

Pennsylvania

System of School Assessment

Summer 2005

Grade 3 Mathematics and Reading Item Sampler



The **McGraw-Hill** Companies



Developed and published under contract with the Pennsylvania Department of Education by CTB/McGraw-Hill LLC, a subsidiary of The McGraw-Hill Companies, Inc., 20 Ryan Ranch Road, Monterey, California 93940-5703. Copyright © 2005 by CTB/McGraw-Hill LLC. Math items numbered 1–6 are copyright © 2005 by Pennsylvania Department of Education. Only State of Pennsylvania educators and citizens may copy, download and/or print the document, located online at <http://www.pde.state.pa.us>. Any other use or reproduction of this document, in whole or in part, requires written permission of the publisher and Pennsylvania Department of Education. *TerraNova*® and CTBS are registered trademarks of The McGraw-Hill Companies, Inc.

Item Sampler

Introduction

In recent years, the Department of Education provided districts and schools with several tools to assist in delivering a more focused instructional program aligned to a more focused state assessment system. These tools included the Assessment Anchors and Eligible Content, the specifics of the assessment including the test blueprints, and the beginning of an item bank. This sampler is another tool to assist with the instructional program and the PSSA assessments. We trust that this Item Sampler for 2006 will be useful in working with students.

Purpose and Uses

This item sampler is designed to provide samples of mathematics and reading items (as well as reading passages) written to focus on the assessment anchors.

The items in the sampler may be used as samples for writing items, and they may also be copied and used as part of an instructional program. Having students respond to the open-ended items and then scoring them with colleagues could be a beneficial activity across classrooms in the school.

What's Included

The items in this sampler will not appear on any future operational form of the PSSA. This sampler gives you an idea of the types of items that will appear on the 2006 PSSA. All items are of high quality and strongly aligned to the Assessment Anchors and State Standards.

Item Format and Scoring Guidelines

Multiple-choice items are constructed with four choices. Open-ended items are written to take about ten minutes to complete.

The open-ended items in mathematics are scored with item-specific scoring guidelines on a 0–4 scale.

The open-ended items in reading are scored with item-specific scoring guidelines on a 0–3 scale. Samples of the item-specific scoring guidelines are presented in this sampler for each score point in reading.

Also included for both mathematics and reading are the General Scoring Guidelines used to develop the item-specific guidelines. These General Scoring Guidelines should be used to develop any item-specific scoring guidelines used in the instructional program.

If you have any questions, please contact the Division of Assessment at 717-787-4234.

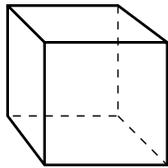
Mathematics

1 Find the difference.

$$\begin{array}{r} 78 \\ -29 \\ \hline \end{array}$$

- 49
- 51
- 67
- 107

Directions Use the picture below to answer Number 2.



2 Which shape forms each side of the cube?

- hexagon
- octagon
- pentagon
- square

3 Put these units of measure in order from shortest to longest.

foot inch mile yard

- inch, yard, foot, mile
- inch, foot, yard, mile
- yard, inch, foot, mile
- foot, inch, mile, yard

Directions Use the number sentence below to answer Number 4.

$$9 + \square < 8 + 7$$

4 Which number can go in the box to make this number sentence true?

- 5
- 6
- 15
- 24

Directions

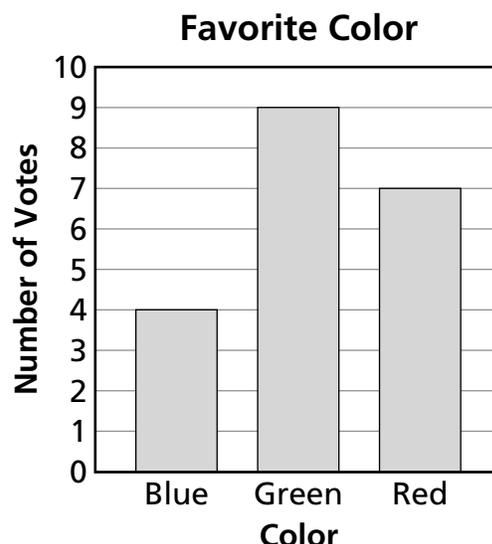
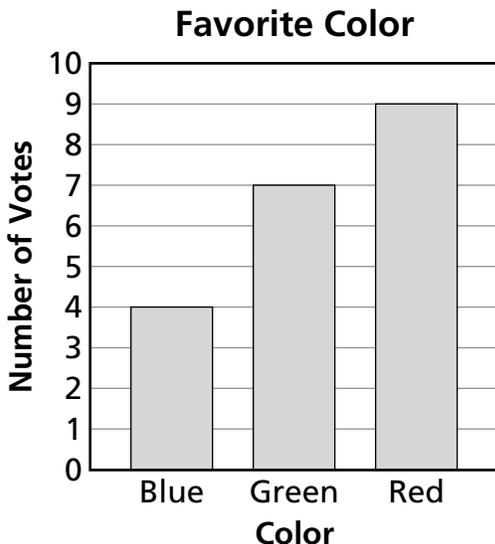
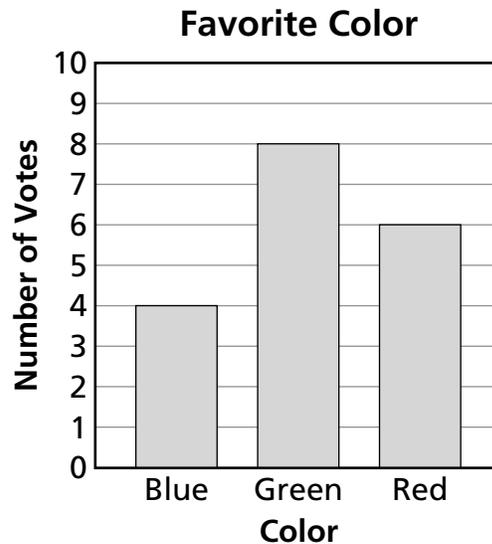
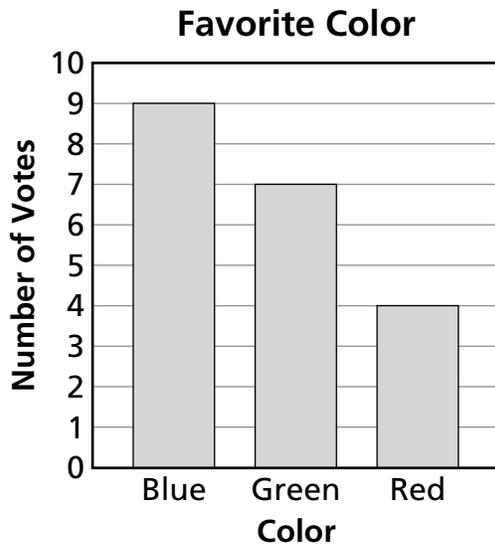
The table below shows the results of a survey on favorite colors. Use the table to answer Number 5.

Favorite Color

Color	Number of Votes
Blue	
Green	
Red	

5

Which bar graph matches the data?

*Go On* ►

6

Tim lives on a farm. One day he counted the animals on his farm. There were 3 cows, 6 chickens, 1 dog, and 2 sheep.

Part A

Tim counted the number of legs of all the animals. What is the total number of legs of the animals on the farm?

SHOW your work.

PUT your answer in the **ANSWER BOX**.

ANSWER BOX:

_____ legs

Reading

Directions Read the passage “Trading Places.” Then do Numbers 1 through 10.

Trading Places

by Clare Mishica

Once there was an old woman who lived by the sea with her two donkeys. The donkeys, Lou and Pete, spent much of their time in a barn, each snug in his own stall. But once a week the old woman loaded some bags on their backs to take to the village market. Lou and Pete carried the bags up a steep path, down a long, rocky road, and across a bridge into town.

Very early one market day, the donkey named Lou started to complain. “Every week I have to carry two big bags while you only have to carry two small ones. It’s not fair.”

“What can I do?” asked the donkey named Pete. “I want to be fair.”

“We should trade places,” said Lou. “Then I would have a chance to carry the little bags. That would be fair.”

“Of course,” said Pete, and he pushed open his stall door.

“Hurry, hurry!” said Lou as they switched stalls. “The sun is up, and the woman will be coming soon.”

A few minutes later, the barn door creaked open, and the woman came in carrying four bags. As usual, she put the two large bags on the donkey in the first stall, and two small bags on the donkey in the second stall. But this time Pete was in the first stall and took the large bags. Lou sighed in relief as the woman came to him with the two small bags.

“Finally,” he thought, “I won’t have to work so hard.”

“Come on, fellows,” the woman said, tugging on their halters. “Off to market we go.”

The donkeys started climbing the steep path. Soon, Lou began to realize that his walk was not so easy. In fact, the little bags weighed twenty times more than the big ones. By the time they had walked as far as the bridge, Lou felt like he must be carrying a mountain.

Finally, they reached the market, and the woman emptied her bags to sell her goods. The little bags were full of seashells, but the big bags only had sea sponges inside!

“Thanks for trading,” said Pete. “I’m so glad you wanted to be fair.” Lou didn’t complain. He was too tired to say a word.



1 Lou thought it was unfair that

- Lou always carried the big bags
- Lou had a smaller stall than Pete
- the woman liked Pete better than Lou
- the woman always went to Lou's stall first

2 Why did Pete probably agree to Lou's plan?

- He wanted to trick Lou into carrying the heavy bags.
- He wanted to be fair by letting Lou take the smaller bags.
- He thought it would be fair for Lou to take the heavier bags.
- He thought that Lou wanted to help him by taking the heavy bags.

3 Read this sentence from the passage.

Very early one market day, the donkey named Lou started to complain.

To complain means

- to praise
- to grumble
- to give orders
- to ask questions

4 Which sentence from the passage tells most about the setting?

- Lou and Pete carried the bags up a steep path, down a long, rocky road, and across a bridge into town.
- Lou sighed in relief as the woman came to him with the two small bags.
- Soon, Lou began to realize that his walk was not so easy.
- By the time they had walked as far as the bridge, Lou felt like he must be carrying a mountain.

5 The old woman always gave Lou the larger bags because

- Lou was in the first stall
- Pete was weaker than Lou
- Lou was the larger donkey
- Pete was her favorite donkey

6 What did Lou discover when he started to carry the little bags?

- They were lighter than the large bags.
- They were heavier than the large bags.
- They weighed the same as the large bags.
- They weighed less than he thought they would.

7 Look at the time line of what happens in the passage.



Which of these events should go in the empty box?

- Pete wants to be fair to Lou.
- Lou wants to carry the small bags.
- Lou carries the small bags to the market.
- Pete carries the small bags to the market.

8 The next time they go to the market, Lou will probably

- offer to carry all the bags
- want to carry the larger bags
- ask Pete to carry all the bags
- keep carrying the smaller bags

9 This passage is an example of

- a play
- fiction
- a poem
- nonfiction

Directions

Read the passage “Watching Wiggly Worms.” Then do Numbers 11 through 19.



by Janeen R. Adil

Earthworms may be small, but they are very important. They help build healthy soil for plants to grow in. If you could look under the ground, you could see earthworms at work. But there’s an easier way to watch them: You can build a worm-viewing box. Here’s how you can construct a worm box.

1. First, you’ll need a clear plastic box with a lid. Use a hammer and nail to punch holes both in the bottom of the box and in the lid.

2. Start filling the box by putting in a layer of gravel or small stones. Next, add a thin layer of sand, followed by a layer of soil. Top this all off with a layer of peat moss, which is decaying plant material that will help protect the soil from getting too wet or frozen.

3. Use a spray bottle to dampen the soil with a little water.

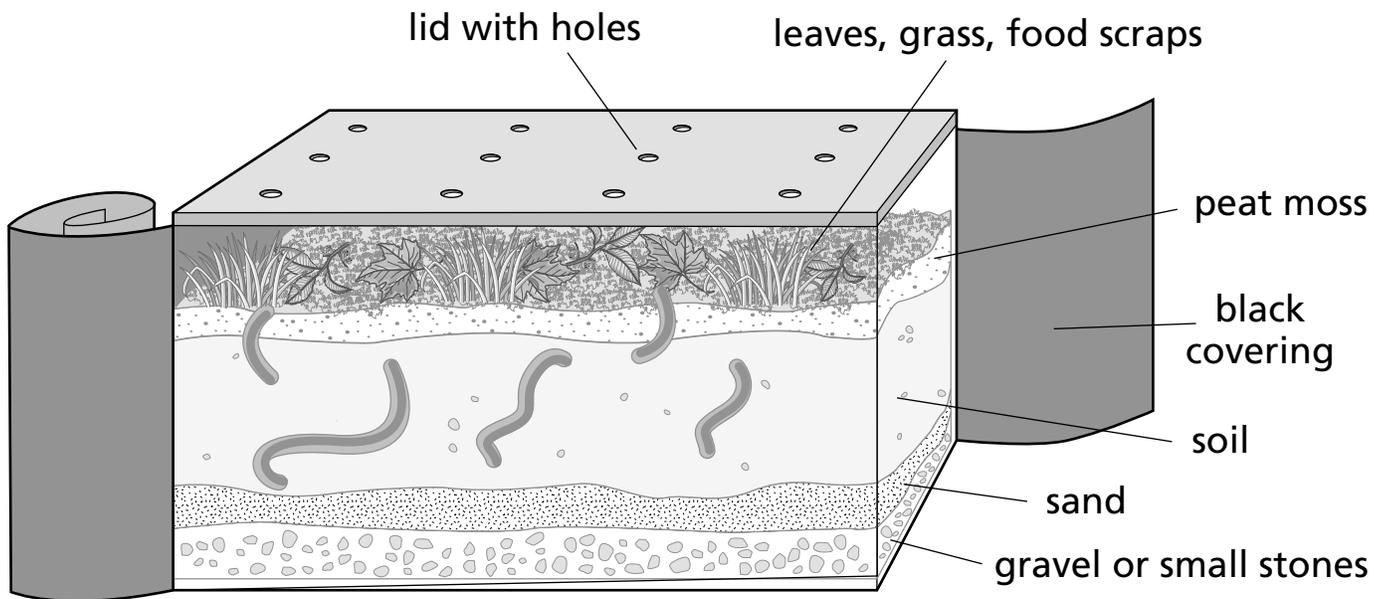
4. Finally, add food for your earthworms. Put in some dead leaves and grass along with some food scraps. Apple cores, lettuce leaves, potato peels, and even coffee grounds are all good worm foods. Now wait a few days before putting your earthworms in the box.

You can dig up earthworms from the lawn or garden, or buy them at a fishing store that sells bait. You will need to find 6–12 worms. Make sure the soil is damp, add the worms to your box, and put the lid on. Wrap black cloth or black paper completely around the box. Remember, earthworms live in darkness!

Put the box in a place where it is

neither very cold nor very hot. Keep the soil damp and feed the worms at least once a week.

When you watch your earthworms, take off the black cover. Notice how the worms make tunnels through the layers of soil. This lets air and water into the ground. Thanks to the worms' work, plants can grow healthy and strong.



11 Why are earthworms important for gardens?

- They eat harmful insects.
- They keep weeds from growing.
- They help make the soil healthy.
- They protect plants from freezing.

12 A person would most likely use a worm box to

- feed earthworms to birds
- find earthworms in a garden
- watch earthworms work in the soil
- carry earthworms from place to place

13 Read these sentences from the passage.

But there's an easier way to watch them: You can build a worm-viewing box. Here's how you can construct a worm box.

Which word from the sentences helps the reader understand the meaning of construct?

- easier
- watch
- build
- worm

14 The soil in a worm box should be kept

- cold
- damp
- hard
- sandy

15 What should be done after putting worms in the worm box?

- Make air holes in it.
- Pour some sand in it.
- Put some gravel in it.
- Wrap a black cover around it.

16 Why should black cloth or paper be wrapped around the worm box?

- to keep out the light
- to help the soil stay damp
- to stop worms from escaping
- to prevent the soil from freezing

17 Which best tells how the information in this passage is organized?

- from the easiest step to the hardest step
- in the order that the steps should be done
- by the length of time needed to complete each step
- from the most important step to the least important step

18 This passage would most likely appear in a

- world atlas
- book of fiction
- poetry magazine
- science magazine

Item Sampler Answer Key

Mathematics			
Item Number	P -Value	Correct Response	Pennsylvania Anchor Statement Measured
1	.82	A	M3.A.3.1.1
2	.89	D	M3.C.1.1.1
3	.80	B	M3.B.1.2.2
4	.53	A	M3.D.2.2.1
5	.81	D	M3.E.1.2.2
6	n/a	See page 18	M3.A.2.1.1

Interpreting Item p-value

An item's p-value is the average difficulty of the item. For example, a p-value of .67 for a multiple-choice item indicates that 67% of the students who were tested selected the correct answer choice for that item.

A p-value that is very high or very low indicates that the item is probably too easy or too difficult, respectively, to contribute much meaningful information about students' achievement.

General Scoring Guidelines for Open-Ended Mathematics Items

4 Points

The response demonstrates a thorough understanding of the mathematical concepts and procedures required by the task.

The response provides correct answer(s) with clear and complete mathematical procedures shown and a correct explanation, as required by the task. Response may contain a minor “blemish” (e.g., missing \$) or omission in work or explanation that does not detract from demonstrating a thorough understanding.

3 Points

The response demonstrates a general understanding of the mathematical concepts and procedures required by the task.

The response and explanation, as required by the task, are mostly complete and correct. The response may have minor errors or omissions that do not detract from demonstrating a general understanding.

2 Points

The response demonstrates a *partial* understanding of the mathematical concepts and procedures required by the task.

The response is somewhat correct with *partial* understanding of the required mathematical concepts and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

1 Point

The response demonstrates a *minimal* understanding of the mathematical concepts and procedures as required by the task.

0 Points

The response has no correct answer and *insufficient* evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task for that grade level.

Response may show only information copied from the question.

Scoring Guide for Open-Ended Mathematics Items

6

PENNSYLVANIA STANDARD CATEGORY: 3M.A

DESCRIPTION OF TASK: Animal legs on Tim's farm

PROBLEM SOLUTION:

Part A

Mathematic Procedure:

• $3 \times 4 = 12$	12	OR	$3 + 1 + 2 = 6$ (4-legged animals)
$6 \times 2 = 12$	12		$6 \times 4 = 24$ legs
$1 \times 4 = 4$	4		$6 \times 2 = 12$ legs
$2 \times 4 = 8$	$\frac{+8}{36}$		$24 + 12 = 36$

OR

Other valid procedure

Answer:

- 36 legs

Part B

• $2 \times 4 = 8$	8	36
$2 \times 2 = 4$	$\frac{+4}{12}$	$\frac{-12}{24}$

OR

Other valid procedure

Answer:

- 24 legs

Explanation:

- Cows have 4 legs and chickens have 2 legs. So 2 cows have 8 legs and 2 chickens have 4 legs. Add those together to get 12 legs. Subtract this from the number of legs that were on Tim's farm in the beginning and get a total of 24 legs.

OR

Other valid explanation of the procedure used by the student

SCORING RUBRIC

4. Student response provides all 5 of the following bulleted elements:

Part A

Mathematic Procedure:

- $3 \times 4 = 12$ 12
 $6 \times 2 = 12$ 12
 $1 \times 4 = 4$ 4
 $2 \times 4 = 8$ $\frac{+8}{36}$

OR

Other valid procedure

Answer:

- 36 legs

Part B

- $2 \times 4 = 8$ 8 36
 $2 \times 2 = 4$ $\frac{+4}{12}$ $\frac{-12}{24}$

OR

Other valid procedure

Answer:

- 24 legs

Explanation:

- Cows have 4 legs and chickens have 2 legs. So 2 cows have 8 legs and 2 chickens have 4 legs. Add those together to get 12 legs. Subtract this from the number of legs that were on Tim's farm in the beginning and get a total of 24 legs.

3. Student response provides 4 of the 5 bulleted elements.

2. Student response provides 3 of the 5 bulleted elements.

1. An attempt to solve the problem using information from the problem. May have nothing correct, but if something is correct, it is less than what is needed for a score of 2.

0. Nothing correct and what has been written does not relate to the problem. Blank papers, off-task responses, and student responses of "I don't know" all receive this score.

Item Sampler Answer Key

Reading			
Item Number	P -Value	Correct Response	Pennsylvania Anchor Statement Measured
1	.79	A	R3.B.1.1
2	.62	B	R3.B.1.1
3	.63	B	R3.A.1.1
4	.75	A	R3.B.1.1
5	.64	A	R3.B.1.1
6	.70	B	R3.B.1.1
7	.55	C	R3.B.1.1
8	.73	B	R3.A.1.3
9	.62	B	R3.A.1.6
10	n/a	See page 22	R3.A.1.5
11	.83	C	R3.A.2.4
12	.80	C	R3.A.2.3
13	.81	C	R3.A.2.2
14	.82	B	R3.A.2.4
15	.68	D	R3.A.2.4
16	.69	A	R3.A.2.3
17	.64	B	R3.B.3.3
18	.75	D	R3.A.2.6
19	n/a	See page 24	R3.A.2.5

Interpreting Item p-value

An item's p-value is the average difficulty of the item. For example, a p-value of .67 for a multiple-choice item indicates that 67% of the students who were tested selected the correct answer choice for that item.

A p-value that is very high or very low indicates that the item is probably too easy or too difficult, respectively, to contribute much meaningful information about students' achievement.

General Scoring Guidelines for Open-Ended Reading Items

3 Points

- The response provides a complete answer to the task, e.g., a statement that offers a correct answer as well as text-based support.
- The response provides specific, appropriate, and accurate details (e.g., naming, describing, explaining, or comparing) or examples.

2 Points

- The response provides a partial answer to the task, e.g., indicates some awareness of the task and at least one text-based detail.
- The response attempts to provide sufficient, appropriate details (e.g., naming, describing, explaining, or comparing) or examples; may contain minor inaccuracies.

1 Point

- The response provides an incomplete answer to the task, e.g., indicating either a misunderstanding of the task or no text-based details.
- The response provides insufficient or inappropriate details or examples that have a major effect on accuracy.

0 Points

- The response provides insufficient material for scoring.
- The response is inaccurate in all aspects.

Scoring Guide for Open-Ended Reading Items

- 10** In the passage, Lou does not want to “work so hard,” so he makes a plan. Explain what Lou’s plan is and why it doesn’t work. Use at least two details from the passage to explain why the plan fails.

Exemplary response

The old woman always puts the large bags on the donkey in the first stall. Lou’s plan is to switch stalls with Pete so the woman will give Lou the smaller bags. Lou believes the smaller bags will be easier to carry. The plan fails because the small bags are actually heavier (weigh twenty times more) than the large bags. Lou has to work harder to carry the small bags because they contain (heavy) seashells, but the bigger bags have light sea sponges in them.

Key elements:

Explain what Lou’s plan is (main idea)

- Lou’s plan is to switch stalls (move into the second stall) because the old woman always puts the smaller bags on the donkey in the second stall. (Lou believes the smaller bags will be easier/lighter to carry.)

OR

- Lou’s plan is to carry the smaller bags, which he believes will be lighter, by switching stalls (trading places) with Pete. Since the old woman always puts the larger bags on the donkey in the first stall, Lou asks Pete to move into the first stall. That way Lou can go into the second stall and receive the smaller bags.

OR

- Lou tells Pete it is unfair that he (Pete) always gets to carry the smaller bags. He says it would be fair if they trade places so Lou gets a chance to carry the smaller bags. Pete agrees because he wants to be fair.

Why the plan doesn’t work (supporting details)

- The small bags are actually (twenty times) heavier than the large bags.
- The smaller bags contain (heavy) seashells while the larger bags contain (light) sea sponges.
- Lou has to work much harder to carry the small bags (because they are heavier/filled with seashells) than he ever did with the large bags.

Score Points: Use Pennsylvania Grade 3 Reading General Rubric.

3 Points:

General Scoring Guidelines

- *The response provides a complete answer to the task, e.g., a statement that offers a correct answer as well as text-based support.*
- *The response provides specific, appropriate and accurate details (e.g., naming, describing, explaining, or comparing), or examples.*

Item Specific Scoring Guidelines

Student uses relevant details from the passage to explain what Lou’s plan is (main idea key element) and why the plan fails (two supporting detail key elements).

2 Points:

General Scoring Guidelines

- *The response provides a partial answer to the task, e.g., indicates some awareness of the task and at least one text-based detail.*
- *The response attempts to provide sufficient, appropriate details (e.g., naming, describing, explaining, or comparing) or examples; may contain minor inaccuracies.*

Item Specific Scoring Guidelines

Student provides main idea (key element) to explain what Lou’s plan is, supported by one relevant detail (supporting detail key element) from the passage.

OR

Student provides two details relating to why the plan failed, but does not explain what Lou’s plan was (trading places to ensure getting the small bags).

1 Point:

General Scoring Guidelines

- *The response provides an incomplete answer to the task, e.g., indicating either a misunderstanding of the task or no text-based details.*
- *The response provides insufficient or inappropriate details or examples that have a major effect on accuracy.*

Item Specific Scoring Guidelines

Student provides incomplete or very general explanation of main idea (e.g., Lou wants to trade places) without explanation and/or accurate supporting details.

OR

Student uses one relevant detail (supporting detail key element) from the passage to show why the plan failed but does not explain main idea (what plan is).

0 Points:

- *The response provides insufficient material for scoring.*
- *The response is inaccurate in all aspects.*

- 19** Jack decided to make a worm-viewing box. He completed the following steps.
- He got a heavy cardboard box and punched holes in the bottom and in the lid.
 - He filled the box by putting in a layer of gravel, a layer of sand, a layer of soil, and finally a layer of small rocks.
 - He sprayed a little water onto the soil.
 - He added food for the worms by planting some flower seeds and grass seeds in the soil. Three days later he put his earthworms in the box.

Describe what needs to be done to improve Jack’s worm-viewing box. Be sure to explain why each improvement is needed. Use at least three details from the passage to support your answer.

Exemplary response

First, Jack needs to use a clear plastic box (not a cardboard box) so he can see the worms when the box is finished. Then, when he fills the box, he should put a layer of peat moss or dead plants on top (not more rocks) so the soil won’t freeze or get too wet. Finally, Jack put in the wrong worm food. He should put in some dead leaves, grass, and food scraps like apple cores, lettuce, and potato peels (not flower or grass seed).

Key elements:

- Jack should use a clear plastic box (not a cardboard box) so he can see the worms.
- When Jack fills the box, he should put a layer of peat moss/decaying plant material/dead plants (not a layer of small rocks) on top of the layer of soil, which will help the soil from getting too wet or frozen.
- Jack should not plant flower seeds or grass seeds for worm food. He should add dead leaves, grass, and food scraps like apple cores, lettuce leaves, potato peels, and coffee grounds (or any other reasonable fruit/vegetable scrap).

Score Points: Use Pennsylvania Grade 3 Reading General Rubric.

3 Points:

General Scoring Guidelines

- *The response provides a complete answer to the task, e.g., a statement that offers a correct answer as well as text-based support.*
- *The response provides specific, appropriate and accurate details (e.g., naming, describing, explaining, or comparing), or examples.*

Item Specific Scoring Guidelines

Student describes and explains the reasons for three improvements needed for Jack’s worm-viewing box, using at least three relevant details from the passage.

2 Points:

General Scoring Guidelines

- *The response provides a partial answer to the task, e.g., indicates some awareness of the task and at least one text-based detail.*
- *The response attempts to provide sufficient, appropriate details (e.g., naming, describing, explaining, or comparing) or examples; may contain minor inaccuracies.*

Item Specific Scoring Guidelines

Student describes and explains the reasons for two improvements needed for Jack’s worm-viewing box, using two relevant details from the passage.

1 Point:

General Scoring Guidelines

- *The response provides an incomplete answer to the task, e.g., indicating either a misunderstanding of the task or no text-based details.*
- *The response provides insufficient or inappropriate details or examples that have a major effect on accuracy.*

Item Specific Scoring Guidelines

Student describes and explains the reason for one improvement needed for Jack’s worm-viewing box, using one relevant detail from the passage.

OR

Student cites one very general improvement. (e.g., Jack should follow the directions better and use a clear box.)

0 Points:

- *The response provides insufficient material for scoring.*
- *The response is inaccurate in all aspects.*