a list of choices.**				

Standard 3: Biology

Goals:	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Goal 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.** **CL: D** **Content Limit: Students will demonstrate understanding of the roles that genetic variability, natural selection, biodiversity, and other environmental factors play in how species change over time.**	**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.** **CL: D** **Content Limit: Students will demonstrate an understanding of how natural selection is a result of genetic variability in a species, competition within a species for a finite supply of resources, and a species producing more offspring than can survive.**			
Goal 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).** **CL: D** **Content Limit: Students will understand the tendency of living systems to become more disorganized over time.**	**9-10.B.3.2.2 Explain how organisms use the continuous input of energy and matter to maintain their chemical and physical organization.** **CL: E** **Content Limit: Students will be able to analyze how matter and energy flow through and create stability in food webs and ecosystems.**	**9-10.B.3.2.3 Show how the energy for life is primarily derived from the Sun through photosynthesis.** **CL: D** **Content Limit: Students will be able to write and evaluate the photosynthetic reaction and its role in the flow of energy in a food web.**	**9-10.B.3.2.4 Describe cellular respiration and the synthesis of macromolecules.** **CL: D** **Content Limit: Students will be able to write the basic reaction of cellular respiration and should understand how cellular respiration uses glucose and oxygen to create ATP. Students will be able to explain that ATP from cellular respiration is used as an energy source for the production of macromolecules (carbohydrates, proteins, and lipids).**	**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).** **CL: D** **Content Limit: Students will explain the role of photosynthesis and cellular respiration on the flow of energy and matter in biological systems.**

Goal 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.** **CL: D** **Content Limit: Students will understand the function and interconnection of organelles including chloroplasts, the nucleus, mitochondria, cell membrane, cell wall, ribosomes, lysosomes, Golgi body, endoplasmic reticulum, cytoplasm, and vacuoles.**	**9-10.B.3.3.2 Explain cell functions involving chemical reactions.** **CL: D** **Content Limit: Students will be able to identify and describe the chemical reactions that occur in specialized organelles such as; photosynthesis in the chloroplasts, cellular respiration in the mitochondria, and protein synthesis in ribosomes.**	**9-10.B.3.3.3 Explain how cells use DNA to store and use information for cell functions.** **CL: D** **Content Limit: Students will be able to summarize DNA replication, meiosis, and mitosis as the mechanism for transferring DNA to the next generation of cells. Students will also describe the role of DNA in the control of cellular processes.**	**9-10.B.3.3.4 Explain how selective expression of genes can produce specialized cells from a single cell.** **CL: D** **Content Limit: Students will be able to explain that a single cell differentiates to produce all cells of the body.**	

<u>Standard 4</u>: Earth and Space Systems

Goals:	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Goal 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.** **CL: D** **Content Limit: Students will demonstrate an understanding of current theories of the formation of the solar system, as a part of cosmic evolution.**	**8-9.ES.4.1.2* Identify methods used to estimate geologic time.** **CL: B** **Content Limit: Students will be able to identify methods used to estimate geologic time, including the Law of Superposition and radioactive decay.**	**8-9.ES.4.1.3* Show how interactions among solid earth, oceans, atmosphere, and organisms have changed the earth system over time.** **CL: D** **Content Limit: Students will be able to recognize how plate tectonics, continental drift, ice ages, climate change, erosion and deposition change the Earth over time.**		
Goal 4.2: Understand the Geo-chemical Cycles and Energy in the Earth System	**8-9.ES.4.2.1* Explain the internal and external energy sources of the earth.** **CL: D** **Content Limit: Students will be able to describe the impact of solar heating, radioactivity, and the resulting convection currents on the Earth's systems.**				

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<u>Standard 5</u>: Personal and Social Perspectives; Technology

Goals:	Objective 1	Objective 2	Objective 3
Goal 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.** **CL: E** **Content Limit: Students will be able to evaluate the causes and effects of current environmental issues and develop possible solutions.**		
Goal 5.2: Understand the Relationship between Science and Technology	**9-10.B.5.2.1 Explain how science advances technology.** **CL: E** **Content Limit: Students will identify how scientific discoveries have lead to technological advances.**	**9-10.B.5.2.2 Explain how technology advances science.** **CL: E** **Content Limit: Students will identify how technological advances have lead to scientific discoveries.**	**9-10.B.5.2.3 Explain how science and technology are pursued for different purposes.** **CL: E** **Content Limit:** **Students will be able to explain that Science is the process that increases and informs our knowledge of the natural world. Technology is the tool we use to advance our scientific knowledge and alter the quality of life.**
Goal 5.3: Understand the Importance of Natural Resources and the Need to Manage and Conserve Them	**9-10.B.5.3.1 Describe the difference between renewable and nonrenewable resources.** **CL: E** **Content Limit: Students will be able to compare and contrast renewable and nonrenewable resources, such as fossil fuels, water, wind, nuclear, and biomass.**		