**Cognitive Skill Level Descriptions for the Grade 8 Science & Tech/Eng (STE) MCAS Test**

Below are examples of cognitive skill level descriptions for the Grade 8 STE MCAS test. The examples are not an exhaustive list. How an item is written, including the stem and the options (key and distractors), may contribute to the cognitive skill assigned to the item. The cognitive skill may also depend on student experiences, such as certain investigations or experiments they are familiar with. In addition, the grade level at which the question is being asked is also a consideration.

|  |  |
| --- | --- |
| **Cognitive Skill** | **Description** |
| ***Remembering*** | **Students identify or define a concept with no context.** *Note: These are not on STE MCAS tests.* |
| ***Understanding/***  ***Level 1*** | **Students show an understanding of scientific and engineering concepts and skills by:**   * Ordering events or quantities for a simple phenomenon, such as the relative sizes of parts of the universe. * Completing a simple model, such as labeling phases as a substance as it undergoes phase changes or identifying the forces during a collision. * Identifying a scientific or engineering process, such as photosynthesis, conditioning, or reflection, in a given model or based on a description. * Identifying or describing basic characteristics of an event or environment, such as a mountain formation. * Describing basic functions or roles of the parts of a system, such as a foundation in a structural system or the function of mitochondria. * Determining the materials and tools needed for a basic investigation or to build a prototype, such as using a thermometer to measure thermal energy. * Identifying design criteria for a given design solution. |
| ***Applying/***  ***Level 2*** | **Students apply their science and engineering knowledge and skills by:**   * Interpreting data from a graph or table to solve a problem or a draw conclusion, such as determining the relative amounts of gravitational potential energy and kinetic energy of an object as it changes heights. * Interpreting a model to draw a conclusion, such as describing what would happen to a consumer population in a food web if a producer population decreased, interpreting rock layer diagrams to determine the relative age of a fault, or determining a wave’s amplitude from a diagram. * Completing an unfamiliar or complex model, such as showing where the highest tides occur in an Earth-Sun-Moon model based on a set of data. * Solving a quantitative problem, such determining the most dense material from several materials, or using a Punnett square to determine the expected percentage of offspring with a particular trait. * Setting up a data table for an investigation, given certain criteria. * Explaining a scientific or engineering concept, such as how the respiratory system interacts with the circulatory system. * Determining what scientific question to ask given certain data and criteria. * Determining which variables should be controlled in an investigation and those that may change. * Writing a testable question that can be asked for an investigation or experiment. (CR items only) |
| ***Analyzing & Evaluating/***  ***Level 3*** | **Students analyze or evaluate data and information using their science and engineering knowledge and skills by:**   * Analyzing data from multiple sources or from a complex graph or table to draw a conclusion or develop an explanation, such as using a graph to explain how a population changed over time. * Drawing a conclusion from a complex model or multiple models, such as analyzing multiple orthographic projections to draw conclusions about the shape of an object. * Analyzing a model and describing how changing multiple components of the model affects another component of the model, such as how changing the distance between two charges and the magnitude of the electric charges affects the strength of the electric forces between them. * Revising a model to make it more accurate and explaining the reasoning for the revision(s). (CR items only) * Explaining how a design solution can be changed to address several criteria and constraints. (CR items only)   Note: Some items will reach this level due to students needing to construct an explanation in a constructed response (CR) based on an application of their knowledge. |