

# OKLAHOMA SCHOOL TESTING PROGRAM TEST BLUEPRINT SCIENCE GRADE 11



This blueprint describes the content and structure of the CCR Science Content Assessment and defines the ideal range of test items by reporting category of the [Oklahoma Academic Standards – Science \(OAS-S\)](#).

## REPORTING CATEGORIES

### PHYSICAL SCIENCES 45 - 55%

- PS.PS1.1** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
- PS.PS1.2** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, knowledge of the patterns of chemical properties, and formation of compounds.
- PS.PS1.5** Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
- PS.PS1.7** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
- PS.PS2.5** Plan and conduct an investigation to provide evidence that an electric current can cause a magnetic field and that a changing magnetic field can cause an electric current.
- PS.PS3.1** Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
- PS.PS3.2** Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields.
- PS.PS3.3** Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
- PS.PS3.4** Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
- PS.PS4.1** Use mathematical representations to explain both qualitative and quantitative relationships among frequency, wavelength, and speed of waves traveling in various media.
- PS.PS4.4** Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.



## **LIFE SCIENCES 45 - 55%**

- B.LS1.1** Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.
- B.LS1.2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- B.LS1.3** Plan and conduct an investigation to provide evidence of the importance of maintaining homeostasis in living organisms.
- B.LS1.4** Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
- B.LS1.5** Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
- B.LS1.6** Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
- B.LS1.7** Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
- B.LS2.1** Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
- B.LS2.2** Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
- B.LS2.3** Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.
- B.LS2.4** Use a mathematical representation to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
- B.LS2.5** Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
- B.LS2.6** Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
- B.LS2.8** Evaluate evidence for the role of group behavior on individual and species' chances to survive and reproduce.
- B.LS3.1** Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.



- B.LS3.2** Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
- B.LS3.3** Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
- B.LS4.1** Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
- B.LS4.2** Construct an explanation based on evidence that biological diversity is influenced by (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
- B.LS4.3** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
- B.LS4.4** Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
- B.LS4.5** Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergency of new species over time, and (3) the extinction of other species.

Standards will be assessed using a cluster-based format: a set of three multiple-choice items linked with a common stimulus or a set of two multiple-choice items and a technology-enhanced item linked with a common stimulus. The CCR Science Content test consists of some clusters containing only multiple-choice items and some clusters containing both multiple-choice and technology-enhanced items. Each cluster will align to a single standard with its associated Disciplinary Core Idea(s), Science and Engineering Practice, and Cross Cutting Concept.

The CCR Science Content operational test will contain a total of 20 operational clusters and 2 field test clusters.

