

# Physical and Biological Sciences

## Cognitive Skills

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### **Identification of Main Ideas**

Questions in this category refer to the main idea of a passage or other major points that are explicitly or implicitly made in the passage. These questions ask for the simple identification or interpretation of material rather than in-depth analysis or evaluation. Questions often require you to demonstrate understanding of the material by identifying any of the following:

- The general purpose of a research study
- Key differences among viewpoints
- Major points or arguments
- A major problem not specifically mentioned in the passage
- Alternate ways of representing material from the passage

### **Identification of Components in a Situation and Relationships Among Them**

Questions in this category refer to specific pieces of information that are important for understanding the passage. The questions test your ability to identify these components or variables and to determine basic relationships among them and may require you to incorporate pertinent background knowledge. The components and variables typical of this category include the following:

- Hypotheses
- Assumptions
- Relevant issues
- Conclusions
- Supporting evidence
- Rationales
- Experimental variables

## Seeking Clarification

Questions in this category ask for a closer definition of material in the passage or for background information that clarifies a particular scientific concept. You may be asked to provide additional information that is relevant to concepts presented in the passage or to concepts presented within the question itself. Questions typical of this category include those that require you to do the following:

- Identify relevant background information
- Translate presented information into a more understandable or useful form
- Identify appropriate clarifying information

## Hypothesis Testing

Questions in this category test, relate, or extend the hypotheses or assumptions presented in the passage or require the development of new hypotheses. These questions tend to focus on assumptions from the passage, rather than pre-drawn conclusions, and may ask you to do the following:

- Predict a result on the basis of background knowledge and specific facts about a situation
- Form a hypothesis to explain a particular scientific phenomenon
- Identify plausible alternative hypotheses or solutions
- Design an experiment to test a hypothesis according to appropriate criteria (e.g., data collection procedures, control of variables, relevance to the hypothesis)
- Determine the likely cause of a particular event or result
- Combine steps in a research design in an appropriate sequence to test a hypothesis

## Evaluation Processes

Questions in this category evaluate scientific data, procedures, conclusions, evidence, or perspectives. You are often required to make some sort of judgment based on generally accepted scientific criteria. These questions may or may not require the use of background knowledge. Questions in this category include those that ask you to do the following:

- Judge whether a conclusion follows necessarily from a given set of premises
- Appraise the rationale for a procedure or generalization
- Judge whether a conclusion is justified by the evidence
- Judge the credibility of given information or evidence
- Determine whether a product, argument, or perspective is acceptable on the basis of specific given criteria (e.g., whether it fulfills task requirements, fully resolves all relevant aspects of a problem, fits available data)

### **Flexibility and Adaptability in Scientific Reasoning**

Questions in this category require the extension of concepts presented or implied in the passage and often ask you to apply the given information or your background knowledge to unfamiliar situations. Typical questions in this category ask you to do the following:

- Use given information to solve a problem
- Arrive at a conclusion based on the evidence
- Determine the implications of results for real-world situations
- Develop a general theory or model based on the given information
- Determine how a conclusion can be modified to be consistent with additional information
- Recognize methods, results, or evidence that would challenge or invalidate a hypothesis, model, or theory

### **Reasoning Using Quantitative Data**

Questions in this category involve the interpretation of a graph, table, or figure or the manipulation of data found therein. Typical questions include those that require you to do the following:

- Understand basic principles and methods used in the presentation of data
- Explain, describe, identify, or compare components of graphs, charts, figures,

- diagrams, and tables
- Identify background knowledge relevant to an interpretation of graphs, charts, figures,
- diagrams, and tables
- Select the most appropriate format for representing data or other information
- Discern trends in data
- Identify relationships inherent in data