

Commonwealth Accountability Testing System

Grade Kentucky Core Content Test Spring 2007 Phase II

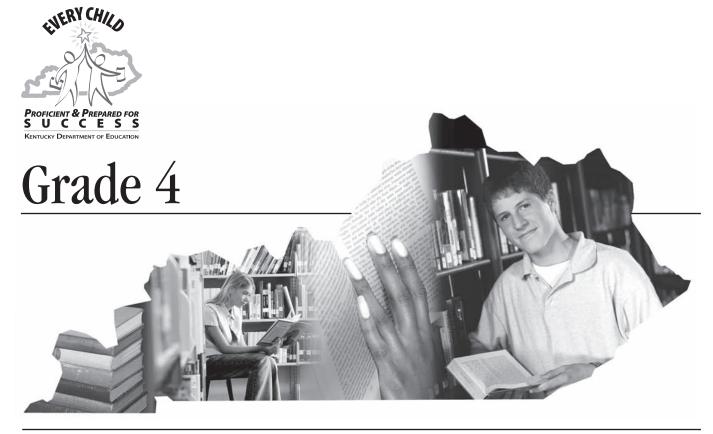


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The following is the general guide that will be used to evaluate your answers to open-response questions.

Kentucky General Scoring Guide

Score Point 4	 You follow all directions and finish all parts of the question. You are able to answer the question clearly so that others can understand. You show that you completely understand the information that is asked about. You show and/or explain the quickest and best way to get an answer. You are able to show and explain what you know by using complex examples, by showing connections between ideas and the real world, by comparing different ideas, and/or by showing how the ideas work together.
	• You follow the directions and finish most of the parts of the
Score Point 3	 Four follow the directions and mish most of the parts of the question.
	• You are able to answer the question clearly so that others can understand.
	• You show and/or explain that you understand the big ideas about the question but there may be a few little mistakes or wrong ideas.
	• You follow some of the directions and finish some parts of the question.
Score Point 2	
Score Point 2	the question.Your answer may not be complete but it is clear so that
Score Point 2	the question.Your answer may not be complete but it is clear so that others can understand.You understand only parts of the information to answer the
Score Point 2 Score Point 1	the question.Your answer may not be complete but it is clear so that others can understand.You understand only parts of the information to answer the
	 the question. Your answer may not be complete but it is clear so that others can understand. You understand only parts of the information to answer the question. You understand only a small part of the information asked
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	 the question. Your answer may not be complete but it is clear so that others can understand. You understand only parts of the information to answer the question. You understand only a small part of the information asked for in the question.
Score Point 1	 the question. Your answer may not be complete but it is clear so that others can understand. You understand only parts of the information to answer the question. You understand only a small part of the information asked for in the question. You only answer a small part of the question. Your answer is completely wrong or has nothing to do with



Reading

This document represents Phase II of the 2007 released items for Grade 4 Reading. Whereas the first phase provided released multiple-choice items, an open-response item, and general scoring information about the questions, this phase includes specific information to assist teachers in scoring student responses to the open-response item and suggestions for instruction.

The open-response item, the Academic Expectation(s), the codes from the Core Content for Assessment Version 4.1, the Depth of Knowledge, the percentage of test takers receiving each score point, as well as the scoring guide describing expectations for each score point are followed by actual student responses for the "4," "3," "2," "1," and "0" score points. Each student paper is accompanied by commentary explaining the rationale for the score given. For most open-response items, there are multiple ways to score a "1," a "2," and often a "3," depending on the item. At times, students' responses provide clear responses for some parts of the item, but general or limited responses for other parts of the item. As a general rule, the scoring guide does not articulate all possible ways to score a "1," a "2," or a "3," but instead provides one or more ways to earn a particular score point. Scorers are trained to expect descriptions that are not exhaustive of all the possible ways students may receive each score point in the scoring guide. Instead scorers are trained to make a holistic determination of where each response falls within the articulated point descriptions.

Following the annotated student responses, ideas are presented for designing classroom activities that relate to the Core Content for Assessment Version 4.1.

Grade

Reading Released Items – Spring 2007

Open-Response Item Scoring Worksheet

Birbal and the Barber

The last sentence of the passage says that Birbal "went to tell the barber the good news, with a little smile tugging at the corners of his mouth."

- a. Describe the good news Birbal was going to tell the barber.
- b. Explain TWO reasons why Birbal might have been smiling.

Use examples from the passage to support your answers.

Academic Expectation: 1.2

Students make sense of the variety of materials they read.

Core Content Code: RD.04.3.0.01

Students will explain a character's or speaker's actions based on a passage.

Depth of Knowledge: 3

Percentage of test takers in 2007 who received

a score of 4: 4 a score of 3: 15 a score of 2: 58 a score of 1: 16 a score of 0: 6 Percentage of blank responses: 0

Reading Passage

The passage below is about a king who comes to understand that he made a mistake. Read the passage to learn about the king's mistake. Then answer the questions that follow.

Birbal and the Barber By T.V. Padma

King Akbar ruled India many bundreds of years ago. He did not know how to read or write, but he was a very good king. He surrounded himself with wise **ministers**, who gave him advice about ruling the country. The cleverest of these ministers was Birbal, who often used his sense of humor to make the king aware of his mistakes.

MANY YEARS AGO, when Akbar ruled almost all of India, there lived a man called Birbal. Birbal was so wise that he became a minister in Akbar's court when he was very young.

One morning Birbal was strolling along the marble terrace of Akbar's palace, when he saw Akbar's barber **sobbing** behind a rosebush. He hurried over and patted the poor barber gently on the shoulder.

ministers – helpers sobbing – crying "What is the matter?" he asked.

"The king has ordered me to leave his kingdom forever," the barber said through his tears.

"Leave the kingdom forever? Why would he want you to do that?"

"This morning, the king stubbed his toe and was stung by a bee right after he saw me. He says all this must have been my fault because I have an unlucky face. He wants to banish me so that he will never have to set eyes on my face again," replied the barber.

Birbal shook his head in disbelief. "Help me. Please help me. You are my only hope," begged the barber as he began to cry again.

Birbal handed the barber a silk handkerchief. "Take this and dry your tears, my good man. No one in the world has an unlucky face, and I will see to it that you are not punished unjustly."

"Will you speak to the king today, sir?" asked the barber.

"Wait here. I will go to see the king right now," promised Birbal.

He marched back up the marble steps into the palace. He stopped outside the courtroom, unwrapped his turban, and blindfolded his eyes with the cloth.

"Would you guide me into the courtroom, so that I am face to face with the king?" he asked the guard. Birbal often did strange things, and the guard knew this. He took Birbal's arm and led him in.

Akbar was seated on his jeweled throne. His eyebrows shot up in surprise as he watched Birbal, blindfolded, stumbling in with the guard's help.

"Birbal, is something wrong? Did someone hurt you?" he asked with alarm. "No, your highness," replied Birbal cheerfully, smiling up at Akbar.

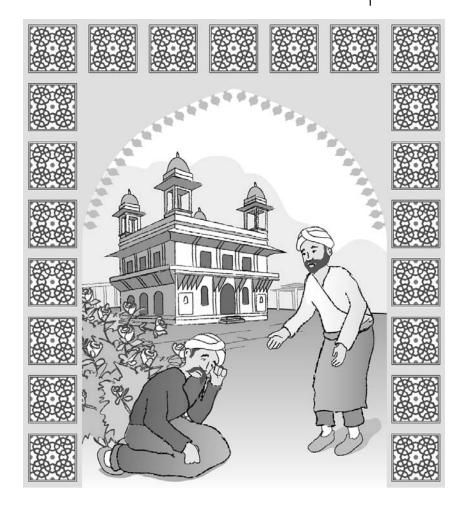
"Then what is the matter with you?" asked Akbar in a puzzled tone. "Why are you wearing a blindfold?"

"Forgive me, your highness. I am wearing a blindfold because I cannot risk seeing your unlucky face," said Birbal.

There was shocked silence in the courtroom. The guards and ministers gazed in horror at Birbal. How could he be so rude to the king? He must have gone crazy!

"My unlucky face! How dare you call my face unlucky? I am your king! I rule almost all of India. I am just and kind and wise and good. Have you forgotten all that I am, you fool?" Akbar thundered.

"Would you let me explain, please, your highness?" Birbal calmly asked.



"Explain, and be quick about it!" roared the king. His shiny, black mustache quivered with fury.

"Well, your highness, I met your barber this morning. He said you told him that he has an unlucky face."

"Yes I did, Birbal. After I saw his face, I stubbed my toe and was stung by a bee. Is that not unlucky?"

"Of course it was most unfortunate, your highness, but did you think about what happened to the barber after he saw your face? The poor man lost his job and is about to be banished from your kingdom. Don't you think your face is unluckier than his? After all, his face only causes bee stings and stubbed toes. Your royal face can bring so much bad luck to someone that he may be forced to leave the land he loves forever."

Akbar was silent for a moment. Then his eyes began to twinkle. He threw back his head and laughed. Laughter rippled through the great hall and tumbled out into the garden.

"You have brought me to my senses again," Akbar said to him. "You shall be given a bag of gold for being bold enough to make me see how silly I was to blame the barber's face for my bad morning."

"What about the barber, sir?" asked Birbal as he undid his blindfold.

"Give him a bag of gold, too. Tell him that he may work for me and live in my kingdom for as long as he wishes."

Birbal bowed to the king and went to tell the barber the good news, with a little smile tugging at the corners of his mouth.

Item Scoring Guide

SCORE	DESCRIPTION
4	Student clearly describes the good news Birbal was going to tell the barber. Student clearly explains two reasons why Birbal might have been smiling. Response is supported with examples from the passage.
3	Student generally describes the good news Birbal was going to tell the barber. Student generally explains two reasons why Birbal might have been smiling. Response is supported with examples from the passage.
2	 Student provides a limited description of the good news Birbal was going to tell the barber. Student provides a limited explanation of two reasons why Birbal might have been smiling. Response may be supported with few or no examples from the passage. OR Student provides a general explanation of the good news Birbal was going to tell the barber. Part b is missing or incorrect. OR Student provides a general explanation of two reasons why Birbal might have been smiling. Part a is missing or incorrect.
1	Student demonstrates minimal understanding (e.g., student provides a limited description of the good news Birbal was going to tell the barber or a limited explanation of one reason why Birbal might have been smiling).
0	Student's response is totally incorrect or irrelevant.
Blank	No student response.

Answer Information:

Part a – The "good news" Birbal had to tell the barber was that the king was not going to banish him from the kingdom and that he would be able to work in the kingdom for as long as he wished. He was also going to tell the barber that the king had given him a bag of gold.

Part b – Some reasons why Birbal might have been smiling

- He had succeeded in showing the king how silly the king had been to blame the barber's face for his bad morning.
- The king had given him a bag of gold for being so bold as to blindfold himself and pretend that the king had an unlucky face.
- He was happy to give the barber a bag of gold from the king.
- He was happy to tell the barber the good news about not being banished.

SAMPLE 4-POINT RESPONSE OF STUDENT WORK (A)

NOTES

1

43. A. Birbal was going to tell the barber some really good news. Birbal would come out of the palace and to the rosebush where the barber sobbed. Birbal would come with a little smile tugging at the corners of his mouth. He would tell the barber that he has good news for him. Then the barber will turn his frown upside down. Then Birbal will say to the barber that the king/Akbar said the barber does not have an unlucky face. Then he will tell the barber that he can work for the king again and he gets a bag of gold. That is what the good news is.

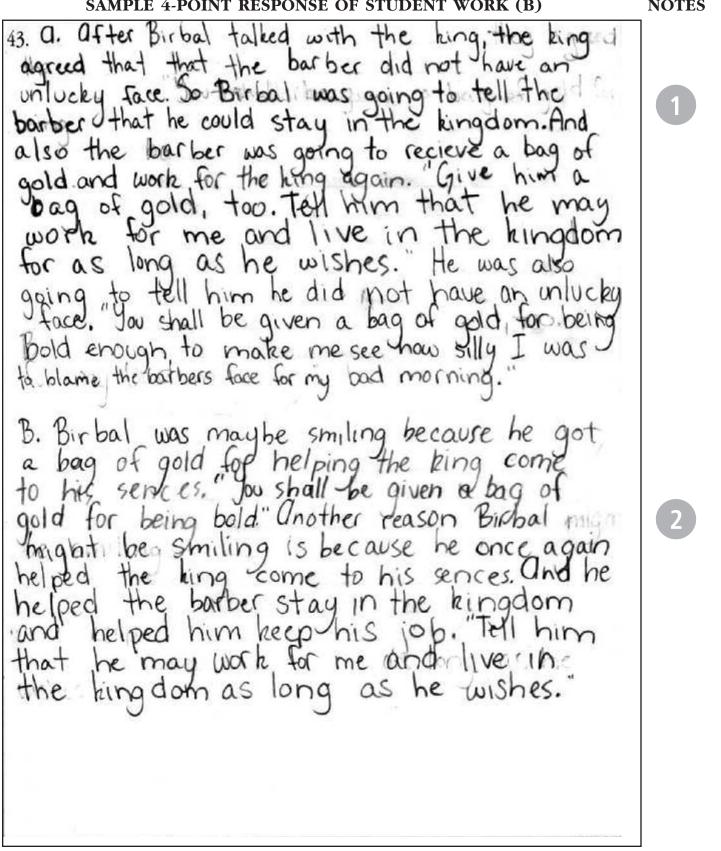
B. I think Birbal should have a smile on his face. The reason for this is because he provied Akbar wrong. He told him that nobody has an unlucky face. That is one reason for Birbal to be smiling. Firother reason he should be smiling is because he has a bag of gold. Now he can do about anything with the gold. He got the gold from the king for being bold enough to make the king look silly. Those are reasons Birbal should be smiling.

ANNOTATION – 4-POINT RESPONSE (A)

- The student clearly describes the good news Birbal was going to tell the barber (i.e., the King/Akbar said the barber does not have an unlucky face; he can work for the king again, and he gets a bag of gold). The response is supported with detailed examples from the passage.
- The student clearly explains two reasons why Birbal might have been smiling (i.e., he proved Akbar wrong, that nobody has an unlucky face; he got the gold from the king for being bold enough to make the king look silly). The response is supported with detailed examples from the passage.

Overall, the student demonstrates a clear understanding of the character's actions based on the passage. The response contains all the information necessary to receive a score of "4."

SAMPLE 4-POINT RESPONSE OF STUDENT WORK (B) **NOTES**



ANNOTATION – 4-POINT RESPONSE (B)

The student clearly describes the good news Birbal was going to tell the barber (i.e., the barber could stay in the kingdom; he was going to receive a bag of gold and was going to work for the king again; he did not have an unlucky face). The response is supported with detailed examples from the passage.

2

The student clearly explains more than two reasons why Birbal might have been smiling (i.e., he got a bag of gold for helping the king come to his senses; he helped the barber stay in the kingdom; he helped the barber keep his job). The response is supported with detailed examples from the passage. Because the question only asked for two reasons, the additional reasons do not count towards the student's score.

Overall, the student demonstrates a clear understanding of the character's actions based on the passage. The student uses direct quotes from the passage as examples, which is not required by the question. The response contains more information than is necessary to receive a score of "4." Because this additional information is correct and contains no errors, it does not affect the student's score.

SAMPLE 3-POINT RESPONSE OF STUDENT WORK NOTES 43. a. The that he 9000 news Was going to tell the barber was he was going to det a bag and that he can work for as he wishes and live in the was that of gold DAG Kingdom as long as he wishes. Birbal might have been smiling because and the barber were going to He bad 700 of a get 2 because he taught think also lesson again. the King a , have also been smiling He man made the barber, king, Loeca use vappy. and hinself

ANNOTATION – 3-POINT RESPONSE

- The student generally describes the good news Birbal was going to tell the barber (i.e., he was going to get a bag of gold; he can work for as long as he wishes and live in the kingdom as long as he wishes). The response is supported with general examples from the passage.
- The student generally explains two reasons why Birbal might have been smiling (i.e., he and the barber were going to get a bag of gold; he taught the king a lesson again). The student provides some support for the explanation by making an inference (i.e., he made the barber, king, and himself happy).

Overall, the student demonstrates a general understanding of the character's actions based on the passage. The student's response to each part is complete, but the response as a whole is general, lacking the detail required for a score of "4."

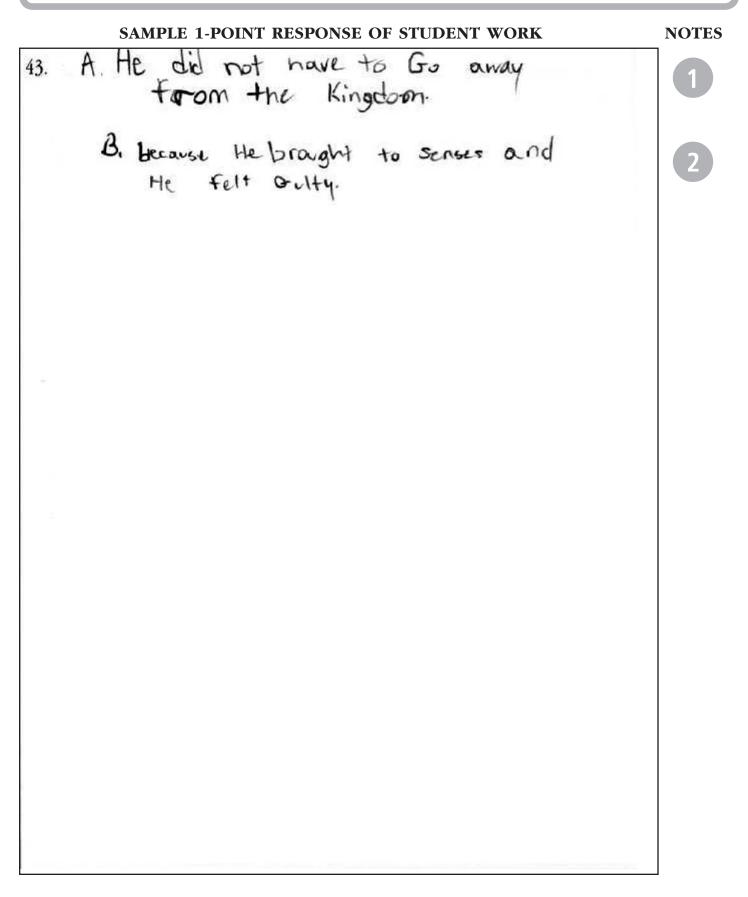
SAMPLE 2-POINT RESPONSE OF STUDENT WORK **NOTES** 43. A Birbal was going to tell the barber that he tight have to leave the kingdom. B) The first reason is that the barber didn't have to leave and the second reason is the he just got a bag of gold for being brave.

ANNOTATION – 2-POINT RESPONSE

The student provides a limited description of the good news Birbal was going to tell the barber (i.e., he didn't have to leave the kingdom). The response is not supported with examples from the passage.

The student provides a limited explanation of two reasons why Birbal might have been smiling (i.e., the barber didn't have to leave; he just got a bag of gold for being brave). The response is not supported with examples from the passage.

Overall, the student demonstrates a limited understanding of the character's actions based on the passage. The student responds to all parts of the question, but the response does not use examples from the passage to support the answers.



ANNOTATION – 1-POINT RESPONSE

- The student provides a limited description of the good news Birbal was going to tell the barber (i.e., he did not have to go away from the kingdom). The response is not supported with examples from the passage.
- The student attempts to explain two reasons why Birbal might have been smiling, but the first reason is incomplete—the reference to the king is missing—and the meaning of the second reason is unclear. The response is not supported with examples from the passage.

Overall, the student demonstrates minimal understanding of the character's actions based on the passage. The student provides only a limited description of the good news Birbal was going to tell the barber. The explanation of two reasons why Birbal might have been smiling is incomplete, and the student receives no credit for this part of the response.

SAMPLE 0-POINT RESPONSE OF STUDENT WORK **NOTES** 43. A. Barber was going to tell Birbal that he has a bag of gold but instead he said the has an unlucky face. B. Birbal might have been smiling because he would have been happy that Barber will leave India or he was smiling because he had something on his face.

ANNOTATION – 0-POINT RESPONSE

The student does not describe the good news Birbal was going to tell the barber.

The student attempts to explain two reasons why Birbal might have been smiling that indicate a misunderstanding of the passage.

Overall, the student does not demonstrate any understanding of the character's actions based on the passage. The student does not correctly respond to any part of the question.

Reading Strategies and Instructional Activities

The open-response question for *Birbal and the Barber* was designed to assess students' (1) ability to make sense of the variety of materials they read, and (2) ability to explain a character's actions based on a passage. The learning experiences present ideas for helping students explore and master these concepts.

Reading Strategies can be organized into seven categories. In this document, instructional activities are organized under these seven categories.

Provide opportunities for students to work individually, in pairs, in small groups, or as a class to complete (with teacher guidance and support) any or all of the following learning experiences for a story (could be any type of reading) being read by the class:

1. Prediction/Making Inferences

Ask the students, "What does it mean to predict?"

Read this paragraph:

The weather forecasters on television look at clouds on the radar and try to predict what the weather will be like today, tomorrow, and a few days ahead. They don't just guess; they find clues that tell them what the weather will be like. They also combine those clues with what they already know to make those predictions. Just like those weather forecasters, we are going to learn how to predict from the passages that we hear or read. We are going to look and listen for clues and combine them with what we already know to tell us what will happen next. Predicting can help us become better readers and writers. As we read, we can see if our predictions come true.

Ask the students to think of what they already know and to respond:

- What do you predict you will see when you visit a pet store?
- What kinds of shows do you predict will be on Saturday morning television?
- Your friend asks you to go to a movie called "Monsters of the Deep". What do you predict the movie will be about?

Ask: Where can you make predictions in a story? Suggested responses:

The most important prediction should come as you read the title or a headline.

Other predictions may happen when you read chapter headings or subtitles, when the author of the story asks a question, or when a character in a story is about to do something.

Students use predictions and inferences to help guide their comprehension. Predictions encourage active reading and keep students interested, whether or not the predictions are correct. Incorrect predictions can signal a misunderstanding that needs to be revisited.

Instruct students:

Before reading, look at the pictures, table of contents, chapter headings, maps, diagrams, and features. Write down predictions about the text. Look for words or phrases during reading that confirm or dispute those predictions. Revise or change predictions made before reading based on information gained while reading.

2. Questioning (From Janet Allen's *Tools for Content Literacy*) Anticipation Guide

Anticipation Guides serve as a bridge between students' background knowledge and their ideas and beliefs. By using this learning experience before you begin your lesson, you can help students develop a personal interest in the topic to be explored and in questions they are interested in answering as they read. In addition, this guide provides a basis for discussion so you can uncover any misconceptions or strongly held beliefs that might need to be examined before, during, and after reading. Anticipation Guides are excellent tools, both for prereading support and postreading evaluations.

After choosing the text students will read, analyze the text for critical ideas, information, and issues. Determine key ideas about which students may have background knowledge and information or issues about which students might have misinformation.

Write several (usually three to eight) statements or questions that will precipitate discussion around each of the key points. Do not make the statements dependent on reading the passage; rather, create statements around which students can state their opinions without having read the text. The statements should tap into students' background knowledge.

Introduce the topic to students and give them the following directions:

- Read each of the key ideas and note whether you agree or disagree with the statement.
- Work with a partner or small group to discuss each of the key ideas or questions, comparing and contrasting your original responses/thoughts to the statements and questions.
- Read the assigned text.
- Revisit the statements and questions after reading to see whether you have found any answers to your questions or agree or disagree with the statements previously made.
- Once you have determined your position in relation to the statements, note whether you believe the author would agree or disagree with them.

Use students' responses to the statements in the Anticipation Guide as the foundation for discussion and/or as a way for students to develop further questions for future inquiry and reading.

(From Janet Allen's *Tools for Content Literacy*) Concept Ladder When readers develop their own questions prior to reading they have already thought about the content of the upcoming reading. When this occurs, they have made a move toward becoming a strategic reader.

A Concept Ladder is an advanced organizer used to help students develop questions that will guide their reading and understanding of a text. Students develop a question for each rung of the ladder based on their existing background knowledge and/or a common reading experience around a concept. These questions then help establish a purpose for reading.

Prior to beginning a reading assignment, an inquiry project, or a major unit of study, read a text to your students that would be meaningful to them and provide them with a rich content background for this topic.

After reading this text, ask students to generate questions they expect will be answered with further reading and research. Students can chart these questions and record answers as they are discovered.

3. Making Connections

Give students two colors of sticky notes. As students read a story, have them put sticky notes of one color next to a character's actions and sticky notes of the other color next to the consequences of a character's actions.

To illustrate cause-and-effect relationships, show the class a pencil. Then let go of the pencil and let it fall to the desk or floor. Ask students to tell you the cause (you let go of the pencil and gravity pulled it downward) and the effect (the pencil fell to the desk/ floor) of this action.

Present other simplified examples to develop an understanding of the cause-and-effect relationship of people's actions (e.g., a boy forgets to close the door, and the dog gets out and runs away). Have them use examples from their own lives to illustrate cause and effect relationships.

Have students work in pairs to create "relationship" puzzles. Each pair of students writes the cause for a given action or the effects of a given action (e.g., ______ because he has a hole in his pocket. Jill did not lock the door on the hamster cage so_____.) Student pairs can then exchange puzzles and try to solve them with a plausible action.

4. Visualizing

Have students role-play characters from a story. As a student pretends to be a character and goes through the actions of the character in the story, his or her words, tone of voice, gestures, etc., should reveal the character's physical traits, personality traits, feelings, and the reasons for the character's actions during the story.

Create cause-and-effect trees to help students identify cause-and-effect relationships between a character's actions and events in a story. Be sure students realize that one cause may have several effects, or several causes may lead to one effect.

- Brainstorm the cause-and-effect relationships found in the text.
- On the chalkboard, the whiteboard, or a large sheet of paper, draw a tree to which you can later add branches.
- Write one cause from the story on the trunk of the tree.
- Determine one effect of the cause.
- Draw a branch on the tree and write that effect on the branch. If there is more than one effect for the cause, draw another branch and write that effect on it.
- Have students use different causes that were provided during the brainstorming session to develop their own cause-and-effect trees.

5. Summarizing

Play a game called "Hot Seat":

- Divide students into groups and assign each group a character from the story being read.
- Give each group the task of becoming "experts" on the character they are assigned.
- Ask each group to identify and describe their character's physical traits, personality traits, feelings, and the reasons for his/her actions during the story.
- Ask each group to come to the front of the room to be put on the "Hot Seat." The selected group sits in a semicircle facing the class while the rest of the class asks them questions.
- As each question is asked, the group puts their heads together to come up with a team answer and selects one member to share it.

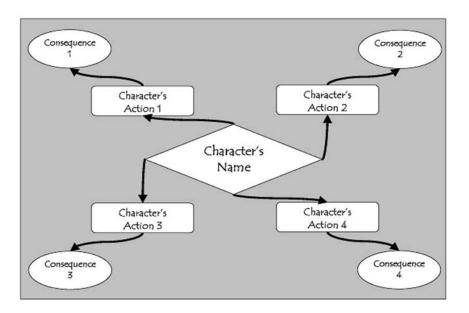
(This activity generally takes more than one day to complete, but it helps students learn to ask and answer both simple recall and in-depth analysis questions.)

Create a character map for a character in the story:

- Place a character's name in a box in the middle a sheet of paper.
- Identify one of the character's actions in the story and write it in a box (an action box) near the character's name box.
- Draw a line from the action box to the character's name box.
- Continue identifying the character's actions until students cannot think of any others.

- Explore one action box at a time and determine the consequences of that action.
- Write each consequence in a box (a consequence box) near the action box and draw a line to connect the boxes.

(Students can use this character map to write what they have learned about the character. This type of character map focuses on the character's actions and the consequences of those actions, which provide students with insights about the character. (See http://home.att.net/~teaching/litcircl/charmap.pdf for an example of an additional type of character map that students might create.)



6. Self-Monitoring (Fix-Up Strategies)

Readers need explicit instruction to become aware of their thinking as they read, detect obstacles and confusions that derail understanding, and understand how strategies can help them repair meaning when it breaks down.

Read a chosen text. Explain "Fix-Up Strategies" (When I don't understand what I read, I do certain things to make sure that I understand before I continue reading.)

On a chart with "Fix-Up Strategies" at the top, record what you do to monitor and repair comprehension during think-alouds while reading various texts. (For example: *notice* when understanding is lost, *stop and go back* to clarify thinking, *reread* to enhance understanding, *read ahead* to clarify meaning, *identify and talk about* what is confusing about the text, *recognize that all questions about a text have value*, *sound it out*, *speak to another reader*, *read the text aloud*, *go slow*.)

Read and stop for 2 or 3 think-alouds. ("While I was reading ______, I realized that I didn't understand ______so I used the Fix-Up Strategy ______to help me understand.")

Explain that the purpose of Fix-Up Strategies is to monitor and repair comprehension while listening to and reading text.

Invite children to share their Fix-Up Strategies as you read texts.

Model the use of a *Fix-Up Strategy T-Chart*, and let students use in independent reading.

Send students off to do independent reading and remind them to use Fix-Up Strategies.

Ask students to think aloud about their Fix-Up Strategies during independent reading conferences.

Record their responses on chart paper as they share their thinking aloud with the group.

7. Determining Importance of Information (From Janet Allen's *Tools for Teaching Content Literacy*) Skimming and Scanning

Skimming and scanning requires a reader to look quickly and find the most important features and information in a text. As students are assigned greater amounts of reading, given more opportunities for research, and asked to read content texts with a significant amount of information, knowing how to skim and scan becomes a critical reading/study skill. Acquisition of this skill will enable students to allocate study time to the portions of the text that meet their reading purposes.

Give students a reading assignment that is expository, such as a chapter of a textbook.

Prior to reading the entire text, ask students to work in pairs to skim and scan the assigned reading by looking at the title, the headings and subheadings, the visuals (charts, graphs, photographs, art), the boldfaced words, and the first and last paragraphs. Allow several minutes for students to complete this task, and then ask them to discuss and decide on what they think this reading will be about.

Using a Skimming and Scanning form (three columns – First Impressions, Fast Facts, and Final Thoughts) engage the whole class in compiling their questions and comments in the First Impressions column.

Ask students to examine those First Impressions and write down several facts they discovered in this limited reading. Compile the facts in the Fast Facts column.

Ask students to look at the class chart of First Impressions and Fast Facts, and determine what they believe will be important points or questions (Final Thoughts) that will be answered from reading this chapter.

At this point, you could assess students' ability to use text features and critical thinking as part of the Skimming and Scanning process by assigning a topic and asking them which parts of the text they would read to find out more information about it. Discussion of the strategies used to quickly determine where and what to read will help solidify students' skills in Skimming and Scanning.



Science

This document represents Phase II of the 2007 released items for Grade 4 Science. Whereas the first phase provided released multiple-choice items, an open-response item, and general scoring information about the questions, this phase includes specific information to assist teachers in scoring student responses to the openresponse item and suggestions for instruction.

The open-response item, the Academic Expectation(s), the codes from the Core Content for Assessment Version 4.1, the Depth of Knowledge, the percentage of test takers receiving each score point, as well as the scoring guide describing expectations for each score point are followed by actual student responses for the "4," "3," "2," "1," and "0" score points. Each student paper is accompanied by commentary explaining the rationale for the score given. For most open-response items, there are multiple ways to score a "1," a "2," and often a "3," depending on the item. At times, students' responses provide clear responses for some parts of the item, but general or limited responses for other parts of the item. As a general rule, the scoring guide does not articulate all possible ways to score a "1," a "2," or a "3," but instead provides one or more ways to earn a particular score point. Scorers are trained to expect descriptions that are not exhaustive of all the possible ways students may receive each score point in the scoring guide. Instead scorers are trained to make a holistic determination of where each response falls within the articulated point descriptions.

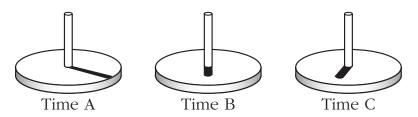
Following the annotated student responses, ideas are presented for designing classroom activities that relate to the Core Content for Assessment Version 4.1.

Grade **Science** A Released Items – Spring 2007

Open-Response Item Scoring Worksheet

Shadows of a Sundial

The pictures below show a sundial and its shadow at three different times during the day.



- a. On the next page, draw where the sun would be to make the shadow shown in EACH of the pictures.
- b. Explain why the position of the shadow on the sundial is in different places during the day.

Academic Expectation: 2.2

Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.

Core Content Code: SC.04.2.3.04

Students will identify patterns, recognize relationships and draw conclusions about the Earth-Sun system by interpreting a variety of representations/models (e.g., diagrams, sundials, distance of sun above horizon) of the sun's apparent movement in the sky.

Changes in movement of objects in the sky have patterns that can be observed, described and modeled. The Sun appears to move across the sky in the same way every day, but the Sun's apparent path changes slowly over seasons. Data collected can be used to identify patterns, recognize relationships and draw conclusions about the Earth and Sun system.

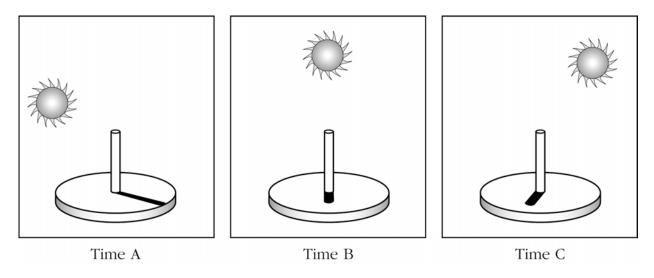
Depth of Knowledge: 3 Percentage of test takers in 2007 who received a score of 4: 9 a score of 3: 27 a score of 2: 47 a score of 1: 8 a score of 0: 8 Percentage of blank responses: 1

Item Scoring Guide

SCORE	DESCRIPTION
4	Student correctly draws where the sun would be to make the shadow shown in each of the pictures. Student clearly explains why the position of the shadow on the sundial is in different places during the day.
3	Student correctly draws where the sun would be to make the shadow shown in each of the pictures. Student generally explains why the position of the shadow on the sundial is in different places during the day. The response may contain minor errors or misconceptions.
2	 Student correctly draws where the sun would be to make the shadow shown in two of the pictures. Student provides a limited explanation of why the position of the shadow on the sundial is in different places during the day. OR Student correctly draws where the sun would be to make the shadow shown in each of the pictures. Response to part b is missing or incorrect.
1	Student demonstrates minimal understanding (e.g., student correctly draws where the sun would be to make the shadow shown in one of the pictures).
0	Student's response is totally incorrect or irrelevant.
Blank	No student response.

Answer Information:

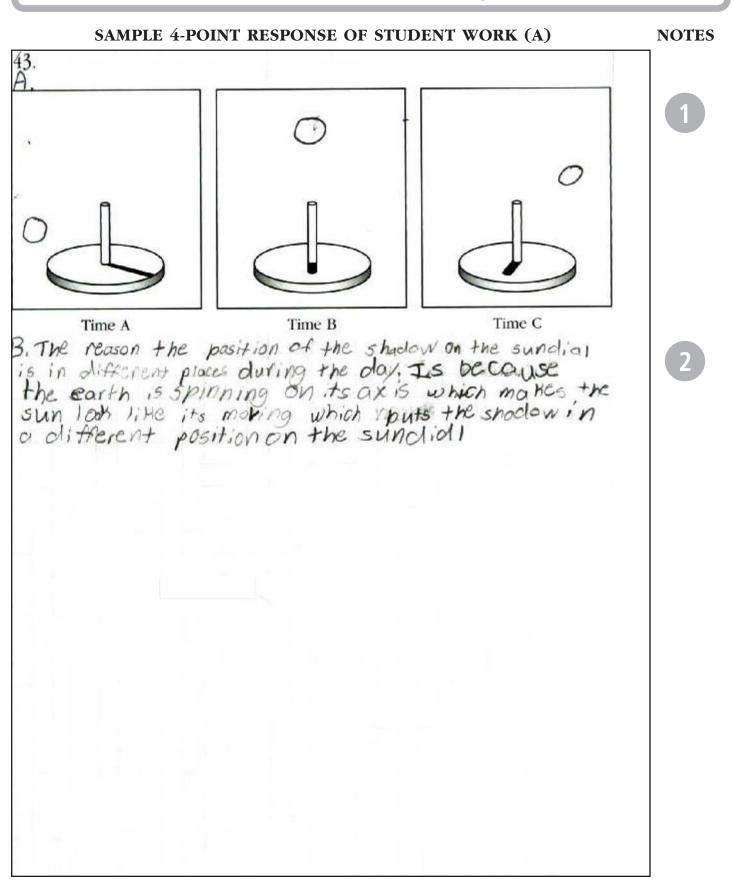
Part a –



- Time A shows sun low to the left of sundial.
- Time B shows sun high directly above sundial.
- Time C shows sun higher than Time A and just to the right of sundial.

Note: Item does not require textual description of where the sun would be.

Part b – During each day, the position of the shadow is in different places because the sun appears to move across the sky from sunrise to sunset. (Student may indicate that the apparent motion of the sun is due to the rotation of Earth on its axis.)



ANNOTATION – 4-POINT RESPONSE (A)

- The student correctly draws where the sun would be to make the shadow shown in each of the pictures.

The student clearly explains why the position of the shadow on the sundial is in different places during the day (i.e., Earth is spinning on its axis which makes the sun look like it is moving).

Overall, the student demonstrates a clear understanding of the Earth-Sun system by interpreting a representation of the sun's apparent movement in the sky. The response contains all the information necessary to receive a score of "4."

SAMPLE 4-POINT RESPONSE OF STUDENT WORK (B) **NOTES** 43. Time C Time A Time B STAD Irda Nova why the shadow on the dile 15IN O 63 when the cart hotertas a san look like is is no 2 Gh Mal

ANNOTATION – 4-POINT RESPONSE (B)

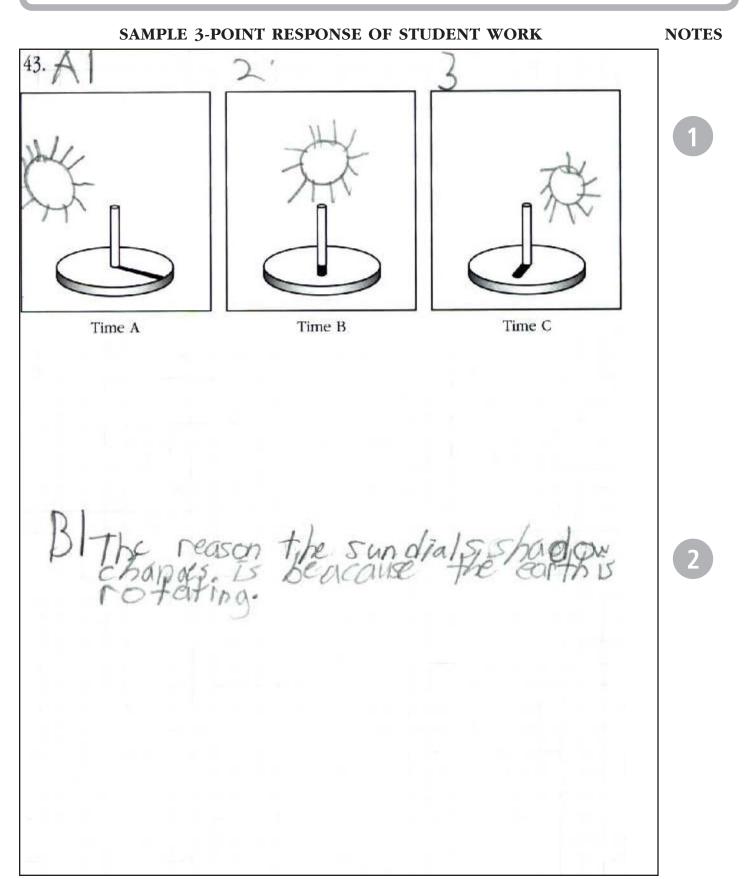


The student correctly draws where the sun would be to make the shadow shown in each of the pictures.



The student clearly explains why the position of the shadow on the sundial is in different places during the day (i.e., when the earth rotates on its axis, it makes the sun look like it is moving across the sky).

Overall, the student demonstrates a clear understanding of the Earth-Sun system by interpreting a representation of the sun's apparent movement in the sky. The response contains all the information necessary to receive a score of "4."

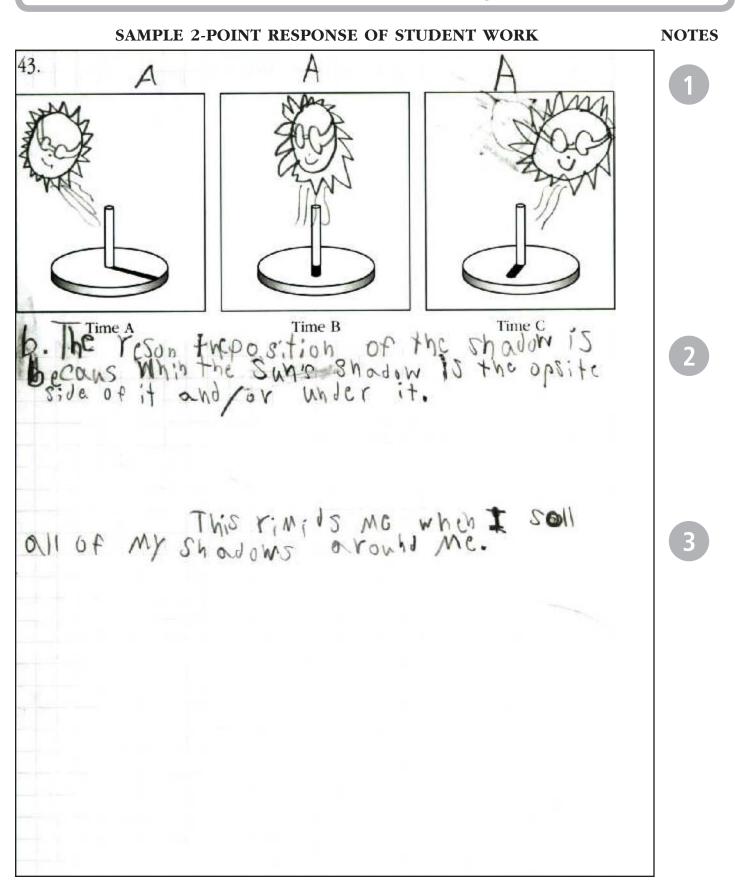


ANNOTATION – 3-POINT RESPONSE

- The student correctly draws where the sun would be to make the shadow shown in each picture.
- 2

The student generally explains why the position of the shadow on the sundial is in different places during the day (i.e., because the earth is rotating). The student does not make clear the relationship between the rotation of Earth (causing the apparent movement of the sun across the sky) and why the position of the shadow on the sundial is in different places during the day.

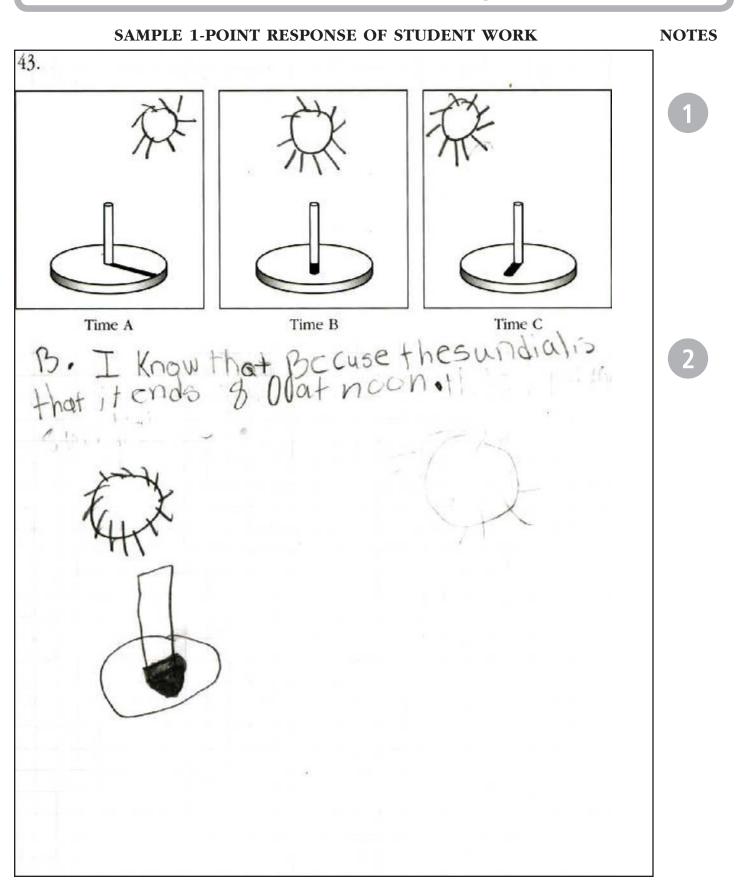
Overall, the student demonstrates a general understanding of the Earth-Sun system by interpreting a representation of the sun's apparent movement in the sky. The student's response to each part is correct, but the explanation of why the position of the shadow on the sundial is in different places during the day is general, lacking the detail required for a score of "4."



ANNOTATION – 2-POINT RESPONSE

- The student correctly draws where the sun would be to make the shadow shown in each picture.
- The student provides a limited explanation of why the position of the shadow on the sundial is in different places during the day. The student explains why the shadow appears (i.e., because when the sun's shadow is the opposite side of it and/or under it) but not why the position of the shadow is in different places during the day.
 - The student includes irrelevant information in an attempt to draw a connection to his or her own personal experience. The student did not receive credit for this information.

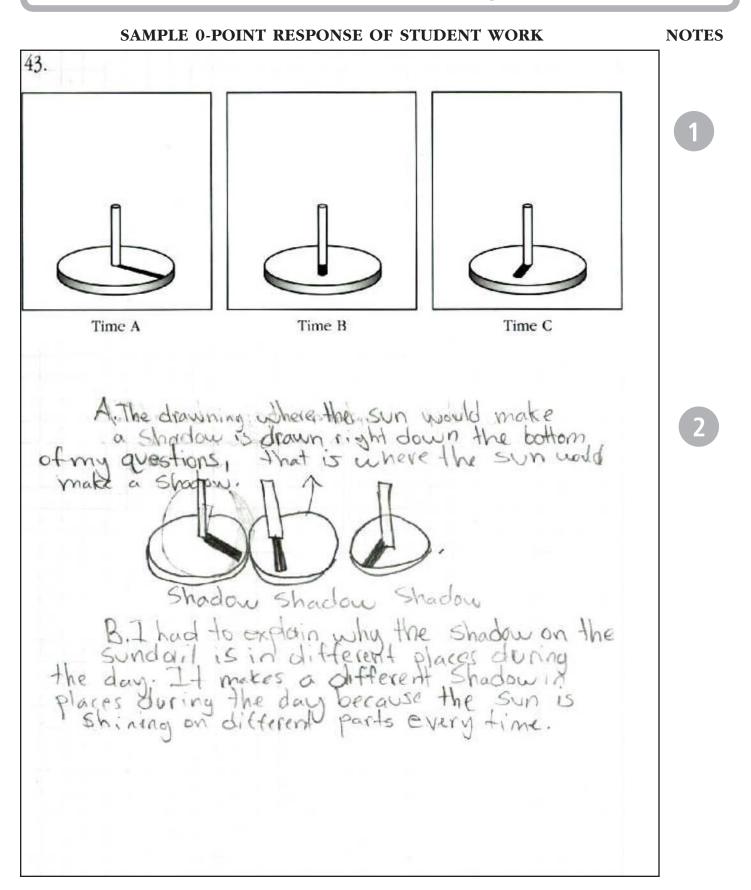
Overall, the student demonstrates a limited understanding of the Earth-Sun system by interpreting a representation of the sun's apparent movement in the sky. The student correctly draws where the sun would be to make the shadow shown in each picture in part a, but does not provide a correct explanation of why the position of the shadow on the sundial is in different places during the day in part b.



ANNOTATION – 1-POINT RESPONSE

- The student correctly draws where the sun would be to make the shadow shown in only one of the pictures (i.e., Time B).
- The student's explanation of why the position of the shadow on the sundial is in different places during the day is incorrect.

Overall, the student demonstrates a minimal understanding of the Earth-Sun system by interpreting a representation of the sun's apparent movement in the sky. The student correctly draws where the sun would be to make the shadow in only one of the pictures, and does not provide any correct information in response to part b.



ANNOTATION – 0-POINT RESPONSE

- The student restates information from the prompt, and does not draw where the sun would be to make the shadow shown in any of the pictures.
- 2

The student restates information from the prompt (i.e., it makes a different shadow in places during the day because the sun is shining on different parts every time). The response is vague and incorrect.

Overall, the student does not demonstrate any understanding of the Earth-Sun system and does not interpret a representation of the sun's apparent movement in the sky. The student does not correctly respond to any part of the question.

Instructional Activities

The open-response question *Sundial* was designed to assess students' (1) understanding of patterns of the Earth-Sun system and (2) understanding of the relationship of the position of an object on Earth and how the object's shadow changes as the earth rotates on its axis. This also requires understanding of the basic properties of light. The instructional strategies below present ideas for helping students explore and master these concepts.

- Allow students to investigate/explore shadows they make/observe with found objects or their bodies. Project a beam of light from a high-intensity lamp or projector across a darkened room and allow them to observe the shadows they make. Ask them to think about what causes the size, shape, and direction of the shadows to change.
- Complete activities such as those found at the BBC website, "Light and Shadows," <u>http://www.bbc.co.uk/schools/scienceclips/ages/7_8/light_shadows.shtml</u>, which provide the opportunity for students to predict and practice what shadows will do under different circumstances.
- Provide opportunities for students to understand the science of shadows by completing the following activities:
 - Using a laser pointer, follow the light path produced using water vapor from a mister or dust produced by clapping erasers together. How does light travel? (In a straight line.) What happens if the beam interacts with an object in its path (e.g., bumps into a table, hits a piece of paper)?
 - In a darkened room, point a flashlight (a small, high-intensity flashlight with the reflector plate removed works best to create a 'point source' effect) at different materials, such as a transparent piece of glass or plastic, a mirror, and black construction paper. What happens to the light when it hits the glass? What happens if the flashlight is pointed at the mirror? Does a shadow appear behind the mirror? What happens if the flashlight is pointed at the black paper? What does this demonstrate about the reason there are shadows? Would there be shadows if light could curve around the paper instead of going in a straight line?
 - Students may observe that the length of an object's shadow varies with the object's distance from the light source. Classroom light sources used to model the sun do not provide the parallel light rays of the sun. If you choose to show how moving the object nearer or farther from the source of light changes the size of the shadow, you will need to clarify that this is because the rays of the light source diverge with distance. This is not what happens to change a shadow from a sundial; the angle of the sun's rays and not the distance between the sun and Earth cause the changing of the shadow.

GRADE 4 – SCIENCE

- Make a sundial. Directions for a simple sundial can be found at <u>http://liftoff.msfc.nasa.</u> <u>gov/academy/earth/sundial/sundial-constructsimple.html</u> or another student-friendly site: <u>http://solar-center.stanford.edu/activities/</u>
- The site "Astronomy With a Stick" (<u>http://www.nsta.org/publications/interactive/aws-din/aws-u1.aspx</u>) demonstrates the content presented by this question through the measurement of time and shadow length. In recording the data, students should practice the **conventions** for drawing the location of the sun and its height above the horizon.
- One of the significant misconceptions students have is that the sun moves across the sky ("apparent movement") causing shadows to change their length and direction. To help overcome this misconception, it is wise not to move the light source while explaining this phenomenon with relation to the sun; instead, move the Earth.
- Move the Earth Activity:
 - Obtain a globe, a large rubber band, a large paperclip, and a high-intensity lamp or flashlight.
 - Place the rubber band around the globe from pole to pole.
 - Unfold the paperclip so that the two tabs are at right angles to each other.
 - Slip the paperclip under the rubber band so that one tab is flat on the globe and the other sticking up perpendicular to the surface.
 - Place the globe and light source as far apart as possible for the paperclip to still make a shadow.
 - Start with the paper clip on the dark side of Earth; rotate the globe clockwise so that the paperclip moves into the light. Notice the location and size of the shadow.
 - Continue the rotation until the paperclip is directly in front of the light source; note the shadow's change.
 - Rotate the globe further, and note the "afternoon" shadow of the paperclip.

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