STUDY GUIDE

050  Elementary Education Subtest 1: Reading/Language Arts/Social Studies

051  Elementary Education Subtest 2: Mathematics/Science/Health and Fitness/Fine Arts

Oklahoma Commission for Teacher Preparation

OK-SG-FD5051-03
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The first two sections of the study guide are available in a separate PDF file. Click the link below to view or print these sections.

Study Guide Introduction and General Information About the Certification Examinations for Oklahoma Educators
FIELD-SPECIFIC INFORMATION

• Test Competencies
• Practice Test Questions and Answers
• Constructed-Response Assignment Scoring

INTRODUCTION

This section includes a list of the test competencies, as well as a set of practice selected-response (multiple-choice) questions and one or more practice constructed-response assignments (if applicable), for the test field included in this study guide.

The OSAT Elementary Education test consists of two subtests:

• **Elementary Education Subtest 1: Reading/Language Arts/Social Studies** (see page 2-2) includes selected-response questions and one constructed-response assignment, which will focus on the teaching of reading.

• **Elementary Education Subtest 2: Mathematics/Science/Health and Fitness/Fine Arts** (see page 2-21) includes selected-response questions only.

Both subtests are given in one regular four-hour testing session. See the most recent version of the CEOE registration bulletin for additional important information about the Elementary Education subtests.

Test Competencies

The test competencies are broad, conceptual statements that reflect the subject-matter skills, knowledge, and understanding an entry-level educator needs to teach effectively in Oklahoma public schools. The list of test competencies for each test field represents the only source of information about what a specific test will cover and therefore should be reviewed carefully.

The descriptive statements that follow the competencies are included to provide examples of possible content covered by each competency. These descriptive statements are neither exhaustive nor exclusionary.

Practice Test Questions

The practice selected-response questions and any practice constructed-response assignments included in this section are designed to give you an introduction to the nature of the questions included in this OSAT test field. The practice test questions represent the various types of questions you may expect to see on an actual test; however, they are not designed to provide diagnostic information to help you identify specific areas of individual strengths and weaknesses or to predict your performance on the test as a whole.

To help you prepare for your OSAT, each practice selected-response question in this section is preceded by the competency it measures and followed by a brief explanation of the correct response. On the actual test, the competencies, correct responses, and explanations will not be given.

If the test field included in this guide has a constructed-response assignment, a sample response is provided immediately following the practice constructed-response assignment. The sample response in this guide is for illustrative purposes only. Your written response should be your original work, written in your own words, and not copied or paraphrased from some other work.

A description of the process that is used for scoring the constructed-response assignment is provided in addition to the OSAT performance characteristics and score scale.

When you are finished with the practice test questions, you may wish to go back and review the entire list of test competencies and descriptive statements for your test field.
SUBAREAS:
I. Reading
II. Language Arts
III. Social Studies

SUBAREA I—READING

Competency 0001

Understand the reading process.

The following topics are examples of content that may be covered under this competency.

Understand reading as a process of constructing meaning through dynamic interaction among the reader, the text, and the context of the reading situation.

Understand factors that affect reading (e.g., cultural, social, linguistic, developmental, environmental).

Understand the oral language foundation of reading and the interrelatedness of reading, writing, listening, and speaking.

Competency 0002

Understand phonological skills and strategies related to reading.

The following topics are examples of content that may be covered under this competency.

Understand how to foster students' phonemic awareness (i.e., ability to perceive and discriminate the sounds of the English language) through rhyming, blending, and segmenting sounds in words.

Demonstrate knowledge of instruction in letter-sound correspondences and systematic, explicit phonics.

Understand strategies to promote students' rapid, automatic decoding through the application of phonics skills.

Competency 0003

Understand skills and strategies related to word identification and vocabulary development.

The following topics are examples of content that may be covered under this competency.

Apply knowledge of word identification strategies (e.g., decoding, recognizing affixes, using context clues).

Understand ways to help students master common irregular sight words.

Understand strategies for increasing students' vocabulary knowledge and their ability to apply vocabulary knowledge in new contexts.
Competency 0004

Understand skills and strategies involved in reading comprehension.

The following topics are examples of content that may be covered under this competency.

Understand factors affecting reading comprehension (e.g., reading rate and fluency, prior knowledge, vocabulary knowledge).

Demonstrate knowledge of literal, inferential, and evaluative comprehension skills.

Identify strategies to facilitate comprehension before, during, and after reading (e.g., predicting, self-monitoring, questioning, rereading).

Competency 0005

Understand reading instruction and study skills in the content areas.

The following topics are examples of content that may be covered under this competency.

Apply knowledge of reading strategies to promote learning in the content areas (e.g., activating and developing prior knowledge).

Understand strategies for reading for different purposes.

Apply knowledge of study skills in the content areas (e.g., note-taking skills, interpretation of graphs, use of reference materials).

Competency 0006

Understand characteristic features of children's literature and strategies to promote students' literary response and analysis.

The following topics are examples of content that may be covered under this competency.

Demonstrate knowledge of major works, authors, and genres of children's literature.

Understand strategies to develop students' responses to literature (e.g., guided reading, reading logs, discussions about literature).

Analyze the use of children's literature to promote respect for and appreciation of diversity.

Understand elements of literary analysis and criticism (e.g., analyzing story elements, recognizing features of different genres, interpreting figurative language).
SUBAREA II—LANGUAGE ARTS

Competency 0007

Understand skills and strategies involved in writing for various purposes.

The following topics are examples of content that may be covered under this competency.

Analyze factors a writer should consider when writing for a variety of audiences and purposes (e.g., expressive, informative, persuasive), including factors related to selection of topic and mode of written expression.

Understand steps and procedures associated with given components of the writing process (e.g., prewriting, gathering and synthesizing information, writing a first draft, revising, proofreading).

Understand developmental stages of a writer, including the use of pictures and developmental spelling.

Compare characteristic features and requirements associated with written materials in various formats (e.g., letter, essay) and modes (e.g., narrative, descriptive, evaluative).

Competency 0008

Analyze written work in relation to its stated purpose; evaluate areas in need of improvement; and revise written texts for style, clarity, and organization.

The following topics are examples of content that may be covered under this competency.

Evaluate revision strategies for improving the effectiveness of written material in relation to a given purpose (e.g., expressive, informative, persuasive).

Analyze given texts in terms of unity and organization, and make appropriate revisions (e.g., adding topic sentences, reordering sentences or paragraphs, using transitional words and phrases, deleting distracting details).

Improve the clarity, precision, and effectiveness of given texts through changes in word choice.

Competency 0009

Apply knowledge of English grammar and mechanics in revising texts.

The following topics are examples of content that may be covered under this competency.

Evaluate given texts in terms of sentence construction, and make appropriate revisions (e.g., revising run-on sentences, misplaced or dangling modifiers, lack of parallel structure).

Revise texts for subject-verb agreement and pronoun-antecedent agreement.

Use standard verb forms, pronouns, adverbs, adjectives, and plural and possessive forms of nouns in context.

Make appropriate revisions involving punctuation and capitalization in a given text.
Competency 0010

Understand skills and strategies involved in listening for various purposes.

_The following topics are examples of content that may be covered under this competency._

Compare listening strategies in terms of their appropriateness for given contexts and purposes (e.g., acquiring information, appreciating literature read aloud, interpreting and evaluating information).

Analyze barriers to effective listening and strategies for active listening.

Apply knowledge of factors affecting the ability to listen effectively and construct meaning from oral messages in various listening situations (e.g., ability to recognize nonverbal cues, to use prior knowledge, to distinguish fact from opinion, to recognize transitions, to identify faulty reasoning).

Competency 0011

Understand skills and strategies involved in speaking for various purposes.

_The following topics are examples of content that may be covered under this competency._

Analyze ways in which features of oral language (e.g., choice of language, rate, pitch, tone, volume) and nonverbal cues (e.g., body language, visual aids) affect communication in given situations.

Evaluate various methods of organizing and presenting thoughts, feelings, ideas, and information for different audiences and purposes (e.g., giving instructions, participating in group discussions, persuading an audience, entertaining).

Recognize factors affecting oral communication and nonverbal cues in different situations.

Apply knowledge of language conventions appropriate to a variety of social situations (e.g., informal conversations, job interviews).

SUBAREA III—SOCIAL STUDIES

Competency 0012

Understand major ideas, eras, themes, developments, and turning points in the history of Oklahoma, the United States, and the world; and analyze their significance from multiple perspectives.

_The following topics are examples of content that may be covered under this competency._

Analyze the societal effects of major developments in world history (e.g., the agricultural revolution, the scientific revolution, the industrial revolution, the information revolution).

Understand the principal political, social, economic, and geographic characteristics of ancient civilizations and the connections and interactions among these civilizations.

Understand the history of interactions among American Indian peoples and European Americans in Oklahoma and the western United States.

Analyze the roles and contributions of individuals and groups to U.S. social, political, economic, cultural, and religious life, including historically underrepresented groups.
Competency 0013

Understand geographic concepts and phenomena, and analyze the interrelationships of geography, society, and culture in the development of Oklahoma, the United States, and the world.

The following topics are examples of content that may be covered under this competency.

Demonstrate an understanding of how the five themes of geography—location, place, relationships within places, movement, and regions—can be used to analyze geographic phenomena and human cultures.

Recognize the physical characteristics of the earth's surface, and analyze the continual reshaping of the surface by physical processes.

Analyze the development and interaction of social, political, cultural, and religious systems in different regions of Oklahoma, the United States, and the world.

Analyze the impact of human activity on the physical environment (e.g., industrial development, population growth, deforestation).

Competency 0014

Understand concepts and phenomena related to human development and interactions (including anthropological, psychological, and sociological concepts).

The following topics are examples of content that may be covered under this competency.

Evaluate factors that contribute to the development of personal identity (e.g., family, group affiliations, socialization processes).

Analyze the roles and functions of social groups and institutions in the United States (e.g., ethnic groups, schools, religions) and their influence on individual and group interactions.

Analyze why individuals and groups hold different or competing points of view on issues, events, and historical developments.

Understand the processes of social and cultural change.

Competency 0015

Understand economic and political principles, concepts, and systems; and relate this knowledge to historical and contemporary developments in Oklahoma, the United States, and the world.

The following topics are examples of content that may be covered under this competency.

Analyze the basic structure, fundamental ideas, accomplishments, and problems of the U.S. economic system.

Analyze values, principles, concepts, and key features of American constitutional democracy (e.g., individual freedom, separation of powers, due process).

Compare different perspectives regarding economic and political issues and policies in Oklahoma and the United States (e.g., in relation to taxing and spending decisions).

Analyze relationships between the United States and other nations (e.g., in the development of democratic principles and human rights).
Competency 0016

Understand the roles, rights, and responsibilities of citizenship in the United States and the skills, knowledge, and attitudes necessary for successful participation in civic life.

The following topics are examples of content that may be covered under this competency.

- Analyze the personal and political rights guaranteed in the Declaration of Independence, the U.S. Constitution, the constitution of the state of Oklahoma, and major civil rights legislation.
- Demonstrate an understanding of the U.S. election process and the roles of political parties, pressure groups, and special interests in the U.S. political system.
- Analyze the ways in which citizens participate in and influence the political process in the United States (e.g., the role of public opinion and citizen action in shaping public policy).
- Analyze the factors that affect attitudes toward civic life and that have expanded or limited the role of the individual in U.S. political life during the twentieth century (e.g., female suffrage, discriminatory laws, the growth of presidential primaries, the role of the media in political elections).

Competency 0017

Understand and apply skills related to social studies, including gathering, organizing, mapping, evaluating, interpreting, and displaying information.

The following topics are examples of content that may be covered under this competency.

- Evaluate the appropriateness of various resources for meeting specified information needs (e.g., atlas, database, surveys, polls, the Internet).
- Interpret information presented in one or more graphic representations (e.g., graph, table, map), and translate written or graphic information from one form to the other.
- Summarize the purpose or point of view of a historical text.
Practice Selected-Response Questions

Competency 0002
Understand phonological skills and strategies related to reading.

1. Karen, a second grader, makes the responses listed below on an oral reading test.

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<tr>
<td>steam</td>
<td>stem</td>
</tr>
<tr>
<td>shop</td>
<td>chop</td>
</tr>
<tr>
<td>cloud</td>
<td>cloud</td>
</tr>
<tr>
<td>swim</td>
<td>swim</td>
</tr>
<tr>
<td>bread</td>
<td>breed</td>
</tr>
<tr>
<td>dish</td>
<td>ditch</td>
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Karen's errors suggest that she would likely benefit most from instruction on which of the following sets of topics?

A. initial consonants and r-controlled vowels
B. consonant digraphs and vowel digraphs
C. final consonants and medial consonants
D. consonant blends and vowel diphthongs

Correct Response: B. The student's oral responses show she is having difficulty pronouncing the *sh*- found in shop and dish, and the *ea*- found in steam and bread. The *sh*- is a consonant digraph and the *ea*- is a vowel digraph. The pattern of her errors shows that she would benefit from further help with consonant and vowel digraphs.
Competency 0003
Understand skills and strategies related to word identification and vocabulary development.

2. Structural analysis would be an especially appropriate strategy for a student to use to determine the meaning of which of the following words?

A. impassable

B. elephant

C. interim

D. examine

Correct Response: A. Structural analysis is a strategy used to determine the meaning of unfamiliar words by breaking the words into their component elements (e.g., roots, affixes, inflected endings). Of the answer choices given, only choice A, impassable, is well suited for using structural analysis to determine its meaning. This is because a reader can readily break the word into its component parts (im, pass, able) and then use the meaning of each of the parts to define the word.
Use the passage below to answer the two questions that follow.

1. The sled dogs were bearing the brunt of the burden, but they were rewarded for their efforts with a fine feast each evening. 2. And, as the journey across the tundra progressed, the packs on their sleds grew lighter. 3. In the evenings the dogs lay next to one another in a furry mass to keep warm. 4. Sometimes they joined in the howling of the wolf packs encircling the camp in the distance, making the humans extremely edgy. 5. The wolves seemed fearful of the campfires. 6. In the mornings, the dogs will have scrambled to their feet and shook themselves off, sometimes creating momentary rainbow bursts as the early morning rays of sun filtered through the spraying snow and ice droplets.

Competency 0008

Analyze written work in relation to its stated purpose; evaluate areas in need of improvement; and revise written texts for style, clarity, and organization.

3. Which of the following revisions would best improve the overall unity of this text?

A. Delete the second half of Sentence 1.
B. Switch the order of Sentences 2 and 3.
C. Delete Sentence 5.
D. Move Sentence 6 to the beginning of the text.

Correct Response: C. Sentence 5 does not pertain to the main idea of the narrative, which describes a group of sled dogs on a journey. The sentence interrupts the development of the narrative and should thus be deleted.
**Competency 0009**

Apply knowledge of English grammar and mechanics in revising texts.

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4. Which of the following changes in verb form should be made to this passage?

   A. Sentence 1: Change "were rewarded" to "have been rewarded."

   B. Sentence 2: Change "grew" to "would grow."

   C. Sentence 4: Change "encircling" to "having encircled."

   D. Sentence 6: Change "will have scrambled" to "scrambled."

**Correct Response:** D. In Sentence 6, "will have scrambled" communicates the idea that the dogs' actions will be happening at some time in the future. In fact, the actions described occurred in the past.
Competency 0011
Understand skills and strategies involved in speaking for various purposes.

5. To best ensure the success of a persuasive speech, which of the following steps should be carried out before planning how to select, organize, and present supporting material?

A. analyzing the knowledge, attitudes, and interests of the intended audience

B. drafting an interesting introduction and conclusion for the speech

C. determining which type of organizational pattern to use for the speech

D. deciding how much time to devote to the presentation of visual aids

Correct Response: A. A speaker is most likely to be successful in persuading an audience if the speaker has taken steps beforehand to understand the audience he or she is trying to persuade. Analyzing an audience's knowledge, attitudes, and interests before developing a persuasive speech enables a speaker to focus on information and issues that can be expected to be meaningful and important to the audience.
Competency 0012
Understand major ideas, eras, themes, developments, and turning points in the history of Oklahoma, the United States, and the world; and analyze their significance from multiple perspectives.

6. Which of the following developments most directly influenced the shift from nomadic life to village living and occupational specialization among the Neolithic peoples of the Near East?

A. the creation of religious belief systems
B. the fashioning of tools from stone and wood
C. the establishment of the family group as the basic social unit
D. the cultivation of food-producing plants

Correct Response: D. The cultivation of food-producing plants by Neolithic peoples created food surpluses that freed some population segments for work in specialized occupations. Because food crops require regular attention throughout much of the year, their increased production strongly influenced the shift from nomadic life to the development of permanent settlements with sedentary populations.
Competency 0013
Understand geographic concepts and phenomena, and analyze the interrelationships of geography, society, and culture in the development of Oklahoma, the United States and the world.

7. During the late twentieth century, economic globalization stimulated industrial growth in many developing countries. Which of the following best describes a major change that accompanied economic development in these countries?

A. Agricultural production declined.

B. The income gap between rich and poor decreased.

C. Average family size increased.

D. The population density of urban areas increased.

Correct Response: D. Most industrial growth in developing countries occurs in urban areas. This stimulates migration from rural areas to cities, which causes an increase in the population density of urban centers.
Competency 0015

Understand economic and political principles, concepts, and systems; and relate this knowledge to historical and contemporary developments in Oklahoma, the United States, and the world.

8. Which of the following illustrate the operation of the system of checks and balances established by the U.S. Constitution?

   I. Congress rejects a territory's petition for statehood.

   II. The Supreme Court renders a decision in a case involving a conflict between two states.

   III. The president vetoes a congressional bill.

   IV. The House of Representatives impeaches a federal judge.

   A. I and II only
   B. II and IV only
   C. I and III only
   D. III and IV only

**Correct Response: D.** The U.S. Constitution provides for checks and balances among the three branches of the federal government—the legislative, executive, and judicial. A presidential veto of a congressional bill is an example of the balance of power between the executive and legislative branches. The impeachment of a federal judge by the House of Representatives is an example of the balance of power between the legislative and judicial branches.
9. **Use the information below to complete the exercise that follows.**

A first-grade teacher is assessing Amie's reading comprehension of a story that she reads fluently and accurately by having Amie retell the story in her own words. The story is printed below.

Pam is at school. She plays a new game. A girl tells her how to play the game. First, Pam has to run as fast as she can. She likes to run. When she runs fast, she can feel the wind on her face. Next, the girl says, "Red light!" Pam has to stop. She must stand very still. Then the girl says, "Green light!" Now, Pam can run again. She runs fast. Pam likes the new game. She wants to play it with her friend Rosa after school.

After Amie reads the story, the teacher asks some questions. Printed below is a transcript of their conversation.

| Teacher: Can you tell me what you were reading about? | Amie: It's a story about some girls. One girl is named Pam. She doesn't know how to cross the street. |
| Teacher: How do you know that Pam needs to learn about crossing the street? | Amie: Because she doesn't even know about red lights and green lights. How red is for stop and green is for go. I think she's a little kid. |
| Teacher: What happens to Pam in this story? | Amie: This other girl bosses her around. Pam wants to run in the wind. The other girl makes her stop. She tells, "Red light!" and then Pam stops. I think the other girl tells her about crossing the street when the cars stop. So, she learns about it. |
| Teacher: What else do you think Pam will do? | Amie: Maybe she'll tell the girl to stop bossing her around. |
Using your knowledge of reading comprehension, write a response in which you:

- identify one reading comprehension need demonstrated by this student;
- provide evidence of this need by citing two specific examples of the need from the student's response to the text;
- describe two different instructional strategies or activities to help address the need you identified; and
- explain why each of the strategies or activities you describe would be effective for this purpose.

FOR YOUR REFERENCE ONLY—The constructed-response item is written to assess understanding in Subarea I, Reading, which consists of the competencies listed below.

Understand the reading process.

Understand phonological skills and strategies related to reading.

Understand skills and strategies related to word identification and vocabulary development.

Understand skills and strategies involved in reading comprehension.

Understand reading instruction and study skills in the content areas.

Understand characteristic features of children's literature and strategies to promote students' literary response and analysis.
Amie demonstrates difficulty with literal comprehension, which leads to her making incorrect inferences.

An example of this can be seen in her response to the teacher’s third question. Amie infers that Pam is being “bossed around” without comprehending that the girls are playing a game.

A second example is Amie’s statement that Pam “doesn’t know how to cross the street.” In both the first and the second examples, she has over-attended to certain phrases (such as “red light”) and under-attended or bypassed the topic sentence and other relevant clues about playing a game.

Since Amie read the story aloud “fluently and accurately,” she may have been concentrating more on decoding than comprehension. Therefore, the first thing I would do is have Amie read the story silently. If, after silent reading, Amie’s answers to literal questions were still weak, I would help her “reconstruct” the story by modeling self-questioning as a strategy, using two kinds of basic questions:

1) “W” questions, like Where is Pam? What is she doing? Who is she with? and
2) sequencing questions, such as What does Pam do first? . . . Next?

At first I would ask the questions out loud and answer them myself, then I’d ask them of Amie. Finally, I’d encourage her to ask and answer her own questions. As a follow-up, I’d have Amie practice this self-questioning strategy with other passages.

This strategy would be effective in improving Amie’s literal comprehension because it models and reinforces a technique she can use to monitor her own literal understanding as she reads.

A second instructional strategy should be employed to help Amie locate and attend to relevant sections of the text. As part of regular whole-group instruction, I would make sure Amie and her classmates had plenty of exposure to stories on large charts. We would read these together, and as a class we would practice locating words, phrases, or sentences in the text that help us answer questions about the passage. For example, after sufficient teacher modeling of this process, students can be asked to “come up to the story chart with a marker and highlight (or underline) the words in the story that tell us where Pam is.” Amie would also practice in a small group or individually with the teacher, using stories that have been typed or photocopied. Amie would be given a marker and asked to locate and highlight phrases in the story that answer my questions or questions asked by members of the group. As Amie shows increasing ability to highlight the passages that substantiate her answers, she can begin to respond verbally by reading those phrases aloud. Amie could also be asked to highlight all phrases or sentences in a story that she considers to be important.

(continued)
This strategy will be effective in improving Amie’s comprehension by teaching her to revisit the text to search for relevant supporting information. By asking her to use a kinesthetic method of locating important phrases or words that support her answers, she will by necessity slow down and be more deliberate in her process of locating information in a text.
CONSTRUCTED-RESPONSE ASSIGNMENT SCORING

All responses to OSAT constructed-response assignments (written and oral) are scored using scoring scales that describe varying levels of performance. These scales were approved by committees of Oklahoma educators who reviewed both the performance characteristics and the scoring scales.

Each response is scored by multiple scorers according to standardized procedures during scoring sessions held immediately after each administration of the CEOE. Scorers with relevant professional backgrounds are oriented to these procedures before the scoring session and are carefully monitored during the scoring sessions.

A constructed-response assignment response is designated unscorable if it is blank, not on the assigned topic, illegible or unintelligible, not in the appropriate language, or of insufficient length to score. If you do not provide a scorable response for each constructed-response assignment on your test, you cannot pass the test regardless of your scores on the other section(s) of the test.

Sample Performance Characteristics for Constructed-Response Assignments

<table>
<thead>
<tr>
<th>PERFORMANCE CHARACTERISTIC</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PURPOSE</td>
<td>The extent to which the response achieves the purpose of the assignment</td>
</tr>
<tr>
<td>SUBJECT MATTER KNOWLEDGE</td>
<td>Accuracy and appropriateness in the application of subject matter knowledge</td>
</tr>
<tr>
<td>SUPPORT</td>
<td>Quality and relevance of supporting details</td>
</tr>
<tr>
<td>RATIONALE</td>
<td>Soundness of argument and degree of understanding of the subject matter</td>
</tr>
</tbody>
</table>

Sample Scoring Scale for Constructed-Response Assignments

<table>
<thead>
<tr>
<th>SCORE POINT</th>
<th>SCORE POINT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The &quot;4&quot; response reflects a thorough knowledge and understanding of the subject matter.</td>
</tr>
<tr>
<td></td>
<td>• The purpose of the assignment is fully achieved.</td>
</tr>
<tr>
<td></td>
<td>• There is a substantial, accurate, and appropriate application of subject matter knowledge.</td>
</tr>
<tr>
<td></td>
<td>• The supporting evidence is sound; there are high-quality, relevant examples.</td>
</tr>
<tr>
<td></td>
<td>• The response reflects an ably reasoned, comprehensive understanding of the topic.</td>
</tr>
<tr>
<td>3</td>
<td>The &quot;3&quot; response reflects a general knowledge and understanding of the subject matter.</td>
</tr>
<tr>
<td></td>
<td>• The purpose of the assignment is largely achieved.</td>
</tr>
<tr>
<td></td>
<td>• There is a generally accurate and appropriate application of subject matter knowledge.</td>
</tr>
<tr>
<td></td>
<td>• The supporting evidence generally supports the discussion; there are some relevant examples.</td>
</tr>
<tr>
<td></td>
<td>• The response reflects a general understanding of the topic.</td>
</tr>
<tr>
<td>2</td>
<td>The &quot;2&quot; response reflects a partial knowledge and understanding of the subject matter.</td>
</tr>
<tr>
<td></td>
<td>• The purpose of the assignment is partially achieved.</td>
</tr>
<tr>
<td></td>
<td>• There is a limited, possibly inaccurate or inappropriate application of subject matter knowledge.</td>
</tr>
<tr>
<td></td>
<td>• The supporting evidence is limited; there are few relevant examples.</td>
</tr>
<tr>
<td></td>
<td>• The response reflects a limited, poorly reasoned understanding of the topic.</td>
</tr>
<tr>
<td>1</td>
<td>The &quot;1&quot; response reflects little or no knowledge and understanding of the subject matter.</td>
</tr>
<tr>
<td></td>
<td>• The purpose of the assignment is not achieved.</td>
</tr>
<tr>
<td></td>
<td>• There is little or no appropriate or accurate application of subject matter knowledge.</td>
</tr>
<tr>
<td></td>
<td>• The supporting evidence, if present, is weak; there are few or no relevant examples.</td>
</tr>
<tr>
<td></td>
<td>• The response reflects little or no reasoning about or understanding of the topic.</td>
</tr>
<tr>
<td>U</td>
<td>The response is unscorable because it is illegible, not written to the assigned topic, written in a language other than English, or of insufficient length to score.</td>
</tr>
<tr>
<td>B</td>
<td>There is no response to the assignment.</td>
</tr>
</tbody>
</table>
SUBAREAS:

I. Mathematics
II. Science
III. Health and Fitness
IV. Fine Arts

SUBAREA I—MATHEMATICS

Competency 0001

Understand formal and informal reasoning processes, including logic and simple proofs, and apply problem-solving techniques and strategies in a variety of contexts.

The following topics are examples of content that may be covered under this competency.

Judge the validity or logic of mathematical arguments.
Evaluate the sufficiency of information provided to solve a problem.
Draw a valid conclusion based on stated conditions.
Apply inductive reasoning to make mathematical conjectures.

Competency 0002

Use a variety of approaches (e.g., estimation, mental math, modeling, pattern recognition) to explore mathematical ideas and solve problems.

The following topics are examples of content that may be covered under this competency.

Evaluate the appropriateness of using estimation to solve a given problem.
Use an appropriate model to illustrate a given problem.
Analyze the usefulness of a specific model or mental math procedure for exploring a given mathematical idea or problem.
Simplify a problem to facilitate a solution.

Competency 0003

Understand mathematical communication and the historical and cultural contexts of mathematics.

The following topics are examples of content that may be covered under this competency.

Use mathematical notation to represent a given relationship.
Use appropriate models, diagrams, and symbols to represent mathematical concepts.
Use appropriate vocabulary to express given mathematical ideas and relationships.
Apply knowledge of the role of mathematics in society and the contributions of various cultures toward the development of mathematics.
Competency 0004

**Understand skills and concepts related to number and numeration, and apply these skills and concepts to real-world situations.**

*The following topics are examples of content that may be covered under this competency.*

Use ratios, proportions, and percents to model and solve problems.

Compare and order fractions, decimals, and percents.

Solve problems using equivalent forms of numbers (e.g., integer, fraction, decimal, percent, exponential and scientific notation).

Analyze the number properties used in operational algorithms (e.g., multiplication, long division).

Competency 0005

**Understand and apply the principles and properties of linear algebraic relations and functions.**

*The following topics are examples of content that may be covered under this competency.*

Analyze mathematical relationships and patterns using tables, verbal rules, equations, and graphs.

Derive an algebraic expression to represent a real-world relationship or pattern, and recognize a real-world relationship that is represented by an algebraic expression.

Use algebraic functions to describe given graphs, to plot points, and to determine slopes.

Perform algebraic operations to solve equations and inequalities.

Competency 0006

**Understand the principles and properties of geometry, and apply them to model and solve problems.**

*The following topics are examples of content that may be covered under this competency.*

Apply the concepts of similarity and congruence to model and solve real-world problems.

Apply knowledge of basic geometric figures to solve real-world problems involving more complex patterns.

Apply inductive and deductive reasoning to solve real-world problems in geometry.

Competency 0007

**Understand concepts, principles, skills, and procedures related to measurement, statistics, and probability; and demonstrate an ability to use this understanding to describe and compare phenomena, to evaluate and interpret data, and to apply mathematical expectations to real-world phenomena.**

*The following topics are examples of content that may be covered under this competency.*

Estimate and convert measurements using standard and nonstandard units.

Solve measurement problems involving volume, time, or speed.

Interpret graphic and nongraphic representations of frequency distributions, percentiles, and measures of central tendency.

Determine probabilities, and make predictions based on probabilities.
SUBAREA II—SCIENCE

Competency 0008

Understand the interrelationships among the physical and life sciences and the connections among science, technology, and society.

The following topics are examples of content that may be covered under this competency.

Apply principles of mathematics, science, and technology to model a given situation (e.g., the movement of energy and nutrients between a food chain and the physical environment).

Analyze the effects of changes in environmental conditions (e.g., temperature, availability of water and sunlight) on plant and animal health, growth, and development.

Analyze the effects of human activities (e.g., burning fossil fuels, clear-cutting forests) on the environment and the benefits and limitations of science and technology.

Evaluate the use of science and technology in solving problems related to the effects of human activities on the environment (e.g., recycling, energy conservation).

Competency 0009

Understand the principles of life science (including biology and ecology), and use this understanding to interpret, analyze, and explain phenomena.

The following topics are examples of content that may be covered under this competency.

Infer the life science principle (e.g., adaptation, homeostasis) illustrated in a given situation.

Analyze relationships among the components of an ecological community.

Analyze the factors that contribute to change in organisms and species over time.

Analyze processes that contribute to the continuity of life (e.g., life cycles; the role of growth, repair, and maintenance).

Competency 0010

Understand the principles of physical science (including earth science, chemistry, and physics), and use this understanding to interpret, analyze, and explain phenomena.

The following topics are examples of content that may be covered under this competency.

Analyze factors and processes related to celestial and atmospheric phenomena (e.g., seasonal changes, the phases of the moon).

Analyze the forces that shape the earth’s surface (e.g., volcanism, erosion).

Distinguish between physical and chemical properties of matter and between physical and chemical changes in matter.

Infer the physical science principle (e.g., effects of common forces, conservation of energy) illustrated in a given situation.
Competency 0011

Apply inquiry skills and processes to communicate scientific information and interpret natural phenomena.

The following topics are examples of content that may be covered under this competency.

Draw conclusions and make generalizations based on examination of given experimental results.

Interpret data presented in one or more graphs, charts, or tables to determine patterns or relationships.

Apply mathematical rules or formulas (including basic statistics) to analyze given experimental or observational data.

Evaluate the appropriateness of different types of graphic representations to communicate given scientific data.

Competency 0012

Understand principles and procedures related to the design and implementation of observational and experimental scientific investigations.

The following topics are examples of content that may be covered under this competency.

Distinguish among the features of a given experimental design (e.g., dependent and independent variables, control and experimental groups).

Formulate hypotheses based on reasoning and preliminary results or information.

Evaluate the validity of a scientific conclusion in a given situation.

Apply procedures for the care and humane treatment of animals and the safe and appropriate use of equipment in the laboratory.

SUBAREA III—HEALTH AND FITNESS

Competency 0013

Understand basic principles and practices of personal, interpersonal, and community health and safety; and apply related attitudes, knowledge, and skills (e.g., decision making, problem solving) to promote personal well-being.

The following topics are examples of content that may be covered under this competency.

Apply decision-making and problem-solving skills and procedures in individual and group situations, including situations related to personal well-being, self-esteem, and interpersonal relationships.

Analyze contemporary health-related problems (e.g., HIV, teenage pregnancy, suicide, substance abuse) in terms of their causes and effects on individuals, families, and society; and evaluate strategies for their prevention.

Analyze the effects of specific practices (e.g., related to nutrition, exercise) and attitudes on lifelong personal health.

Analyze relationships between environmental conditions and personal and community health and safety.
Competency 0014

Understand physical education concepts and practices related to the development of personal well-being.

*The following topics are examples of content that may be covered under this competency.*

Recognize activities that promote the development of motor skills (e.g., locomotor, manipulative, body mechanics), perceptual awareness skills (e.g., body awareness, spatial and directional awareness), and fitness (e.g., endurance, flexibility).

Apply safety concepts and practices associated with physical activities (e.g., doing warm-up exercises, wearing protective equipment).

Understand skills necessary for successful participation in given sports and activities (e.g., dodging, spatial orientation, eye-body coordination).

Analyze ways in which participation in individual or group sports or physical activities can promote personal well-being (e.g., self-discipline, respect for self and others) and interpersonal skills (e.g., cooperation, leadership).

SUBAREA IV—FINE ARTS

Competency 0015

Understand concepts, techniques, and materials associated with the visual arts; analyze works of visual art; and understand the cultural dimensions of the visual arts.

*The following topics are examples of content that may be covered under this competency.*

Apply knowledge of basic tools, techniques, and technologies in creating different types of artwork.

Analyze how the illusion of space is created in a given two-dimensional work of art (e.g., linear perspective, overlapping elements).

Analyze a given two-dimensional or three-dimensional work of art in terms of its unifying elements.

Analyze how given works of art reflect the cultures that produced them.

Competency 0016

Understand concepts, techniques, and materials for producing, listening to, and responding to music; analyze works of music; and understand the cultural dimensions of music.

*The following topics are examples of content that may be covered under this competency.*

Compare various types of instruments (e.g., percussion, woodwind, computerized) in terms of the sounds they produce.

Apply common musical terms (e.g., pitch, tempo).

Relate characteristics of music (e.g., rhythm, beat) to musical effects produced.

Analyze how different cultures have created music reflective of their own histories and societies (e.g., call-and-response songs, ballads, work songs).
Competency 0017

Understand concepts, techniques, and materials related to theater and dance; analyze works of drama and dance; and understand the cultural dimensions of drama and dance.

The following topics are examples of content that may be covered under this competency.

Compare dramatic and theatrical forms and their characteristics (e.g., pantomime, improvisation).

Analyze how technical aspects of drama (e.g., the use of masks, costumes, props) affect the message or overall impression created by a dramatic performance.

Relate types of dance (e.g., ballet, folk dance) to their characteristic forms of movement, expressive qualities, and cultural roles.

Analyze ways in which different cultures have used drama and dance (e.g., to teach moral lessons, to preserve cultural traditions, to affirm a sense of community, to entertain).
Practice Selected-Response Questions

Competency 0005
Understand and apply the principles and properties of linear algebraic relations and functions.

1. Use the word problem below to answer the question that follows.

Janelle calls her friend Frank long-distance. The first minute of the call costs $1.23, and each additional minute costs $0.89. The total cost of the call is $15.47. For how many minutes did Janelle and Frank talk?

If \( x \) represents the total number of minutes talked, which of the following equations can be used to solve this problem?

A. \( 1.23 + 0.89 = 15.47 \)
B. \( 1.23 + 0.89(x - 1) = 15.47 \)
C. \( (1.23 + 0.89)x = 15.47 \)
D. \( (1.23 + 0.89)(x - 1) = 15.47 \)

Correct Response: B. The total number of minutes, \( x \), is the sum of the first one minute plus the number of subsequent minutes, which is the total number of minutes minus the first one minute, \( (x - 1) \). The charge for the first minute, $1.23, combined with the total charges for the subsequent minutes, $0.89(\( x - 1 \)), equals the total charge for the call, $15.47. Therefore, the total number of minutes can be found by solving for \( x \) in the equation \( 1.23 + 0.89(x - 1) = 15.47 \).
Competency 0006
Understand the principles and properties of geometry, and apply them to model and solve problems.

2. Use the diagram below to answer the question that follows.

The diagram shows five different figures on a geoboard. Which of the following statements about the figures is true?

A. All the figures have the same area.
B. All the figures have the same perimeter.
C. The sum of the internal angles of all the figures is the same.
D. The corresponding sides of all the figures are proportional.

Correct Response: A. The area of any figure equals the number of square units that can fit inside it. By this definition it can be said that the first figure has an area of two square units on the geoboard. Each of the subsequent figures is comprised of squares and half-squares, the total area of which is equal to that of the rectangle.
Recent scientific research indicates that the destruction of the earth's protective ozone layer may cause sharp declines in the populations of krill and other microscopic plants and animals in the oceans. How would such declines be expected to affect the food web shown in the diagram above?

A. The numbers of sardines and herring would increase as those organisms took over habitats formerly used by krill and other microscopic organisms.

B. All organisms in the food web would suffer sharp population declines as their main food sources became increasingly scarce.

C. There would be a decrease in sardine and herring populations, but other organisms in the food web would be unaffected.

D. All other organisms in the food web would experience a brief decline in population but would then return quickly to their original size.

Correct Response: B. The organisms at each level of the food web are dependent upon the organisms in the level above them for their main source of food. Therefore, a decline in the population of any organism will cause a decline in all organisms beneath it in the diagram. So the decline of krill and other microscopic plants and animals causes the decline not only of sardines and herring but of all organisms lower on the web.
Competency 0012
Understand principles and procedures related to the design and implementation of observational and experimental scientific investigations.

4. **Use the information below to answer the question that follows.**

An experiment is being conducted on the effects of temperature on the incubation of chicken eggs. One hundred chicken eggs are divided into two groups of 50 eggs each and placed into two incubators set at different temperatures. The eggs are approximately the same size and were laid and gathered on the same day.

To ensure the validity of this experiment, it is important to consider which of the following elements of experimental design?

I. The size of each experimental group is large enough to minimize effects due to random variation among the eggs.

II. A control group is set up to correspond to each of the experimental groups.

III. The eggs are randomly distributed between the experimental groups.

IV. All conditions, except for temperature, are identical for each group of eggs.

A. I and II only

B. IV only

C. II and III only

D. I, III, and IV only

**Correct Response: D.** Given that there are natural variations in the eggs, an adequately large group is needed to guard against the possibility that a small group might by chance contain individual eggs sharing pronounced characteristics. The eggs must be randomly distributed between the two test groups to eliminate any characteristics independent of temperature that might affect incubation. All other conditions must also be equal to exclude other variables that may affect incubation.
Competency 0013
Understand basic principles and practices of personal, interpersonal, and community health and safety; and apply related attitudes, knowledge, and skills (e.g., decision making, problem solving) to promote personal well-being.

5. Which of the following practices is most effective in preventing illnesses caused by food-borne bacteria such as *Salmonella* and *E. coli*?

A. washing hands carefully before eating

B. cooling hot food to room temperature before refrigerating

C. ensuring that food is cooked thoroughly

D. wiping food preparation surfaces with a damp sponge or towel

**Correct Response: C.** The most effective means of preventing infection by food-borne bacteria is thorough cooking, which kills the bacterial pathogens.
Competency 0014
Understand physical education concepts and practices related to the development of personal well-being.

6. When participating in activities such as bicycling and rollerblading, the most effective way to avoid serious injury is to:

A. wear properly fitting protective equipment.
B. avoid areas with hard paved surfaces.
C. travel at a very low speed.
D. practice falling in a safe manner.

Correct Response: A. The most effective way to avoid injury when bicycling or rollerblading is to wear protective equipment that will protect the body in unforeseen accidents.
Competency 0015
Understanding concepts, techniques, and materials associated with the visual arts; analyze works of visual art; and understand the cultural dimensions of the visual arts.

7. Use the reproduction below of the painting entitled *Stone City, Iowa* by Grant Wood to answer the question that follows.

Which of the following contributes most to the sense of rhythm in this painting?

A. naturalistic rendition of form
B. use of formal perspective
C. repetition of shapes
D. establishment of uniform value

Correct Response: C. In a work of visual art, as in music, repetition tends to establish a rhythm. In *Stone City, Iowa*, Grant Wood has used this device to create a variety of rhythmic effects, from the slow, rolling rhythm of the mound-shaped hills, to the trees that seem to march across the middle ground, to the lively staccato rhythm of the seedlings beneath the viewer's feet.
### ACKNOWLEDGMENTS

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