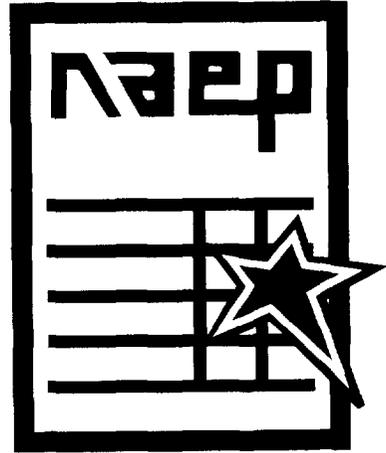


**THE NATION'S
REPORT
CARD**



**1996 Assessment
SCIENCE-PUBLIC RELEASE
Grade 4**

Number of Items: 40



1996 ASSESSMENT

SCIENCE PUBLIC RELEASE

GRADE 4

NO. OF ITEMS: 40

This package of released items includes:

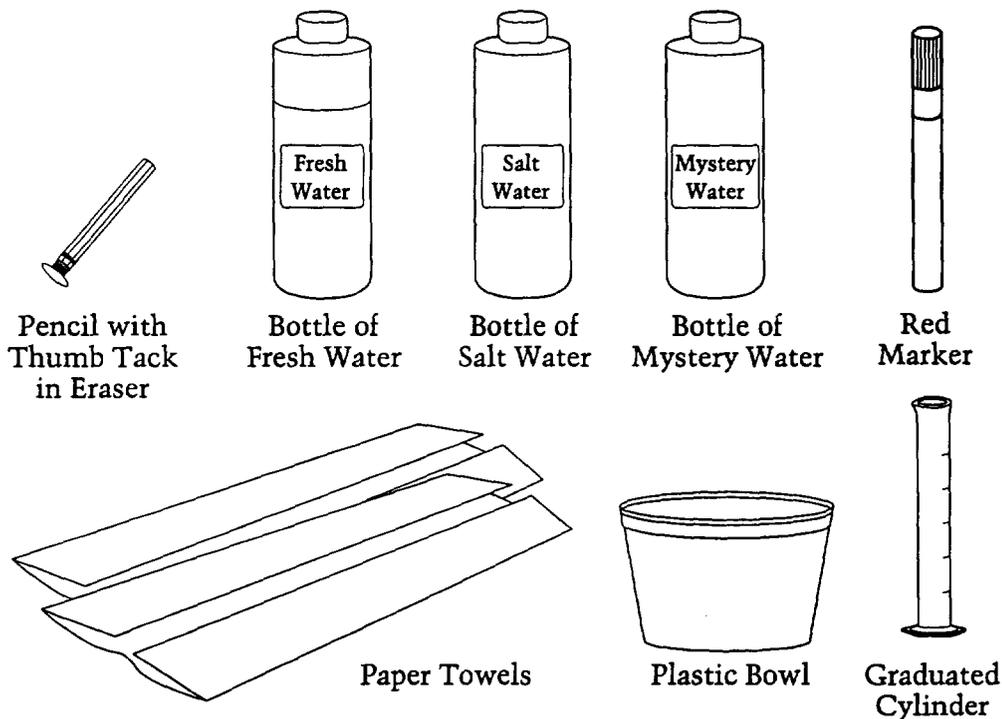
- *information about the framework classification codes available for each item,*
- *information about the item difficulty, as provided for each item,*
- *text of each item,*
- *item identification for each item, framework classification codes for each item, the key for each multiple-choice item, and the scoring guide for each constructed-response item.*

Further information about the 1996 NAEP Science Assessment is available in the Science Framework for the 1996 National Assessment of Educational Progress (Washington, DC: National Assessment Governing Board, 1995), the 1996 Science Report Card for the Nation and the States (O'Sullivan, Reese, and Mazzeo, 1997), the 1996 NAEP Science State Technical Report (Allen, Swinton, and Zelenak, 1997), and the NAEP 1996 Technical Report (Allen, Carlson, and Zelenak, in preparation). Information is also available on the World Wide Web at www.ed.gov/NCES/NAEP.

FLOATING PENCIL

Using a Pencil to Test Fresh and Salt Water

You have been given a bag with some things in it that you will work with during the next 20 minutes. Take all of the things out of the bag and put them on your desk. Now look at the picture below. Do you have everything that is shown in the picture? If you are missing anything, raise your hand and you will be given the things you need.



Section 123

Now you will use the things on your desk to do some activities and answer some questions about those activities. Follow the directions step-by-step and write your answers to the questions in the space provided in your booklet.

Rainwater and the water in streams and lakes are called fresh water. Fresh water has very little salt in it and is quite different from salt water, which is found in oceans. One way you can tell the difference between fresh water and salt water is by doing the following tests.

OP000727

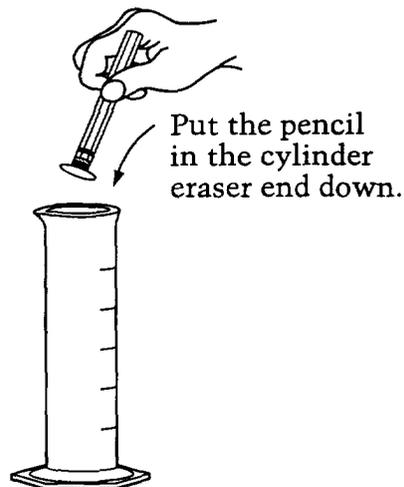
1. Open the bottle labeled **Fresh Water**. Pour all of the fresh water into the cylinder. Put the cap back on the bottle.

After you add the fresh water to the cylinder, what is the total amount of water in the cylinder? _____ milliliters (mL)

Now use the red marker to draw a short line on the side of the cylinder to show how much water is in it.

Now take the pencil and put it in the water in the cylinder, eraser-end down.

OP000728



2. How much water is in the cylinder now that you have put the pencil in it? (Fill in the oval in front of the best answer.)

- A More Water than before the pencil was added
 - B The same amount of water as before the pencil was added
 - C Less water than before the pencil was added
- OP0007300

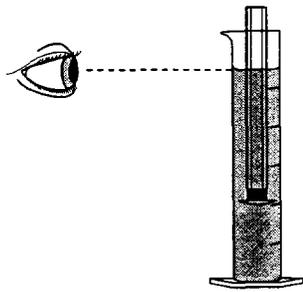
Tell why you think so.



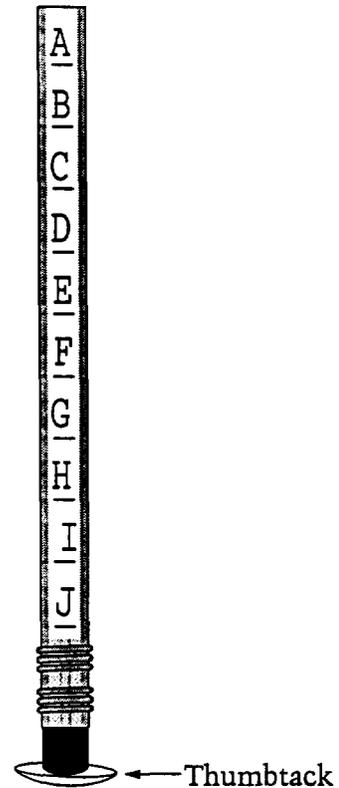
Section 123

3. Look at the pencil in the fresh water. There are letters along the side of the pencil. Make sure the pencil is not touching the side of the cylinder. Note the exact level where the water surface meets the side of the pencil, as shown in picture A. Then draw a line on picture B where the water surface comes to on your pencil. This line will help you to remember where the water level comes on your pencil for the next step (4).

OP000731

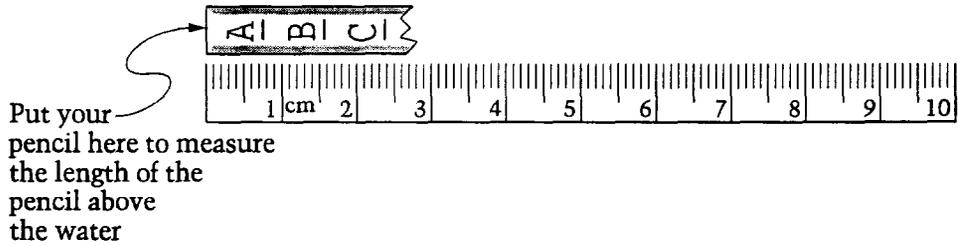


Picture A



4. Now take the pencil out of the water and dry it with a paper towel.

Use the ruler printed below to measure the length of the pencil that was above the water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the water?

_____centimeters (cm)

Now pour the fresh water out of the cylinder into the large plastic bowl. Later you will throw this water away.

OP000732



Section 123

Open the bottle labeled Salt Water. Add salt water to the cylinder up to the red line. Put the cap back on the bottle.

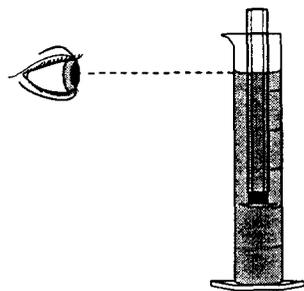
5. Now take the pencil and put it in the cylinder, eraser-end down. How does the way the pencil floats in the salt water compare with how it floated in the fresh water? (Fill in the oval in front of the best answer.)

- A In the salt water, the entire pencil sinks below the water surface.
- B In the salt water, more of the pencil is below the water than before.
- C In the salt water, more of the pencil is above the water than before.
- D In the salt water, the same amount of the pencil is above the water as in the fresh water.

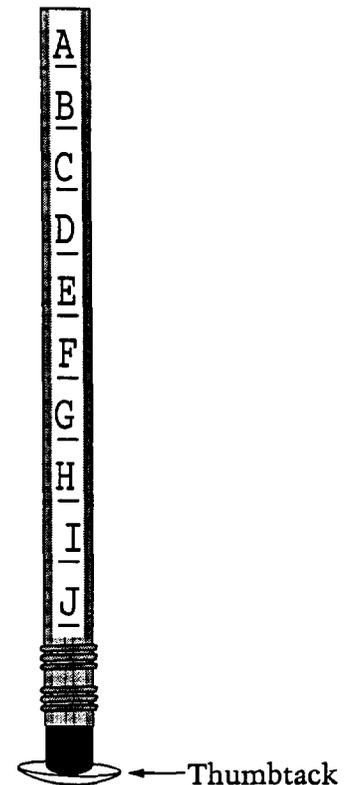
OP000733

6. Look at the pencil in the salt water. Look at the letters along the side of the pencil, as shown in picture A. Where does the salt water come up to on the pencil? Now look at picture B. Draw a line on picture B where the water level comes to on your pencil.

OP000734

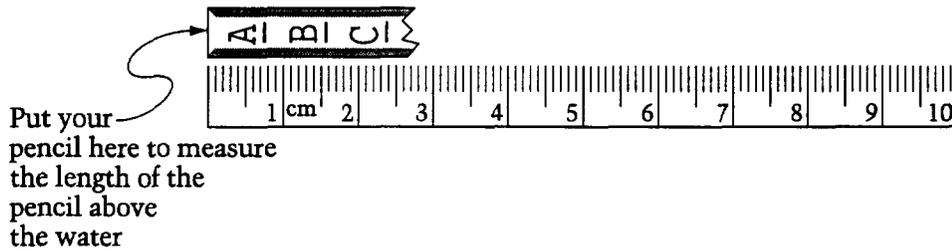


Picture A



Picture B

7. Now take the pencil out of the salt water and dry it with a paper towel. Use the ruler printed below to measure the length of the pencil that was above the salt water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the salt water?

_____ centimeters (cm)

OP000735

8. If you dissolved more salt in the salt water, how would this change the way that the pencil floats? (Fill in the oval in front of the best answer.)

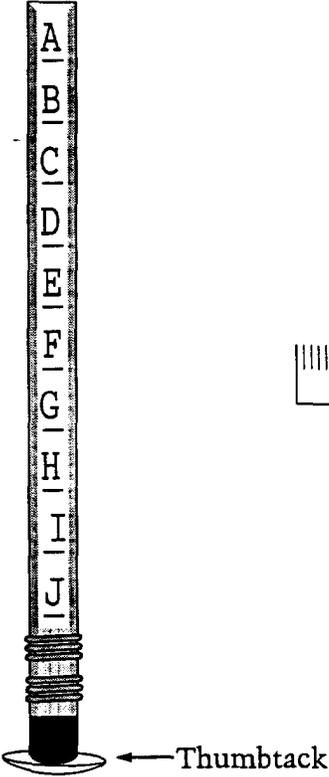
- Ⓐ The pencil would float higher than it did before the extra salt was added.
- Ⓑ The pencil would float at the same level as it did before the extra salt was added.
- Ⓒ The pencil would float lower than it did before the extra salt was added.

Now pour the salt water out of the cylinder into the large plastic bowl. Later you will throw this water away.

OP000736

9. Now use the floating-pencil test to find out if the water in the bottle labeled Mystery Water is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.

OP000737



Section 123

10. Is the mystery water fresh water or is it salt water?

How can you tell what the mystery water is?

Now pour the mystery water into the large plastic bowl. VK00007

11. When people are swimming, is it easier for them to stay afloat in the ocean or in a freshwater lake?

Explain your answer. OP000738



Cleaning Up

Use the paper towels to wipe up any spills. Be sure that the lids on the bottles are tightly closed. Then put the cylinder, the pencil, the marker, and the bottles back into the large plastic bag. Someone will collect the paper towels and the bowl with the solutions in it.



**INFORMATION ABOUT THE FRAMEWORK CLASSIFICATION CODES
AVAILABLE FOR EACH ITEM**

Following this description of the classification codes, there is a single sheet with NAEP ID numbers, short descriptions of the items, item keys(1-4 if the item is multiple-choice; blank if the item is open-ended), as well as the mean p-values for the items in the released block.

The classification codes for each item can be viewed within each item in the scoring guide.

- Field 1) Program Profile:**
N27S NAEP, year 27 of Science
- Field 2) Grade:**
1 Grade 4 only item
1/2 Grade 4/8 overlap item
2 Grade 8 only item
2/3 Grade 8/12 overlap item
3 Grade 12 only item
- Field 3) Field of science:**
P S Physical Science
E S Earth Science
L S Life Science
Field science of subcontent area:
The letter corresponds to the subcontent areas described in the Science Assessment and Exercise specifications for the 1996 National Assessment of Educational Progress.
- Field 4) Physical Science:**
A Matter and Its Transformations
B Energy and Its Transformations
C Motion
Earth Science:
A Solid Earth (lithosphere)
B Water (hydrosphere)
C Air (atmosphere)
D Earth in Space
Life Science:
A Change and Evolution
B Cells and Their Functions
C Organisms
D Ecology
- Field 5) Ways of knowing and doing science:**
S I Scientific Investigation
P R Practical Reasoning
C U Conceptual Understanding

Field 6)

Theme:

SYS Systems
MOD Models
PC Patterns of Change
NA Not Applicable

Field 7)

Nature of Science/Technology:

NS Nature of Science
NT Nature of Technology
NA Not Applicable

Field 8)

Item Type:

MC Multiple-Choice
SCR Short Constructed-Response
ECR Extended Constructed-Response
NA Not Applicable

1996 Science Items

GRADE: 04 BLOCK: 27S5

<u>ITEM</u>	<u>NAEP ID</u>	<u>SHORT DESCRIPTION</u>	<u>KEY</u>	<u>CONTENT</u>	<u>PROCESS</u>	<u>P-VALUE</u>	<u>STATUS</u>
1A	K031201	PENCIL: READING GRADUATED CYLINDER OE		1	1	0.540	P
2	K031212	PENCIL: WATER VOLUME AFTER PENCIL ADDED MC	2	2	1	0.070	P
2A	K031202	PENCIL: WATER VOLUME AFTER PENCIL ADDED OE		2	1	0.097	P
3A	K031203	PENCIL: IDENTIFY WATER LEVEL ON PENCIL OE		1	1	0.519	P
4A	K031204	PENCIL: LENGTH OF PENCIL ABOVE WATER OE		1	1	0.260	P
5	K031205	PENCIL: HOW DOES IT FLOAT IN SALT WATER MC	3	2	1	0.728	P
8	K031208	PENCIL: EFFECT OF MORE SALT ON LEVEL MC	1	2	3	0.684	P
10A	K031210	PENCIL: IDENTIFY MYSTERY WATER OE		1	1	0.500	P
11A	K031211	PENCIL: EASIER TO FLOAT IN FRESH/SALT H2O OE		2	2	0.283	P

Content: 1 = Physical Sciences
 2 = Earth & space sciences
 3 = Life sciences

Process: 1 = Scientific investigation
 2 = Practical reasoning
 3 = Conceptual understanding

Note: Items 6 and 7 were scored with other items.

Information about the Item Difficulty Available for Each Item

Item identification, a short item description, and the key (for multiple-choice items) are provided, in addition to information about the item difficulty, for each item. The items are identified by their position within a block and by their NAEP IDs. The NAEP IDs are used to identify items during the analysis of NAEP data in the summary of item level results in data almanacs, and in the secondary user data sources.

The numbers in the column labeled “P-Value” on the item statistic sheet vary for item types (multiple-choice and 2-category constructed-response items and constructed-response items with more than two categories). For the multiple-choice items and for the 2-category constructed-response items that were scored correct or incorrect the number in that column is the percent of students correctly responding to the item. This value is often called the p-value or the P+ for an item. For constructed-response items with more than two categories, the value in the column is the mean item score for the item.

For example, if the number of categories for a constructed-response item is 3 with a category/unsatisfactory/incorrect (category 1) worth 0 points, a partial category (category 2) worth 1/2 of a point and a complete category (category 3) worth 1 point, then a student can receive either 0, 1/2 or 1 point for his response to the item. The mean item score is the number that you would get if the scores on this item are averaged for all of the students in the assessment. This value varies from 0 to 1 just as the percent correct for a multiple-choice item could vary. It can be interpreted as an indication of where on the 0-1 scale for the item that an “average” student might score. For instance, if the mean item score for a 3-category constructed-response item is .8, then an “average” student would be expected to have a response in either category 2 (worth 1/2 or .5 of a point) or category 3 (worth 1 point). In fact it is a little more likely that the student would have a response in category 3, since .8 is closer to 1.0 than to .5.

Item Number: NONE Accession Number: OP000727

Key: NONE

Classification Codes:

N27S 1 PS A SI NA NA NA

Rationale Text:

In this task, students observe, measure, and compare the lengths of the portion of a pencil that floats above the water surface in fresh water and salt water. They then determine if an unknown water sample is fresh water or salt water, and predict how the addition of more salt to the salt water would affect the floating pencil. The task assesses students' ability to make simple observations, measure volume using a graduated cylinder, measure length using a ruler, apply their observations and measurements to test an unknown, make generalized inferences from their observations, and apply their understanding to an everyday situation.

Item Number: 1 Accession Number: OP000728

Key: NONE

Classification Codes:
N27S 1 PS A SI NA NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates an ability to measure the volume of water in a graduated cylinder. (The water sample in the bottle of freshwater has been pre-measured to be 95mL.)

3 = Complete - Student response is 94 - 96 mL.

2 = Partial - Student response is 90 - 93.99 mL.

1 = Unsatisfactory/Incorrect - Student response is < 90 mL or >96 mL.

Item Number: Accession Number: OP000730

Key: NONE

Classification Codes:
N27S 1 ES B SI NA NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates an ability to understand that the volume of water in the cylinder remains constant when the pencil is added, even though the pencil displaces water in the cylinder.

3 = Complete - Student answers the same amount of water (B), and gives a correct explanation.

2a = Partial - Student answers the same amount of water (B), but provides no explanation or provides an inadequate explanation to justify the response.

2b = Partial - Student answers “more,” but has an explanation that refers to the pencil taking up space.

1 = Unsatisfactory/Incorrect - Student answers either more water (A) or less water (C), and provides no explanation, or an illogical explanation.

Item Number: 3 Accession Number: OP000731

Key: NONE

Classification Codes:

N27S 1 PS A SI NA NA ECR

Scoring Guide: The scoring guide refers to the scoring of marks on the three drawings of the pencil in questions 3, 6, and 9 -- the three are scored as a group.

Scoring Rationale: Student demonstrates an ability to perform the floating pencil tests correctly by accurately observing the water level along the side of each pencil and correctly marking the level of the water on the three drawings of the pencil.

4 = Complete - Student accurately marks the water level on all three drawings of picture B (pages 4, 6, 9).

3 = Essential - Student accurately marks the water level on two of the three drawings of picture B (pages 4, 6, 9).

2 = Partial - Student accurately marks the water level on one of the three drawings of picture B (pages 4, 6, 9).

1 = Unsatisfactory/Incorrect - Student does not accurately mark the water level on any of the three drawings.

Credited responses:

<u>sample correct</u>	<u>relationships</u>
1st pencil -	near A or B
2nd pencil -	lower than first, usually C or D
3rd pencil -	near A or B

Item Number: 4 Accession Number: OP000732

Key: NONE

Classification Codes:
N27S 1 PS A SI NA NA ECR

Scoring Guide:

(1) The scoring guide refers to the scoring of the markings of the length of the pencil that floated above the water on the three rulers printed in the test booklet for questions 4, 7, and 9 -- the three are scored as a group, and the evaluation is based on whether the marks on the printed rulers match the length of the pencil marked off on the three drawings of the pencil (numbers 3, 6, and 9). A student can still receive credit for having marked correctly even if the observations were incorrect.

(2) The scoring guide refers to the scoring of the reading of the measurement that has been marked on the printed rulers in questions 4 and 7. A student can receive credit for having correctly read the measurement on the ruler even if the measurement of the length of the pencil is incorrect.

Scoring Rationale: Student demonstrates an ability to mark the length of the pencil that floated above the water surface using a 10-cm metric ruler and demonstrates an ability to accurately read a ruler by correctly recording the measurement marked on the ruler. All readings should be accurate to within +/- 0.2 cm.

5 = Complete - Student accurately marks the three pencil lengths (pages 5, 7, and 9) and accurately records the measurements marked on the two rulers (pages 5 and 7).

4a = Essential - Student accurately marks the three pencil lengths and accurately records the measurements marked on one of the two rulers.

4b = Essential - Student accurately marks the three pencil lengths but does not accurately record the measurements marked on the rulers.

3a = Adequate - Student accurately marks the two pencil lengths and accurately records the measurements marked on the two rulers.

3b = Adequate - Student accurately marks the two pencil lengths and accurately records the measurements marked on one of the two rulers.

3C = Adequate - Student accurately marks the two pencil lengths but does not accurately record the measurements marked on the rulers.

2a = Partial - Student accurately marks one pencil length and accurately records the measurement marked on the corresponding ruler.

2b = Partial - Student accurately marks one pencil length but does not accurately record the measurements marked on the rulers.

1 = Unsatisfactory - Student does not accurately mark any of the three pencil lengths or accurately record the measurements marked on the rulers.

Item Number: 5 Accession Number: OP000733

Key: C

Classification Codes:

N27S 1 ES B SI NA NA MC

Item Number: 6 Accession Number: OP000734

Key: NONE

Classification Codes:
N27S 1 PS A SI NA NA ECR

This item is scored with numbers 3 and 9. Refer to the scoring guide for number 3 (OP000731).

Item Number: 7 Accession Number: OP000735

Key: NONE

Classification Codes:

N27S 1 PS A SI NA NA ECR

Scoring Guide: This item is scored with numbers 4 and 9. Refer to the scoring guide for number 4 (OP000732).

Item Number: 8 Accession Number: OP000736

Key: A

Classification Codes:

N27S 1 ES B CU NA NS MC

Item Number: 9 Accession Number: OP000737

Key: NONE

Classification Codes:

N27S 1 ES B SI NA NS ECR

Scoring Guide: Part of this item is scored with numbers 3 and 6 (the line on the pencil). the other part is scored with numbers 4 and 7 (the line on the ruler). Refer to the scoring guides for numbers 3 and 4.

Item Number: 10 Accession Number: VK000007

Key: NONE

Classification Codes:

N27S 1 PS A SI NA NS SCR

Scoring Guide

Scoring Rationale: Student demonstrates an ability to apply his/her understanding of the floating pencil test to determine whether the unknown solution is fresh water or salt water. (In this task the “Mystery Water” is a sample of fresh water.)

3 = Complete - Student correctly states that the mystery water is fresh water and adequately justifies this conclusion by using a comparison.

2 = Partial - Student correctly states that the mystery water is fresh water; however, this response is not justified or is inadequately justified (e.g., “the mystery water is fresh water. I knew this because it looked like fresh water,” “it works like fresh water,” “it was the same as freshwater,” it matches up to freshwater,” it floats higher”).

1 = Unsatisfactory/Incorrect - Student shows little or no evidence of the ability to apply the floating pencil test to the task of determining the identity of the mystery water.

Item Number: 11 Accession Number: OP000738

Key: NONE

Classification Codes:
N27S 1 ES B PR MOD NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates a beginning understanding of the concept of density by applying the observations of the floating pencil to a real-world situation (swimming in salt water and fresh water).

3 = Complete - Student response demonstrates a beginning understanding of the concept of density by choosing ocean and giving an explanation that refers back to the test they did. They explain that the pencil floats better in salt water than fresh water, or the pencil went down more in fresh water.

2 = Partial - Student response demonstrates some understanding of floating and density by explaining that the ocean is salt water, or relates answer to pencil but does not give a complete explanation (e.g., the pencil floated higher).

1 = Unsatisfactory/Incorrect - Student response does not relate swimming in salt water and fresh water to density in any way (e.g., "I like swimming in salt water better"), or just restates information in the question (e.g., "floating is easier in ocean water").

Student Sample Responses

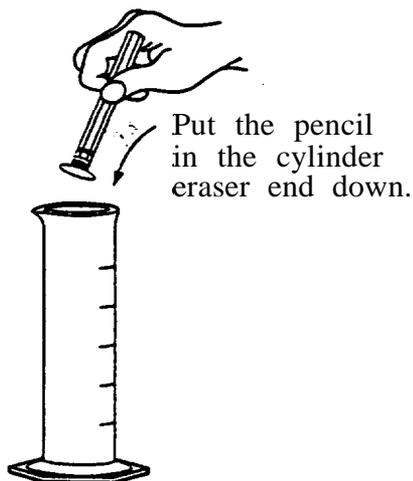
Rainwater and the water in streams and lakes are called *fresh water*. Fresh water has very little salt in it and is quite different from *salt water*, which is found in oceans. One way you can tell the difference between fresh water and salt water is by doing the following tests.

1. Open the bottle labeled **Fresh Water**. Pour all of the fresh water into the cylinder. Put the cap back on the bottle.

After you add the fresh water to the cylinder, what is the total amount of water in the cylinder? 94 milliliters (mL)

Now use the red marker to draw a short line on the side of the cylinder to show how much water is in it.

Now take the pencil and put it in the water in the cylinder, eraser-end down.



Student Sample Responses

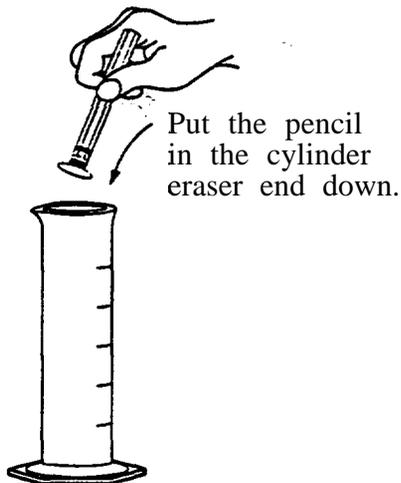
Rainwater and the water in streams and lakes are called *fresh water*. Fresh water has very little salt in it and is quite different from *salt water*, which is found in oceans. One way you can tell the difference between fresh water and salt water is by doing the following tests.

1. Open the bottle labeled **Fresh Water**. Pour all of the fresh water into the cylinder. Put the cap back on the bottle.

After you add the fresh water to the cylinder, what is the total amount of water in the cylinder? 91 milliliters (mL)

Now use the red marker to draw a short line on the side of the cylinder to show how much water is in it.

Now take the pencil and put it in the water in the cylinder, eraser-end down.



Level:
Partial (2)

Student Sample Responses

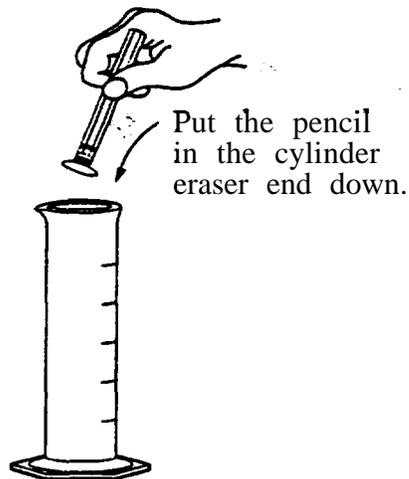
Rainwater and the water in streams and lakes are called *fresh water*. Fresh water has very little salt in it and is quite different from *salt water*, which is found in oceans. One way you can tell the difference between fresh water and salt water is by doing the following tests.

1. Open the bottle labeled **Fresh Water**. Pour all of the fresh water into the cylinder. Put the cap back on the bottle.

After you add the fresh water to the cylinder, what is the total amount of water in the cylinder? 89 milliliters (mL)

Now use the red marker to draw a short line on the side of the cylinder to show how much water is in it.

Now take the pencil and put it in the water in the cylinder, eraser-end down.



Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

2. How much water is in the cylinder now that you have put the pencil in it? (Fill in the oval in front of the best answer.)

- A More water than before the pencil was added
- B The same amount of water as before the pencil was added
- C Less water than before the pencil was added

Tell why you think so.

The pencil takes up space the water has nowhere to go but up.

Level:
Complete (3)

2. How much water is in the cylinder now that you have put the pencil in it ? (Fill in the oval in front of the best answer.)

- A More water than before the pencil was added
- B The same amount of water as before the pencil was added
- C Less water than before the pencil was added

Tell why you think so.

the pencil is heavy
so heavy things float.

Level:
Partial (2)

Student Sample Responses

2. How much water is in the cylinder now that you have put the pencil in it? (Fill in the oval in front of the best answer.)

- More water than before the pencil was added
- The same amount of water as before the pencil was added
- Less water than before the pencil was added

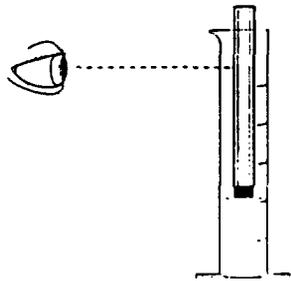
Tell why you think so.

The water goes higher
then it was.

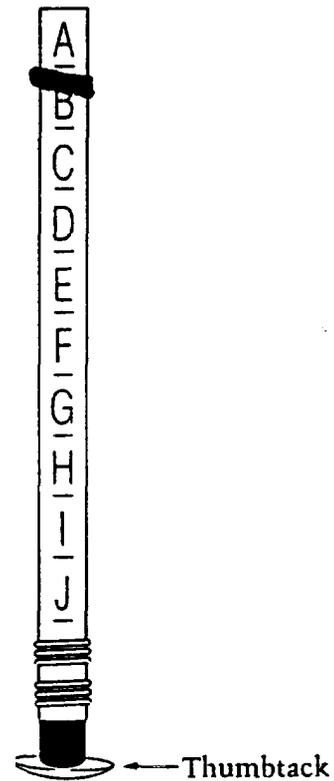
Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

3. Look at the pencil in the fresh water. There are letters along the side of the pencil. Make sure the pencil is not touching the side of the cylinder. Note the exact level where the water surface meets the side of the pencil, as shown in picture A. Then draw a line on picture B where the water surface comes to on your pencil. This line will help you to remember where the water level comes on your pencil for the next step (4).



Picture A

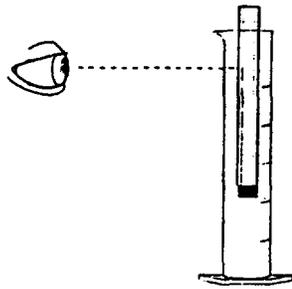


Picture B

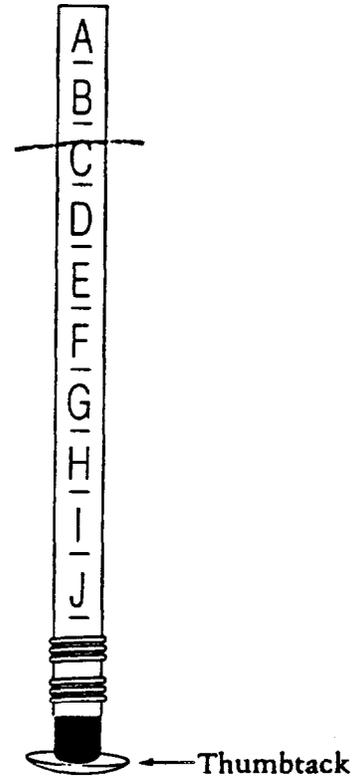
Level:
Complete (4)

Student Sample Responses

6. Look at the pencil in the salt water. Look at the letters along the side of the pencil, as shown in picture A. Where does the salt water come up to on the pencil, as shown in picture B. Draw a line on picture B where the water level comes to on your pencil.

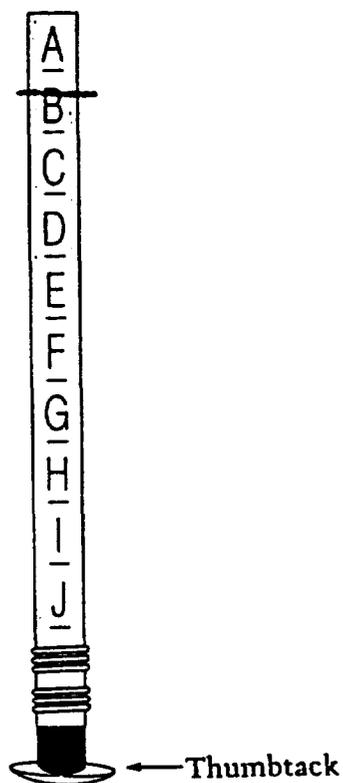


Picture A



Student Sample Responses

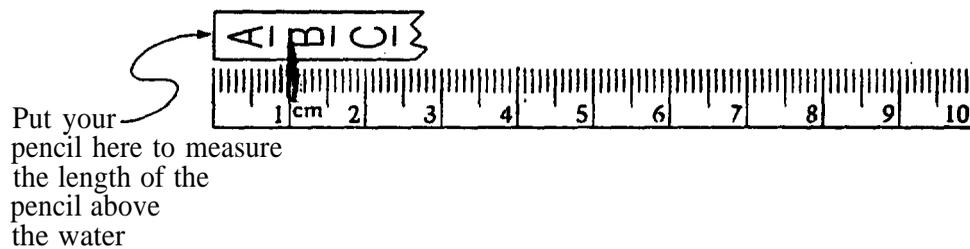
9. Now use the floating-pencil test to find out if the water in the bottle label **Mystery Water** is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.



Student Sample Responses

4. Now take the pencil out of the water and dry it with a paper towel.

Use the ruler printed below to measure the length of the pencil that was above the water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the water?

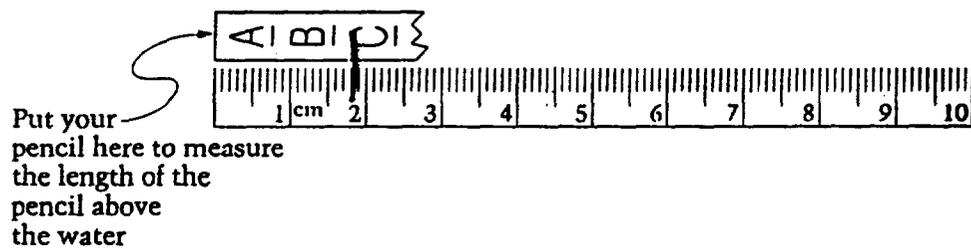
1 centimeters (cm)

Now pour the fresh water out of the cylinder into the large plastic bowl. Later you will throw this water away.

Level:
Complete (5)

Student Sample Responses

7. Now take the pencil out of the salt water and dry it with a paper towel. Use the ruler printed below to measure the length of the pencil that was above the salt water. Draw a line on the ruler to show how much of the pencil was above the water.

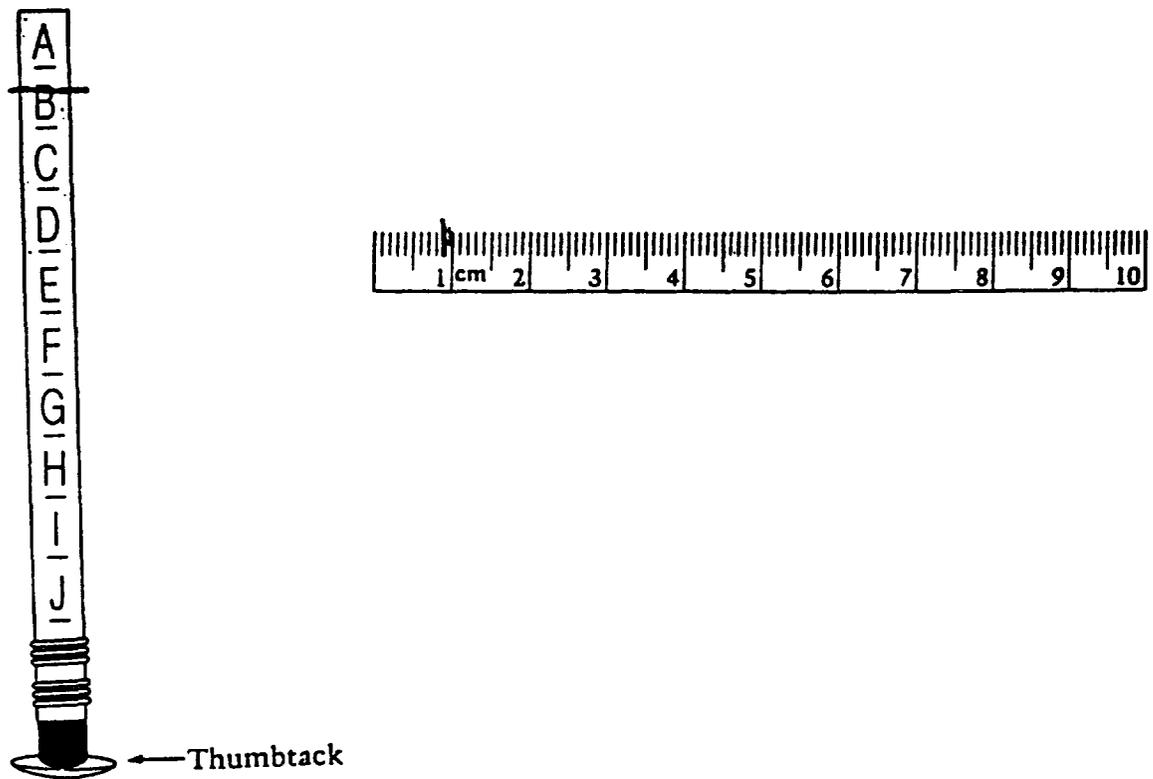


How long was the part of the pencil that was above the salt water?

2 centimeters (cm)

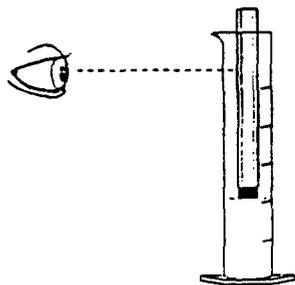
Student Sample Responses

9. Now use the floating-pencil test to find out if the water in the bottle labeled **Mystery Water** is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.

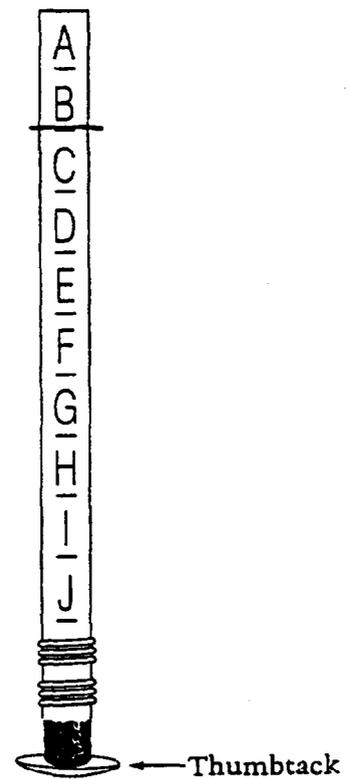


Student Sample Responses

3. Look at the pencil in the fresh water. There are letters along the side of the pencil. Make sure the pencil is not touching the side of the cylinder. Note the exact level where the water surface meets the side of the pencil, as shown in picture A. Then draw a line on picture B where the water surface comes to on your pencil. This line will help you to remember where the water level comes on your pencil for the next step (4).



Picture A

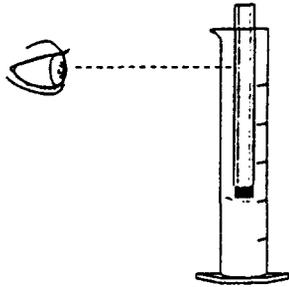


Picture B

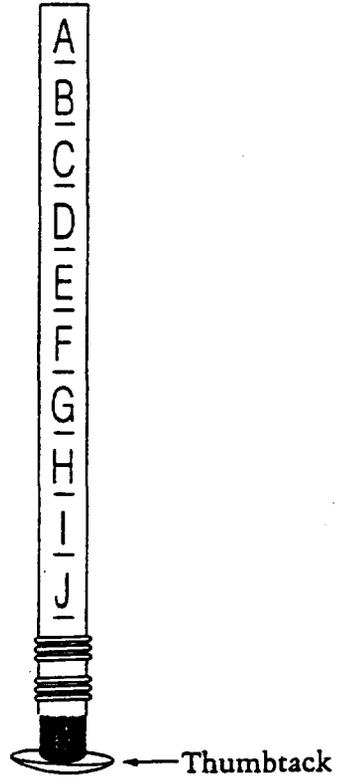
Level:
Essential (3)

Student Sample Responses

6. Look at the pencil in the salt water. Look at the letters along the side of the pencil, as shown in picture A. Where does the salt water come up to on the pencil? Now look at picture B. Draw a line on picture B where the water level comes to on your pencil.



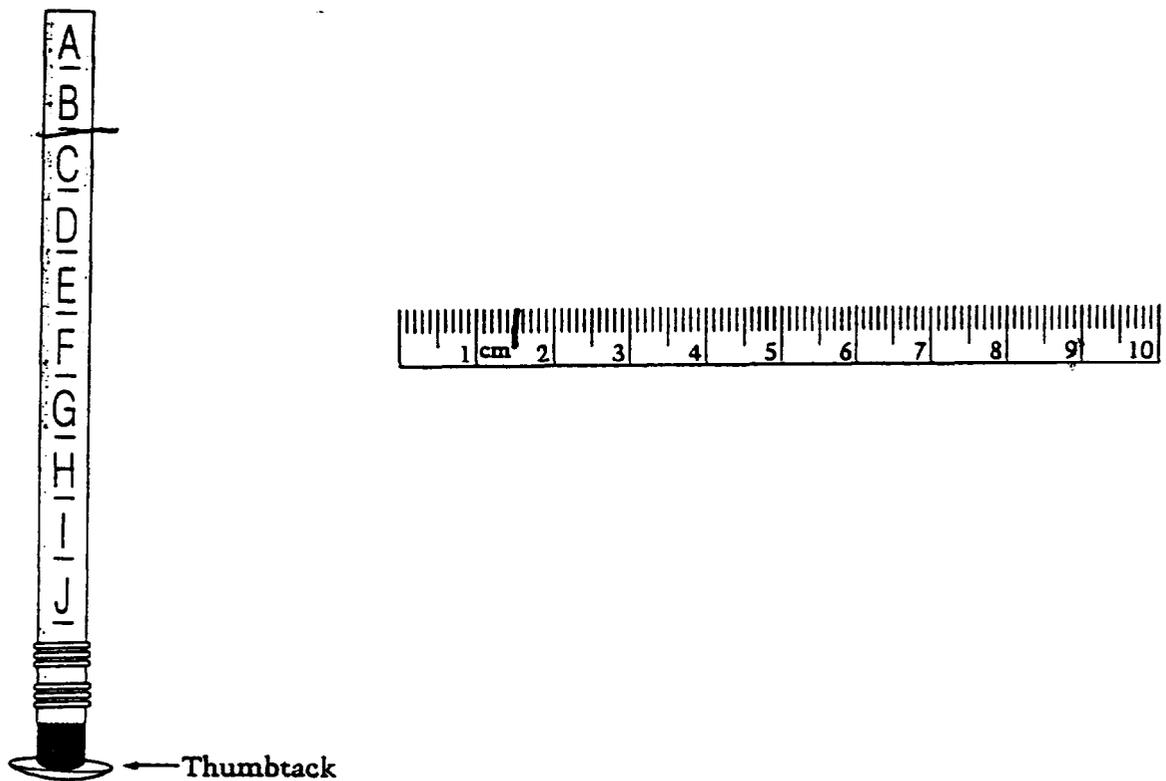
Picture A



Picture B

Student Sample Responses

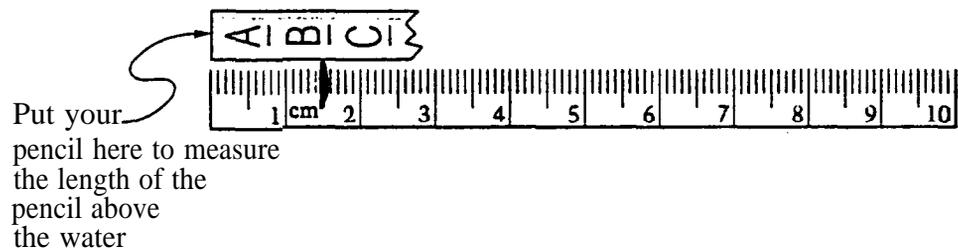
9. Now use the floating-pencil test to find out if the water in the bottle labeled Mystery Water is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.



Student Sample Responses

4. Now take the pencil out of the water and dry it with a paper towel.

Use the ruler printed below to measure the length of the pencil that was above the water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the water?

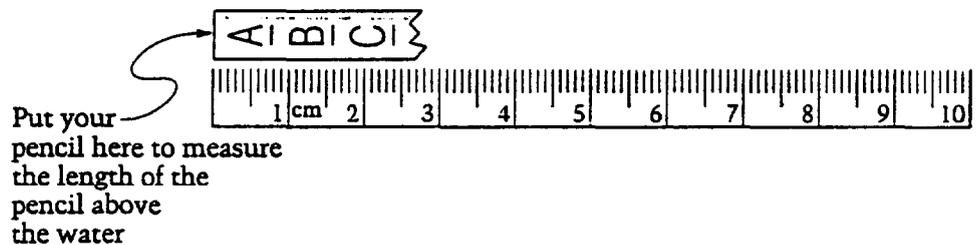
1.5 centimeters (cm)

Now pour the fresh water out of the cylinder into the large plastic bowl. Later you will throw this water away.

Level:
Adequate (3)

Student Sample Responses

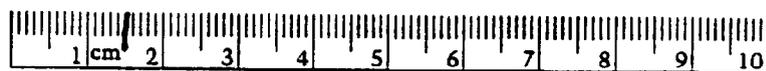
7. Now take the pencil out of the salt water and dry it with a paper towel. Use the ruler printed below to measure the length of the pencil that was above the salt water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the salt water?

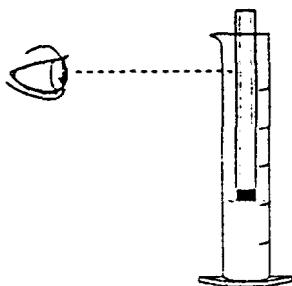
_____centimeters (cm)

9. Now use the floating-pencil test to find out if the water in the bottle labeled Mystery Water is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.

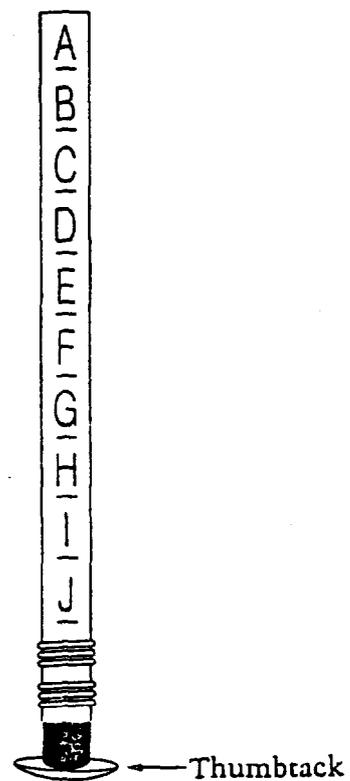


Student Sample Responses

3. Look at the pencil in the fresh water. There are letters along the side of the pencil. Make sure the pencil is not touching the side of the cylinder. Note the exact level where the water surface meets the side of the pencil, as shown in picture A. Then draw a line on picture B where the water surface comes to on your pencil. This line will help you to remember where the water level comes on your pencil for the next step (4).



Picture A

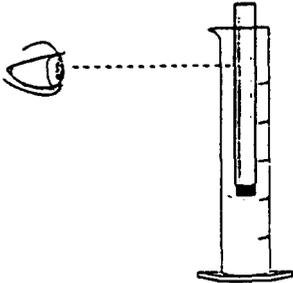


Picture B

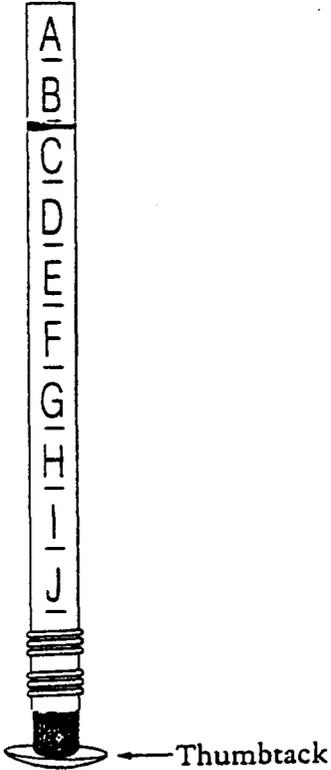
Level:
Partial (2)

Student Sample Responses

6. Look at the pencil in the salt water. Look at the letters along the side of the pencil, as shown in picture A. Where does the saltwater come up to on the pencil? Now look at picture B. Draw a line on picture B where the water level comes to on your pencil.



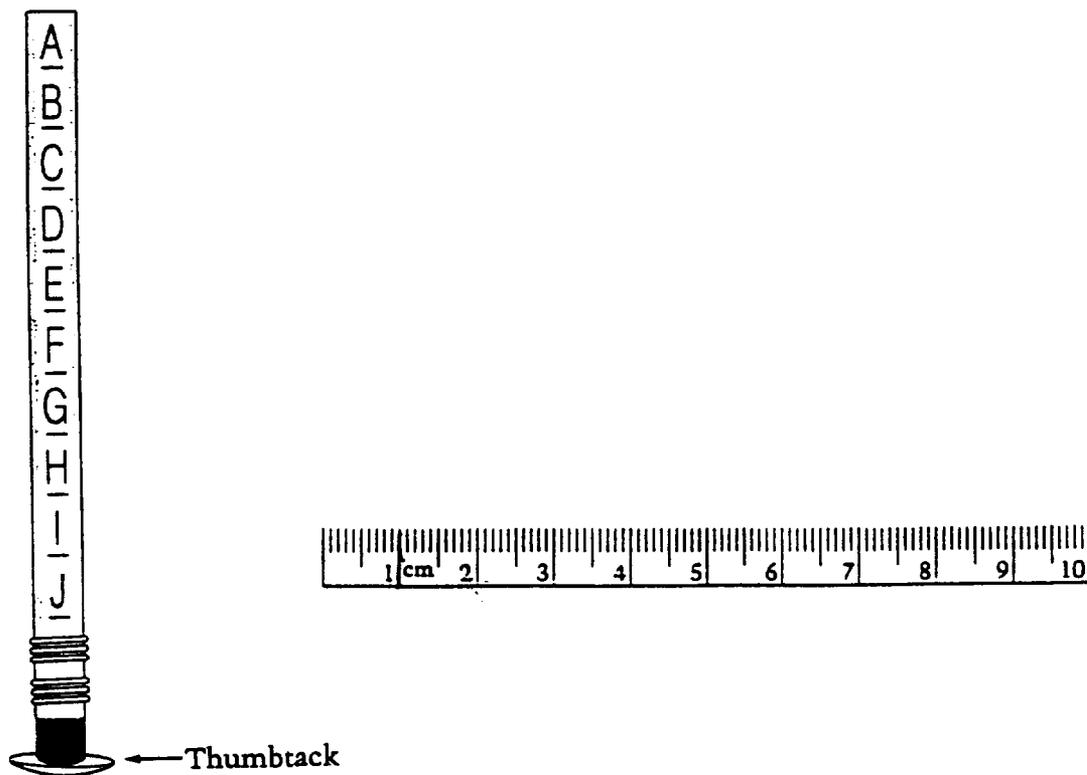
Picture A



Picture B

Student Sample Responses

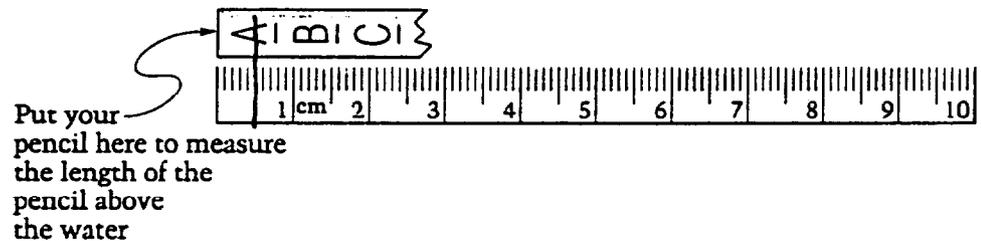
9. Now use the floating-pencil test to find out if the water in the bottle labeled Mystery Water is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.



Student Sample Responses

4. Now take the pencil out of the water and dry it with a paper towel.

Use the ruler printed below to measure the length of the pencil that was above the water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the water?

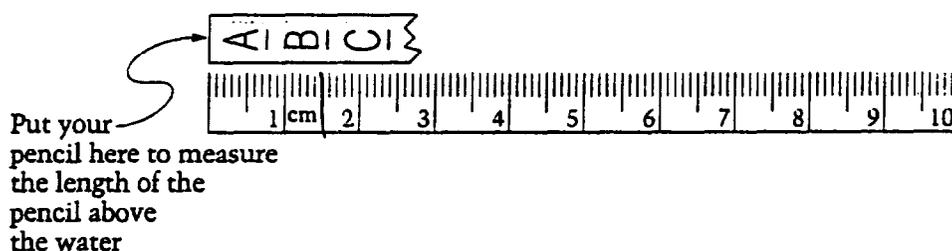
1 centimeters (cm)

Now pour the fresh water out of the cylinder into the large plastic bowl. Later you will throw this water away.

Level:
Partial (2)

Student Sample Responses

7. Now take the pencil out of the salt water and dry it with a paper towel. Use the ruler printed below to measure the length of the pencil that was above the salt water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the salt water?

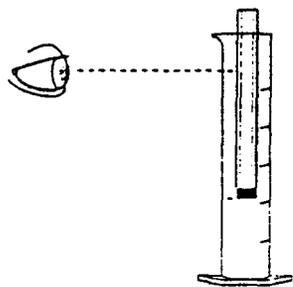
1 1/2 centimeters (cm)

9. Now use the floating-pencil test to find out if the water in the bottle labeled Mystery Water is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.

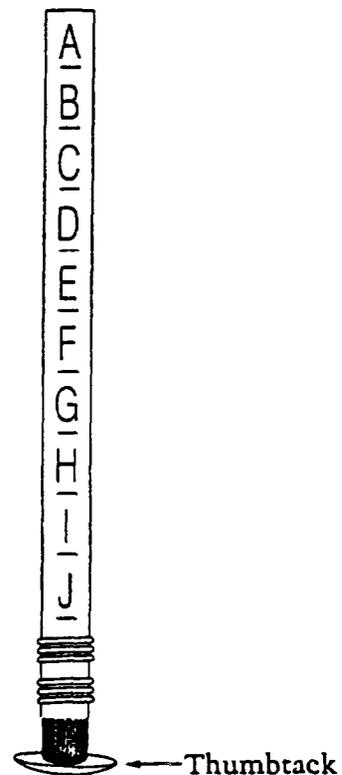


Student Sample Responses

3. Look at the pencil in the fresh water. There are letters along the side of the pencil. Make sure the pencil is not touching the side of the cylinder. Note the exact level where the water surface meets the side of the pencil, as shown in picture A. Then draw a line on picture B where the water surface comes to on your pencil. This line will help you to remember where the water level comes on your pencil for the next step (4).



Picture A

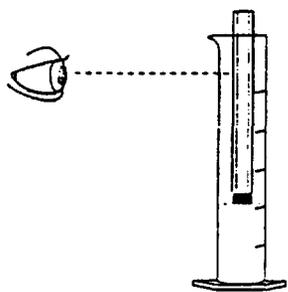


Picture B

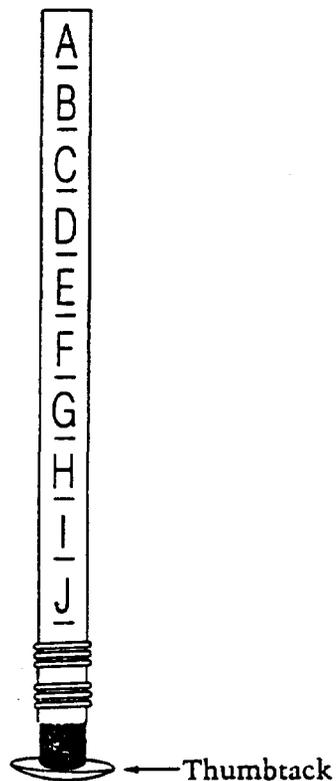
Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

6. Look at the pencil in the salt water. Look at the letters along the side of the pencil, as shown in picture A. Where does the salt water come up to on the pencil? Now look at picture B. Draw a line on picture B where the water level comes to on your pencil.



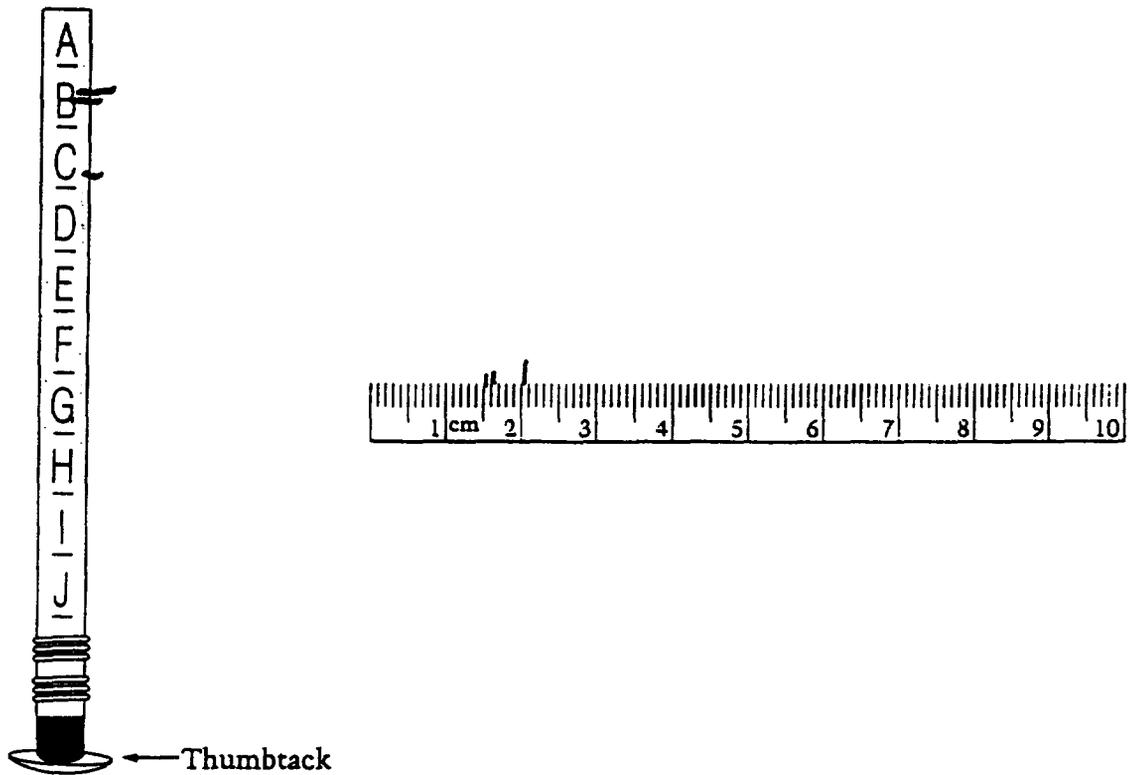
Picture A



Picture B

Student Sample Responses

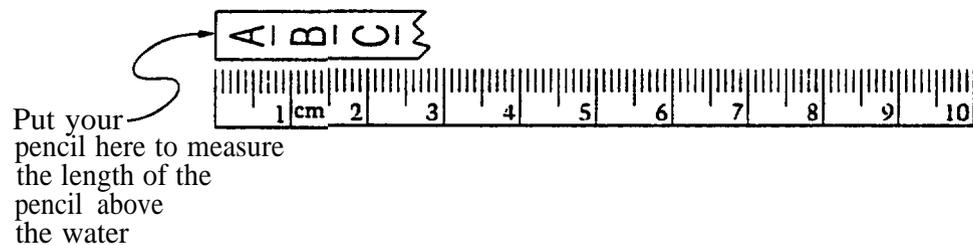
9. Now use the floating-pencil test to find out if the water in the bottle labeled Mystery Water is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.



Student Sample Responses

4. Now take the pencil out of the water and dry it with a paper towel.

Use the ruler printed below to measure the length of the pencil that was above the water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the water?

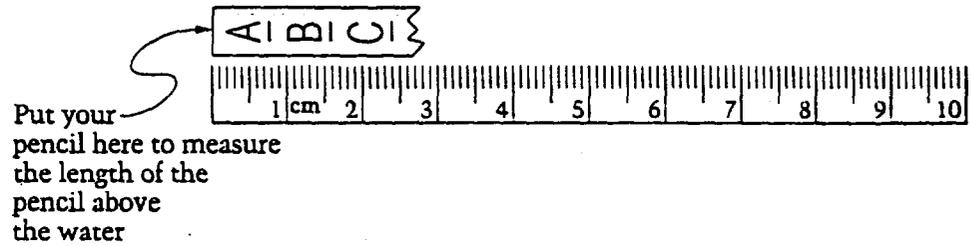
1.7 centimeters (cm)

Now pour the fresh water out of the cylinder into the large plastic bowl. Later you will throw this water away.

Level:
Unsatisfactory (1)

Student Sample Responses

7. Now take the pencil out of the salt water and dry it with a paper towel. Use the ruler printed below to measure the length of the pencil that was above the salt water. Draw a line on the ruler to show how much of the pencil was above the water.



How long was the part of the pencil that was above the salt water?

2 centimeters (cm)

9. Now use the floating-pencil test to find out if the water in the bottle labeled Mystery Water is fresh water or salt water. Do your test just like you did for the fresh water and the salt water. For this test, you can draw lines on the pictures of the pencil and the ruler below.



Student Sample Responses

10. Is the mystery water fresh water or is it salt water?

fresh water

How can you tell what the mystery water is?

because in the fresh water
it went to A and it went to
A again

Level:
Complete (3)

Now pour the mystery water into the large plastic bowl.

10. Is the mystery water fresh water or is it salt water?

fresh water

How can you tell what the mystery water is?

because it do not have salt and
it

Level:
Partial (2)

Now pour the mystery water into the large plastic bowl.

Student Sample Responses

10. Is the mystery water fresh water or is it salt water?

it was good

How can you tell what the mystery water is?

With soap.

Now pour the mystery water into the large plastic bowl.

Level:

Unsatisfactory/Incorrect (1)

Student Sample Responses

11. When people are swimming is it easier for them to stay afloat in the ocean or in a freshwater lake?

salt water

Explain your answer.

I think people can stay
afloat better in salt water
because the pencil went
higher in the salt water.

Level:
Complete (3)

11. When people are swimming, is it easier for them to stay afloat in the ocean or in a freshwater lake?

in the ocean

Explain your answer.

because there are a lot of
salt

Level:
Partial (2)

Student Sample Responses

11. When people are swimming is it easier for them to stay afloat in the ocean or in a freshwater lake?

Ocean

Explain your answer.

Because the ocean
is bigger.

Level:
Unsatisfactory/Incorrect (1)

SECTION 123

Section 123

In this section, you will have 20 minutes to answer 8 questions. Mark your answers in your booklet. Fill in only one oval for each question or write your answer on the lines. Please think carefully about your answers. When you are writing your answers, be sure that your handwriting is clear.

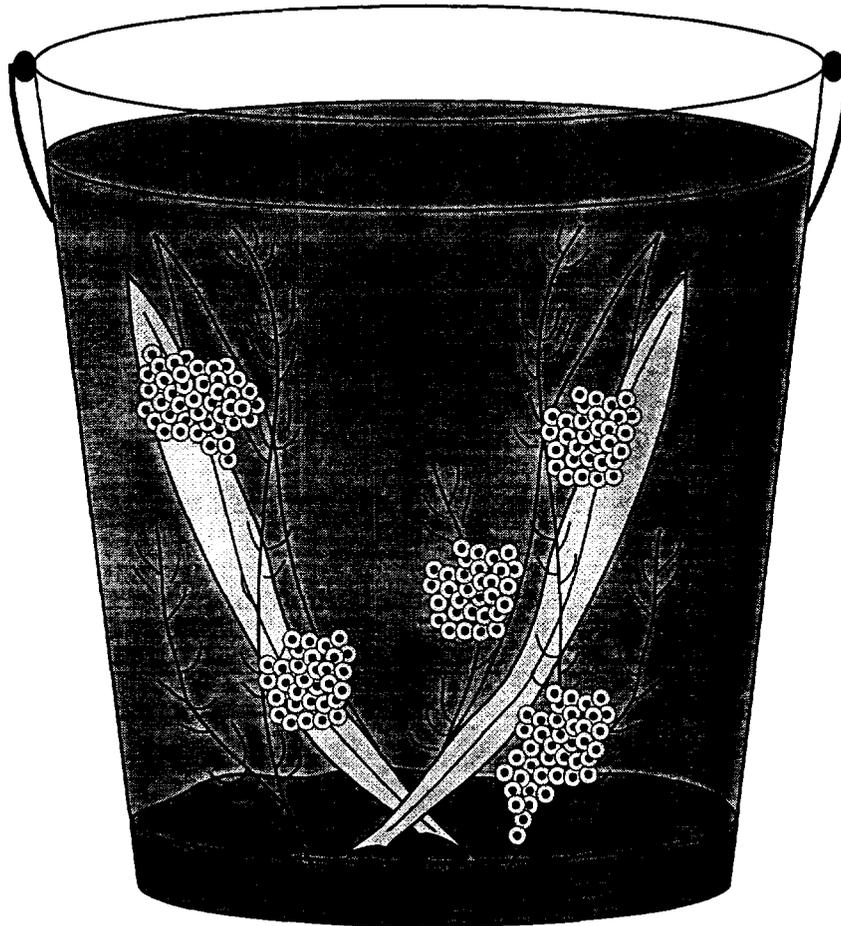
Do not go past the **STOP** sign at the end of the section. If you finish before time is called, you should go over your work again.

PLEASE TURN THE PAGE AND BEGIN NOW.

Section 123

Questions 1-8 refer to the life cycles of different animals.

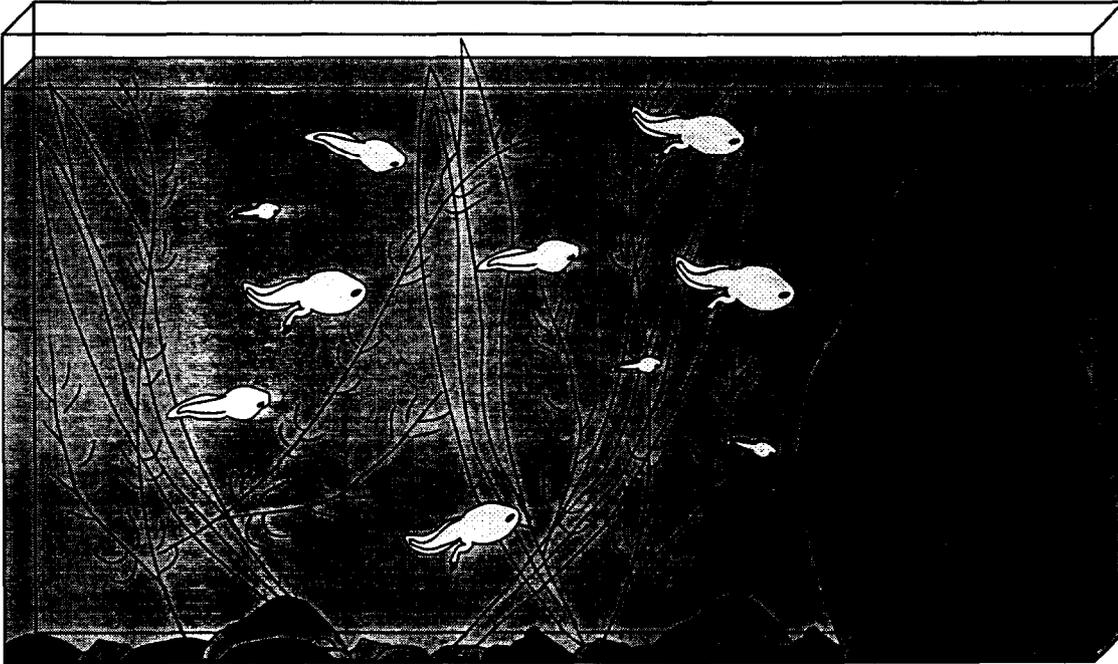
One day Ms. Brown brought a bucket of pond water to her fourth-grade class. In the bucket were several clumps of frogs' eggs—and there were many eggs in each clump, as you can see in Picture 1. “We’ll put these eggs and the pond water into the fish tank on the table in the back of the room,” said Ms. Brown, “and soon these eggs will hatch into tadpoles. Then we can watch as the tadpoles grow and change into frogs.”



Picture 1

Today, two weeks later, all of the eggs that are going to hatch have hatched and the fish tank is full of tadpoles. The last eggs hatched yesterday. As you can see in Picture 2, all the tadpoles do not look alike.

HE001408



Picture 2

1. Draw a circle around each of the tadpoles that hatched yesterday.

HE001409

2. Tell why all the tadpoles in the fish tank do not look alike

HE001410

Section 123

3. All animals need oxygen to live.

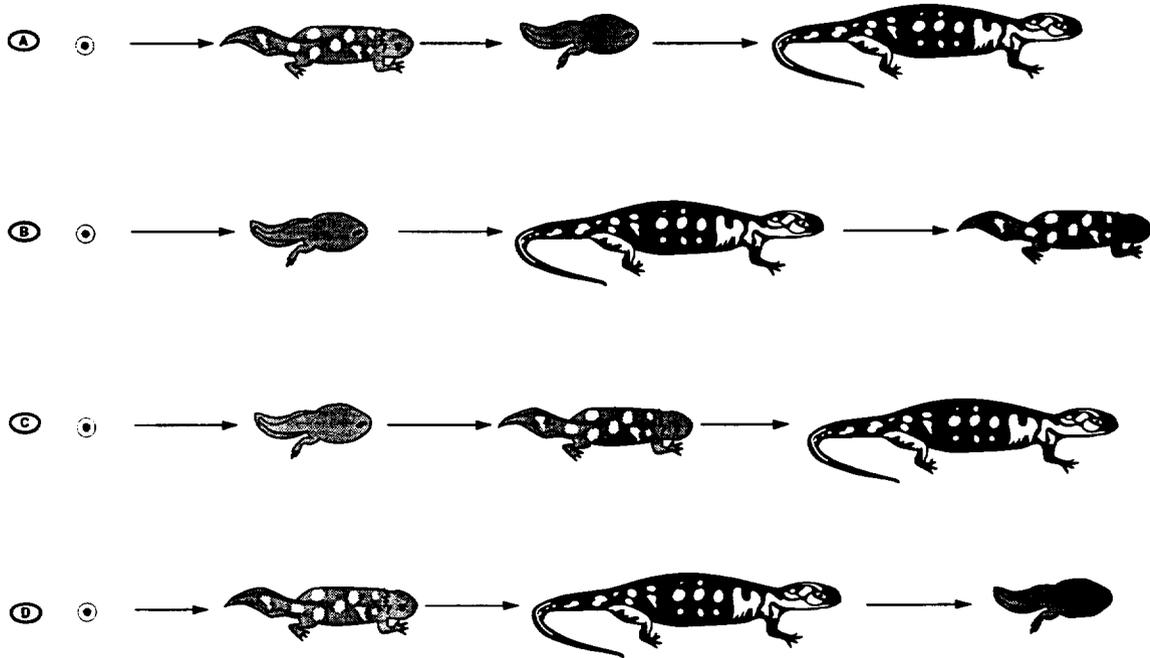
Describe how a tadpole gets oxygen into its body.

Describe how a frog gets oxygen into its body.

HE001412

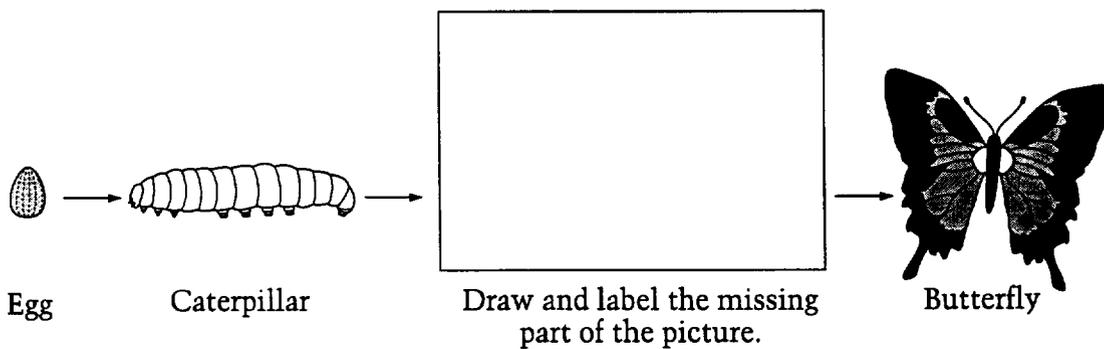
4. Salamanders have a life cycle that is like the life cycle of a frog. Look at the following pictures. Which set shows the correct order of the stages in a salamander's life cycle?

HE001413

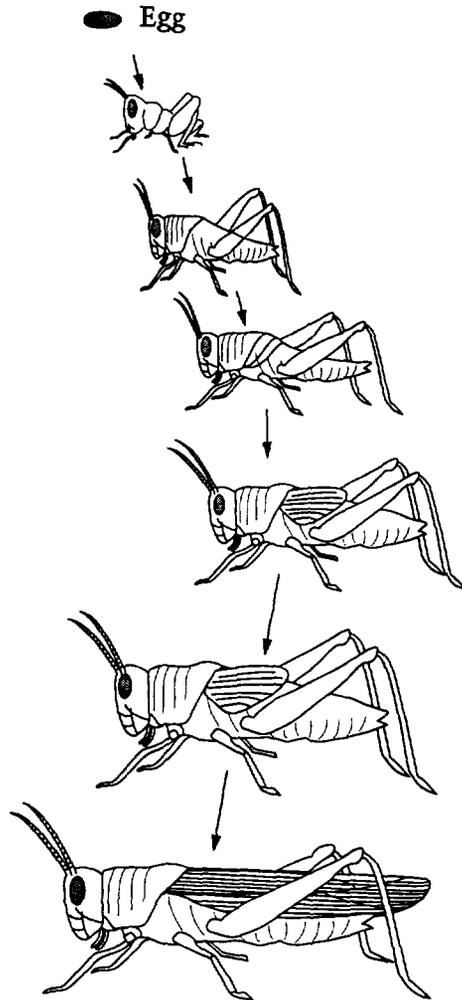


5. Insects also change as they grow. Look at the picture below. One part of the picture is missing. Draw and label the missing part of the picture.

HE001414



6. The picture below shows the life cycle of a grasshopper.



Adult Grasshopper

Tell one way that the grasshopper's life cycle is different from the butterfly's life cycle.

Section 123

7. Different types of adult living things look very different, but they do many of the same things. Name three things that animals such as frogs, grasshoppers, and butterflies must do to live. HE001416

8. Think about how humans grow and develop from newborn babies to adults. Is a human's life cycle more like a frog's life cycle or more like a grasshopper's life cycle? Explain your answer. HE001417



**INFORMATION ABOUT THE FRAMEWORK CLASSIFICATION CODES
AVAILABLE FOR EACH ITEM**

Following this description of the classification codes, there is a single sheet with NAEP ID numbers, short descriptions of the items, item keys(1-4 if the item is multiple-choice; blank if the item is open-ended), as well as the mean p-values for the items in the released block.

The classification codes for each item can be viewed within each item in the scoring guide.

- Field 1) Program Profile:**
N27S NAEP, year 27 of Science
- Field 2) Grade:**
1 Grade 4 only item
1/2 Grade 4/8 overlap item
2 Grade 8 only item
2/3 Grade 8/12 overlap item
3 Grade 12 only item
- Field 3) Field of science:**
P S Physical Science
E S Earth Science
L S Life Science
Field science of subcontent area:
The letter corresponds to the subcontent areas described in the Science Assessment and Exercise specifications for the 1996 National Assessment of Educational Progress.
- Field 4) Physical Science:**
A Matter and Its Transformations
B Energy and Its Transformations
C Motion
Earth Science:
A Solid Earth (lithosphere)
B Water (hydrosphere)
C Air (atmosphere)
D Earth in Space
Life Science:
A Change and Evolution
B Cells and Their Functions
C Organisms
D Ecology
- Field 5) Ways of knowing and doing science:**
S I Scientific Investigation
P R Practical Reasoning
C U Conceptual Understanding

Field 6)

Theme:

SYS Systems
MOD Models
PC Patterns of Change
NA Not Applicable

Field 7)

Nature of Science/Technology:

NS Nature of Science
NT Nature of Technology
NA Not Applicable

Field 8)

Item Type:

MC Multiple-Choice
SCR Short Constructed-Response
ECR Extended Constructed-Response
NA Not Applicable

1996 Science Items

GRADE: 04 BLOCK: 27S8

<u>ITEM</u>	<u>NAEP ID</u>	<u>SHORT DESCRIPTION</u>	<u>KEY</u>	<u>CONTENT</u>	<u>PROCESS</u>	<u>P-VALUE</u>	<u>RELEASE STATUS</u>
1A	K031501	LIFE CYCLES: CIRCLE YOUNGEST TADPOLES OE		3	3	0.718	P
2A	K031502	LIFE CYCLES: WHY DO TADPOLES DIFFER OE		3	3	0.366	P
3A	K031503	LIFE CYCLES: SOURCE 02 FOR TADPOLE OE		3	3	0.244	P
3 G	K031509	LIFE CYCLES: SOURCE 02 FOR FROG OE		3	3	0.286	P
4	K031504	LIFE CYCLES: CORRECT CYCLE FOR SALAMANDER MC 3		3	3	0.920	P
5A	K031505	LIFE CYCLES: DRAW AND LABEL PUPA OE		3	3	0.691	P
6A	K031506	LIFE CYCLES: COMPARE GRASSHOPPER+BUTTERFLY OE		3	3	0.369	P
7A	K031507	LIFE CYCLES: LIST SIMILAR FUNCTIONS OE		3	3	0.450	P
8A	K031508	LIFE CYCLE: MAN/FROG/GRASSHOPPER OE		3	2	0.189	P

Content: 1 = Physical Sciences
 2 = Earth & space sciences
 3 = Life sciences

Process: 1 = Scientific investigation
 2 = Practical reasoning
 3 = Conceptual understanding

Information about the Item Difficulty Available for Each Item

Item identification, a short item description, and the key (for multiple-choice items) are provided, in addition to information about the item difficulty, for each item. The items are identified by their position within a block and by their NAEP IDs. The NAEP IDs are used to identify items during the analysis of NAEP data in the summary of item level results in data almanacs, and in the secondary user data sources.

The numbers in the column labeled “P-Value” on the item statistic sheet vary for item types (multiple-choice and 2-category constructed-response items and constructed-response items with more than two categories). For the multiple-choice items and for the 2-category constructed-response items that were scored correct or incorrect the number in that column is the percent of students correctly responding to the item. This value is often called the p-value or the P+ for an item. For constructed-response items with more than two categories, the value in the column is the mean item score for the item.

For example, if the number of categories for a constructed-response item is 3 with a category/unsatisfactory/incorrect (category 1) worth 0 points, a partial category (category 2) worth 1/2 of a point and a complete category (category 3) worth 1 point, then a student can receive either 0, 1/2 or 1 point for his response to the item. The mean item score is the number that you would get if the scores on this item are averaged for all of the students in the assessment. This value varies from 0 to 1 just as the percent correct for a multiple-choice item could vary. It can be interpreted as an indication of where on the 0-1 scale for the item that an “average” student might score. For instance, if the mean item score for a 3-category constructed-response item is .8, then an “average” student would be expected to have a response in either category 2 (worth 1/2 or .5 of a point) or category 3 (worth 1 point). In fact it is a little more likely that the student would have a response in category 3, since .8 is closer to 1.0 than to .5.

Item Number: NONE Accession Number: HE001408

Key: NONE

Classification Codes:
N27S 1 LS

C

CU

PC

NA

NA

Item Number: 1 Accession Number: HEO01409

Key: NONE

Classification Codes:

N27S 1 L S C CU PC NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates an understanding of life cycles--specifically, that organisms grow over time--by recognizing that the smallest tadpoles in the drawing are the youngest tadpoles.

3 = Complete - Student circles all three of the smallest tadpoles in the diagram.

2a = Partial - Student circles two of the smallest tadpoles and does not mark any other tadpole(s).

2b = Partial - Student circles one of the smallest tadpoles and does not mark any other tadpole(s).

1 = Unsatisfactory/Incorrect - Student circles tadpole(s) that may include the smallest tadpoles.

Item Number: 2 Accession Number: HE001410

Key: NONE

Classification Codes:
N27S 1 LS C CU PC NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates an ability to explain why there may be physical differences among a group of similar-appearing organisms.

3 = Complete - Student response demonstrates an ability to explain why there may be physical differences among the group of organisms and identifies which tadpoles are addressed (e.g., “the bigger ones with legs were born a while ago, and the ones without legs were just born”).

2 = Partial - Student response gives an explanation of the difference in age only (e.g., some were born earlier than others) .

1 = Unsatisfactory/Incorrect - Student demonstrates little or no understanding of reasons that explain the differences in age among a group of similar-appearing tadpoles by giving a description of the picture, or a restatement of the prompt, or an incorrect explanation.

Item Number: 3 Accession Number: HEO01412

Key: NONE

Classification Codes:
N27S 1 LS C CU PC NA SCR

Scoring Guide 3a

Scoring Rationale: Student demonstrates a basic understanding of the structure and function of respiratory systems in aquatic animals by explaining that tadpoles get oxygen from the water using their gills.

3 = Complete - Student describes both the source of oxygen and the organs used for breathing in tadpoles.

2a = Partial - Student correctly describes the source of oxygen (e.g., “tadpoles get oxygen from water”).

2b = Partial - Student correctly describes the organs used for respiration for tadpoles.

1 = Unsatisfactory/Incorrect - Student is unable to correctly identify the source of oxygen (water), or the organs used for respiration (gills) for tadpoles.

Scoring Guide 3b

Scoring Rationale: Student demonstrates a basic understanding of the structure and function of respiratory systems in aquatic/terrestrial animals by explaining that frogs get oxygen from the air using their lungs and/or from the water using their skin.

3 = Complete - Student describes both the source of oxygen and the organ(s) used for breathing in frogs.

2a = Partial - Student correctly describes the source of oxygen.

2b = Partial - Student correctly describes the organ(s) used for respiration for frogs.

1 = Unsatisfactory/Incorrect - Student is unable to correctly identify the source of oxygen (water, air), or the organs used for respiration (lungs, skin) for frogs (e.g., “all animals need oxygen”).

Item Number: 4 Accession Number: HE001413

Key: C

Classification Codes:
N27S 1 LS

C

CU

PC

NA

MC

Item Number: 5 Accession Number: HE001414

Key: NONE

Classification Codes:

N27S 1 LS C CU PC NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates an understanding of the life cycle of a familiar organism -- a butterfly -- by correctly drawing the pupal stage of the life cycle.

3 = Complete - Student correctly draws the pupal stage of the butterfly life cycle and labels it.

2 = Partial - Student correctly draws the pupal stage of the butterfly life cycle but does not label it, or writes the label without a diagram.

1 = Unsatisfactory/Incorrect - Student does not draw the pupal stage of a butterfly life cycle.

Credited labels include:

Cocoon
pupa
chrysalis

Item Number: 6 Accession Number: HE001415

Key: NONE

Classification Codes:
N27S 1 LS C CU PC NA ECR

Scoring Guide

Scoring Rationale: Student demonstrates an understanding of the life cycle of familiar organisms (grasshopper and butterfly) by describing similarities and differences between their life cycles.

5 = Complete - Student tells two ways the grasshopper's life cycle differs from the butterfly's life cycle and two ways the life cycles are similar.

4 = Essential - Student tells two ways the grasshopper's life cycle differs from the butterfly's life cycle and one way the life cycles are similar.

or
Student tells one way the grasshopper's life cycle differs from the butterfly's life cycle and two ways the life cycles are similar.

3 = Adequate - Student tells one way the grasshopper's life cycle differs from the butterfly's life cycle and one way the life cycles are similar, or tells two similarities, or two differences in life cycles.

2 = Partial - Student tells 1 way that the life cycles of the butterfly and grasshopper are different.

or
Student tells 1 way that the life cycles of the butterfly and grasshopper are similar.

1 = Unsatisfactory/Incorrect - Student does not correctly tell either a similarity or a difference between the life cycles of a butterfly and a grasshopper.

Credited responses include:

Differences:

The grasshopper doesn't change much in form after it hatches from the egg, but mainly just increases in size, while the butterfly changes from a caterpillar to a butterfly with wings.

The grasshopper eats the same food as it develops; the butterfly doesn't.

One goes in cocoon, one doesn't

Similarities:

Both hatch from eggs

Both undergo a great increase in size

Both develop into adults that can produce eggs themselves

Neither born with wings

Both molt

Item Number: 7 Accession Number: HE001416

Key: NONE

Classification Codes:

N27S 1 LS C CU PC NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates an understanding of the common features of animals by listing things that are done by frogs, grasshoppers, and butterflies.

3 = Complete - Student names three things that animals such as frogs, grasshoppers, and butterflies must do to live.

2a = Partial - Student names two things that animals such as frogs, grasshoppers, and butterflies must do to live.

2b = Partial - Student names one thing that animals such as frogs, grasshoppers, and butterflies must do to live.

1 = Unsatisfactory/Incorrect - Student does not correctly name anything that animals such as frogs, grasshoppers, and butterflies must do to live.

Note: “do” = actions (“have” is not acceptable; i.e., “have oxygen” or “have camouflage”)

Item Number: 8 Accession Number: HE001417

Key: NONE

Classification Codes:

N27S 1 LS C PR PC NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates 1) an understanding of the human life cycle and the life cycle of a grasshopper or frog, and 2) the ability to describe the similarities between organisms by comparing the human life cycle to the life cycle of a frog or grasshopper.

3 = Complete - Student states a reasonable justification that includes a brief description of one correct similarity between the human life cycle and the frog or grasshopper life cycle.

1 = Unsatisfactory/Incorrect - Student describes no correct similarities between the human life cycle and the grasshopper or frog life cycles, or describes an incorrect similarity, or gives a characteristic that all 3 have.

Credited responses:

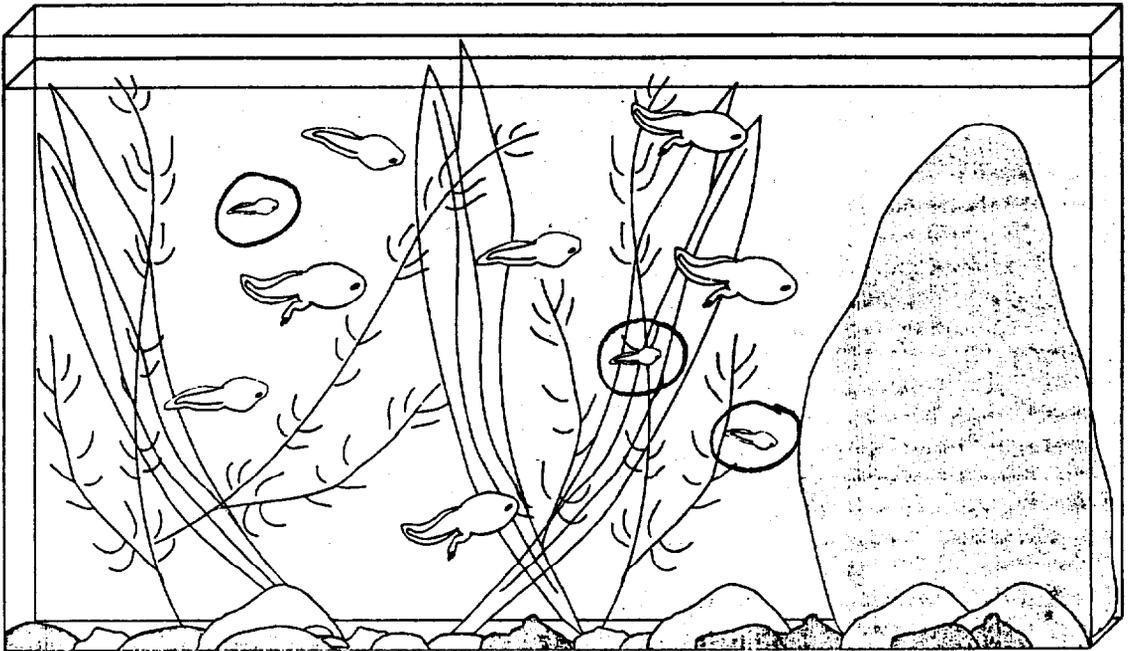
Humans and frogs do not undergo complete metamorphosis.

Grasshopper, because we are going to look the same when we grow up.

Humans and grasshoppers have the same form all along

Student Sample Responses

Today, two weeks later, all of the eggs that are going to hatch have hatched and the fish tank is full of tadpoles. The last eggs hatched yesterday. As you can see in Picture 2, all the tadpoles do not look alike.



Picture 2

1. Draw a circle around each of the tadpoles that hatched yesterday.

Level:
Complete (3)

Student Sample Responses

Today, two weeks later, all of the eggs that are going to hatch have hatched and the fish tank is full of tadpoles. The last eggs hatched yesterday. As you can see in Picture 2, all the tadpoles do not look alike.



Picture 2

1. Draw a circle around each of the tadpoles that hatched yesterday.

Level:
Partial (2)

Student Sample Responses

Today, two weeks later, all of the eggs that are going to hatch have hatched and the fish tank is full of tadpoles. The last eggs hatched yesterday. As you can see in Picture 2, all the tadpoles do not look alike.



Picture 2

1. Draw a circle around each of the tadpoles that hatched yesterday.

Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

2. Tell why all the tadpoles in the fish tank do not look alike.

Some of them are older which makes them look more like a frog because they have legs the younger ones don't.

Level:
Complete (3)

2. Tell why all the tadpoles in the fish tank do not look alike.

Because some of them are older.

Level:
Partial (2)

2. Tell why all the tadpoles in the fish tank do not look alike.

Because some are from different frogs.

Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

3. All animals need oxygen to live.

Describe how a tadpole gets oxygen into its body.

A tadpole get oxygen with his gills like fish so he can breath under water.

Level:
Complete (3)

3. All animals need oxygen to live.

Describe how a tadpole gets oxygen into its body.

water has some oxygen in it and the tadpole get it.

Level:
Partial (2)

3. All animal need oxygen to live.

Describe how a tadpole gets oxygen into its body.

Tadpoles have to go to the surface of the water to get some air and then they go back under the water.

Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

3. All animals need oxygen to live.

Describe how a frog gets oxygen into its body.

A frog has lungs
like we do therefore
they breathe like
we do.

Level:
Complete (3)

3. All animals need oxygen to live.

Describe how a frog gets oxygen into its body.

well when its older the gills
go away and they get lungs.

Level:
Partial (2)

3. All animals need oxygen to live.

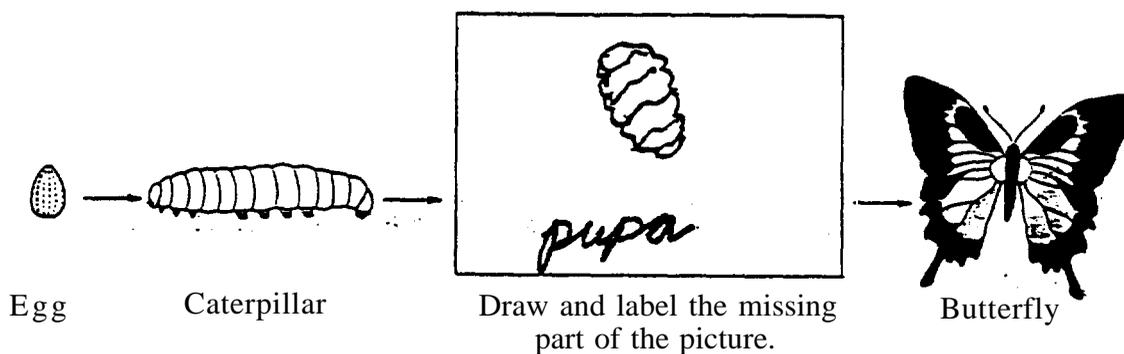
Describe how a frog gets oxygen into its body.

Some frogs can stay
under water for a long
time because they breathe
under water.

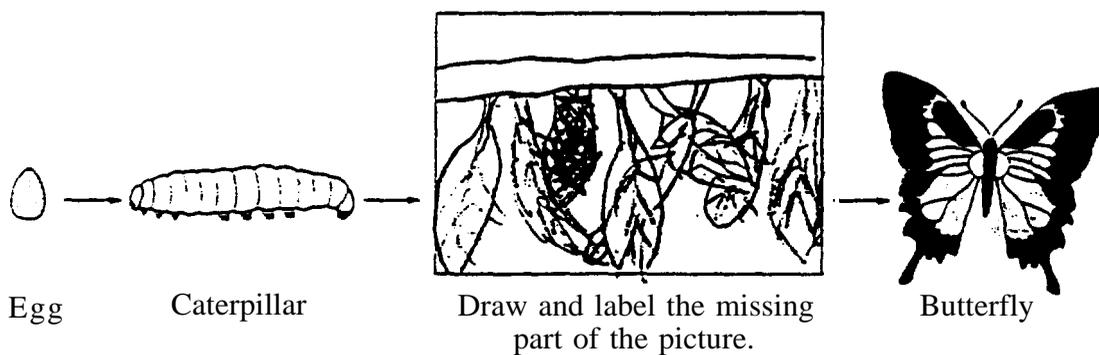
Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

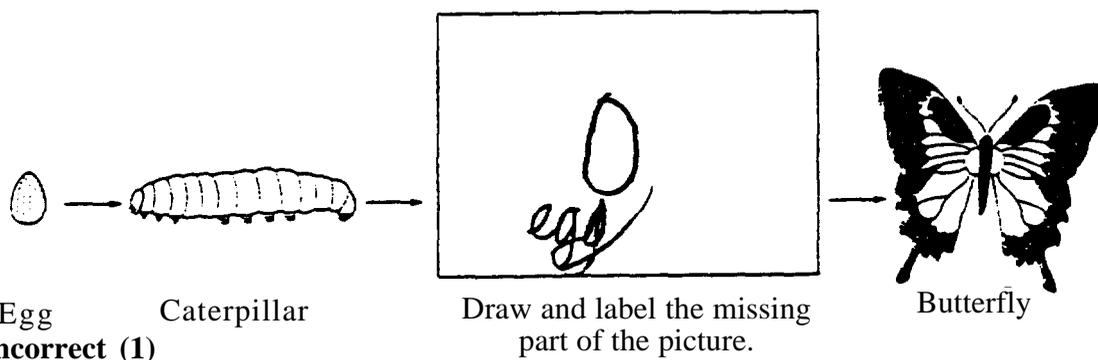
5. Insects also change as they grow. Look at the picture below. One part of the picture is missing. Draw and label the missing part of the picture.



5. Insects also change as they grow. Look at the picture below. One part of the picture is missing. Draw and label the missing part of the picture.

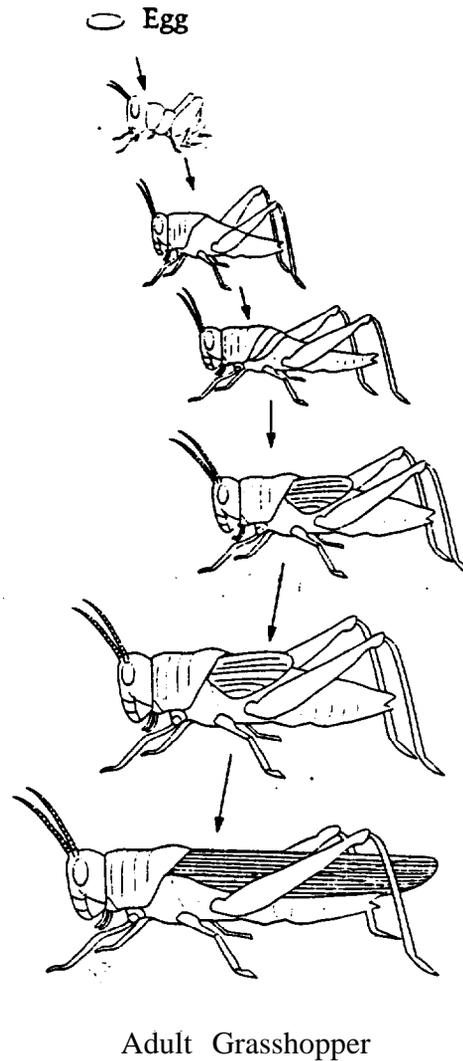


5. Insects also change as they grow. Look at the picture below. One part of the picture is missing. Draw and label the missing part of the picture.



Student Sample Responses

6. The picture below shows the life cycle of a grasshopper.



Tell one way that the grasshopper's life cycle is different from the butterfly's life cycle.

The grasshoppers life cycle
is different because it does not
go into a cocoon, also there are way
more growth cycles than the butterfly's.

Level:
Essential (4)

Student Sample Responses

Tell one way that the grasshopper's life cycle is the same as the butterfly's life cycle.

The grasshopper comes out after being born missing body parts.

Tell some other ways that the grasshopper's and the butterfly's life cycles are similar and different from each other.

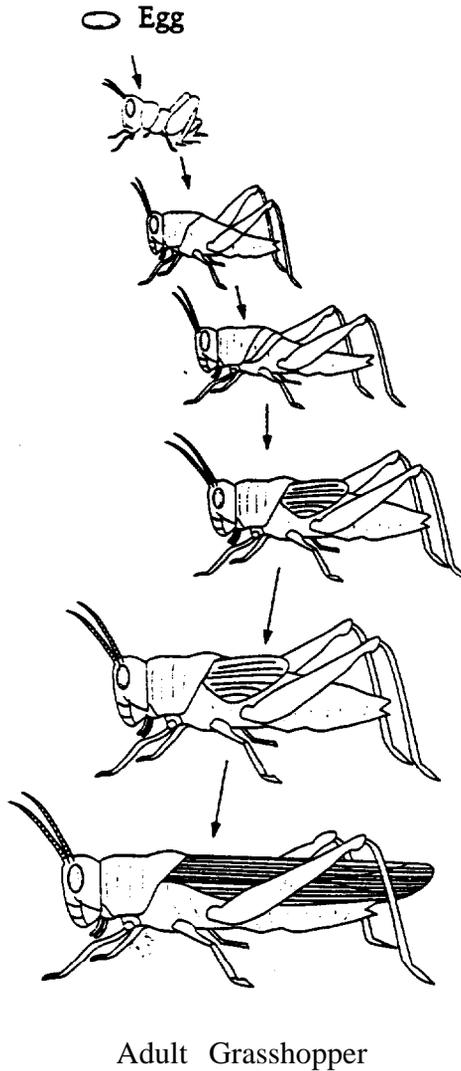
They are both different from each other because of the grasshopper having 7 growth patterns and the butterfly only has 4 that a difference by 2.

They are both the same in the way they both come from an egg.

Also they are both the same by them both being in the insect species.

Student Sample Responses

6. The picture below shows the life cycle of a grasshopper.



Tell one way that the grasshopper's life cycle is different from the butterfly's life cycle.

They don't go in cocoons.

Level:
Adequate (3)

Student Sample Responses

Tell one way that the grasshopper's life cycle is the same as the butterfly's life cycle.

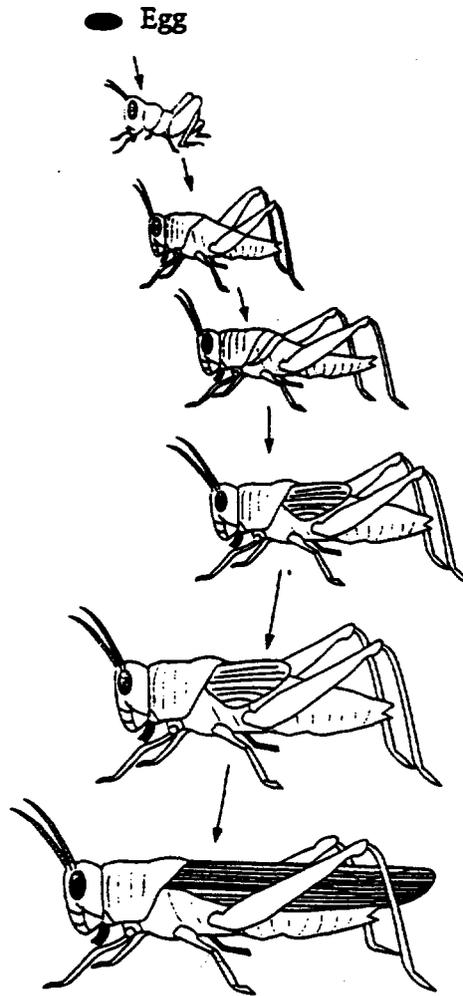
They both start out as an egg.

Tell some other ways that the grasshopper's and the butterfly's life cycles are similar and different from each other.

The grasshopper gets bigger and the butterfly gets bigger too.

Student Sample Responses

6. The picture below shows the life cycle of a grasshopper.



Adult Grasshopper

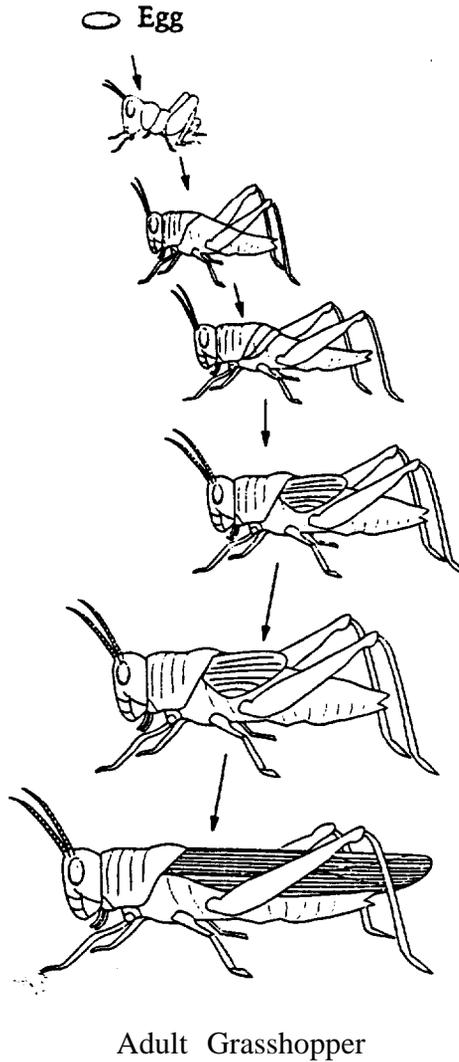
Tell one way that the grasshopper's life cycle is different from the butterfly's life cycle.

Because the butterfly comes from
a worm. The grasshopper comes from
egg.

Level:
Partial (2)

Student Sample Responses

6. The picture below shows the life cycle of a grasshopper.



Tell one way that the grasshopper's life cycle is different from the butterfly's life cycle.

A grasshopper don't fly.
A butterfly does fly.

Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

Tell one way that the grasshopper's life cycle is the same as the butterfly's life cycle.

Some grasshopper's fly
and a butterfly fly's.

Tell some other ways that the grasshopper's and the butterfly's life cycles are similar and different from each other.

HE001415

A butterfly can go way
UP in the air a grasshopper
can't

Student Sample Responses

7. Different types of adult living things look very different, but they do many of the same things. Name three things that animals such as frogs, grasshoppers, and butterflies must do to live.

They have to breathe, eat,
and start out as eggs

Level:
Partial (2)

7. Different types of adult living things look very different, but they do many of the same things. Name three things that animals such as frogs, grasshoppers, and butterflies must do to live.

they all have green in them

Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

8. Think about how humans grow and develop from newborn babies to adults. Is a human's life cycle more like a frog's life cycle or more like a grasshopper's life cycle? Explain your answer.

I think a grasshopper because
a grasshopper doesn't really
change that much by its looks
and either do humans

Level:
Complete (3)

8. Think about how humans grow and develop from newborn babies to adults. Is a human's life cycle more like a frog's life cycle or more like a grasshopper's life cycle? Explain your answer.

a frog's. because frogs
and humans both have
adults and kids and babies.

Level:
Unsatisfactory/Incorrect (1)

SECTION 123

Section 123

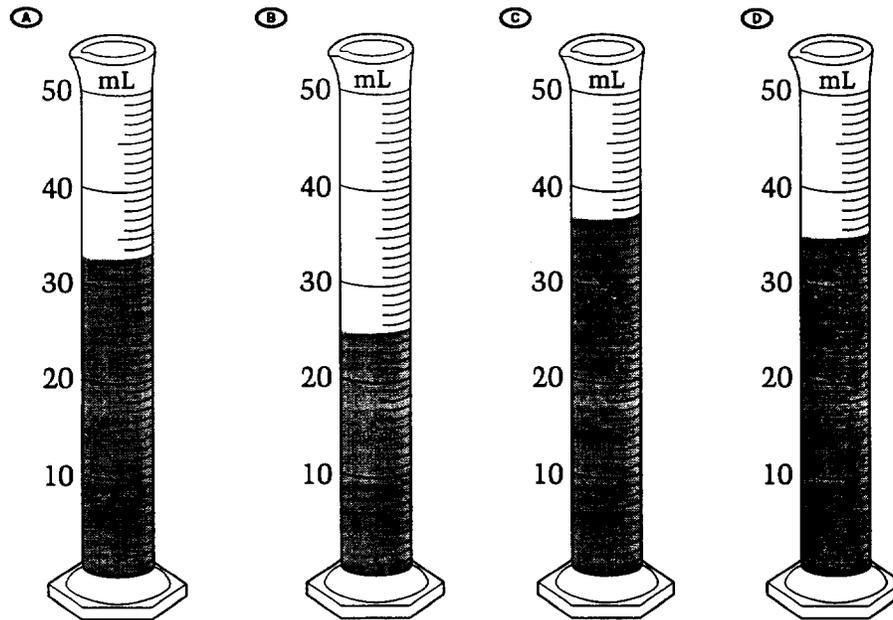
In this section, you will have 20 minutes to answer 11 questions. Mark your answers in your booklet. Fill in only one oval for each question or write your answer on the lines. Please think carefully about your answers. When you are writing your answers, be sure that your handwriting is clear.

Do not go past the **STOP** sign at the end of the section. If you finish before time is called, you should go over your work again.

PLEASE TURN THE PAGE AND BEGIN NOW.

1. The pictures below show containers with water in them. Which container has 35 milliliters (mL) of water in it?

HE001475



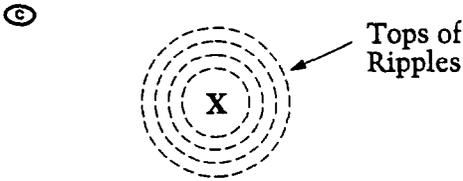
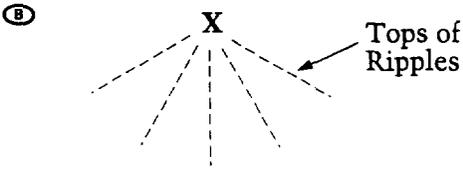
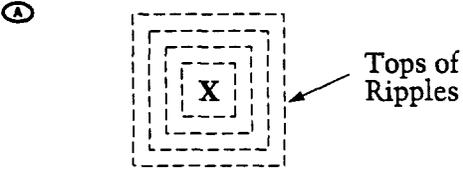
2. Cars and many other machines use gasoline as an energy source. What is the major source of gasoline?

- A Water from the Earth's oceans
- B Wood from large trees
- C Gases in the atmosphere
- D Oil from beneath the Earth's surface

HE001432

3. You stand on the end of a boat dock and toss a small stone out into a pond of still water. Ripples form on the surface of the water. Which drawing shows what you will see when you look down at the water? (X marks where the stone enters the water.)

HE01435

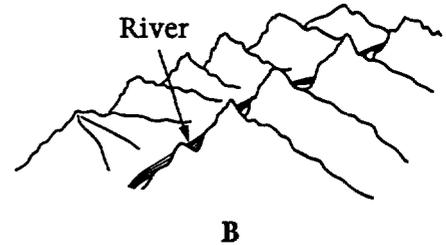
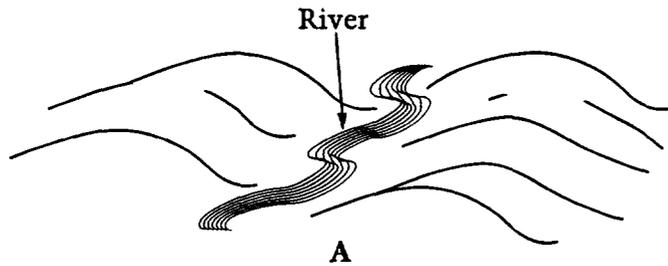


4. Explain why many stars look smaller than the Sun even though they are really bigger than the Sun.

HE001449

5. The pictures below show the same river and mountains, but one picture shows how they looked millions of years ago, and the other picture shows how they look now. Circle the letter under the picture that shows how the river and mountains look now. Explain how you can tell this.

HE001442



6. Most of the Earth's surface is covered by

- Ⓐ oceans
- Ⓑ lakes
- Ⓒ land
- Ⓓ ice caps

HE001348

7. We can see the Moon from Earth because the Moon

- Ⓐ is so hot that it glows like the Sun
- Ⓑ reflects light from the Sun
- Ⓒ has many volcanoes that give off a glowing gas
- Ⓓ is made of rocks that give off their own light

HE001431

8. In some parts of the United States, smog sometimes makes the air seem hazy, even on a sunny day. Smog also makes it hard for some people to breathe. Where does most of the smog in the air come from?

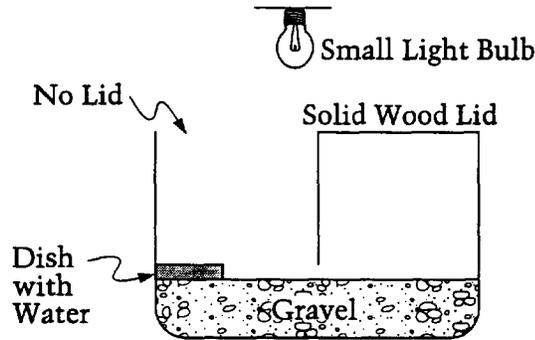
- Ⓐ Factories and automobiles
- Ⓑ Volcanoes and earthquakes
- Ⓒ Forests and farm fields
- Ⓓ Nuclear power plants

HE001455

Questions 9-11

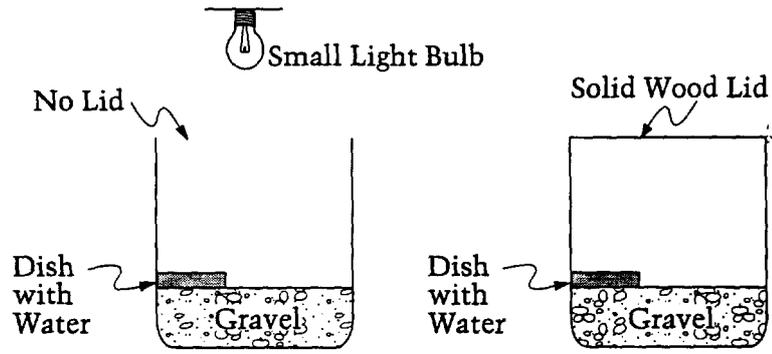
Some fourth-grade students were doing a project for their science class. They were trying to find the answer to the question “Do beetles choose to live in bright light or in the shade?” The next three pictures show the ways that three different students set up an experiment to find out if beetles choose to live in bright light or in the shade.

VK000004



9. Is this a good way to set up this experiment? Tell why or why not.

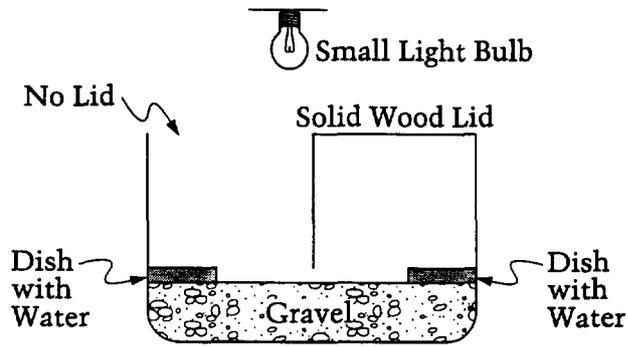
HE001516



10. Is this a good way to set up this experiment? Tell why or why not.

HE001520

Section 123



11. Is this a good way to set up this experiment? Tell why or why not.

HE001521



**INFORMATION ABOUT THE FRAMEWORK CLASSIFICATION CODES
AVAILABLE FOR EACH ITEM**

Following this description of the classification codes, there is a single sheet with NAEP ID numbers, short descriptions of the items, item keys(1-4 if the item is multiple-choice; blank if the item is open-ended), as well as the mean p-values for the items in the released block.

The classification codes for each item can be viewed within each item in the scoring guide.

- Field 1) Program Profile:**
N27S NAEP, year 27 of Science
- Field 2) Grade:**
1 Grade 4 only item
1/2 Grade 4/8 overlap item
2 Grade 8 only item
2/3 Grade 8/12 overlap item
3 Grade 12 only item
- Field 3) Field of science:**
P S Physical Science
E S Earth Science
L S Life Science
Field science of subcontent area:
The letter corresponds to the subcontent areas described in the Science Assessment and Exercise specifications for the 1996 National Assessment of Educational Progress.
- Field 4) Physical Science:**
A Matter and Its Transformations
B Energy and Its Transformations
C Motion
Earth Science:
A Solid Earth (lithosphere)
B Water (hydrosphere)
C Air (atmosphere)
D Earth in Space
Life Science:
A Change and Evolution
B Cells and Their Functions
C Organisms
D Ecology
- Field 5) Ways of knowing and doing science:**
S I Scientific Investigation
P R Practical Reasoning
C U Conceptual Understanding

Field 6)

Theme:

SYS Systems
MOD Models
PC Patterns of Change
NA Not Applicable

Field 7)

Nature of Science/Technology:

NS Nature of Science
NT Nature of Technology
NA Not Applicable

Field 8)

Item Type:

MC Multiple-Choice
SCR Short Constructed-Response
ECR Extended Constructed-Response
NA Not Applicable

1996 Science Items

GRADE: 04 BLOCK: 27S11

<u>ITEM</u>	<u>NAEP ID</u>	<u>SHORT DESCRIPTION</u>	<u>KEY</u>	<u>CONTENT</u>	<u>PROCESS</u>	<u>P-VALUE</u>	<u>RELEASE STATUS</u>
1	K032701	READING GRADUATED CYLINDER MC	4	1	1	0.757	P
2	K032801	MAJOR SOURCE OF GASOLINE MC	4	2	3	0.639	P
3	K032901	IDENTIFY PATTERN OF RIPPLES FROM DROPPED STONE MC	3	1	3	0.671	P
4A	K033001	SIZE OF STARS AND SUN OE		2	3	0.746	P
5A	K033101	IDENTIFY HOW RIVERS AND MOUNTAINS LOOK NOW OE		2	3	0.072	P
6	K033201	WHAT COVERS MOST OF EARTH'S SURFACE MC	1	2	3	0.776	P
7	K033301	WHY CAN THE MOON BE SEEN FROM EARTH MC	2	2	3	0.697	P
8	K033401	CAUSES OF SMOG MC	1	2	3	0.555	P
9A	K033501	WILL BEETLE SET-UP 1 WORK OE		3	1	0.254	P
10A	K033502	WILL BEETLE SET-UP 2 WORK OE		3	1	0.357	P
11A	K033503	WILL BEETLE SET-UP 3 WORK OE		3	1	0.435	P

Content: 1 = Physical Sciences
 2 = Earth & space sciences
 3 = Life sciences

Process: 1 = Scientific investigation
 2 = Practical reasoning
 3 = Conceptual understanding

Information about the Item Difficulty Available for Each Item

Item identification, a short item description, and the key (for multiple-choice items) are provided, in addition to information about the item difficulty, for each item. The items are identified by their position within a block and by their NAEP IDs. The NAEP IDs are used to identify items during the analysis of NAEP data in the summary of item level results in data almanacs, and in the secondary user data sources.

The numbers in the column labeled “P-Value” on the item statistic sheet vary for item types (multiple-choice and 2-category constructed-response items and constructed-response items with more than two categories). For the multiple-choice items and for the 2-category constructed-response items that were scored correct or incorrect the number in that column is the percent of students correctly responding to the item. This value is often called the p-value or the P+ for an item. For constructed-response items with more than two categories, the value in the column is the mean item score for the item.

For example, if the number of categories for a constructed-response item is 3 with a category/unsatisfactory/incorrect (category 1) worth 0 points, a partial category (category 2) worth 1/2 of a point and a complete category (category 3) worth 1 point, then a student can receive either 0, 1/2 or 1 point for his response to the item. The mean item score is the number that you would get if the scores on this item are averaged for all of the students in the assessment. This value varies from 0 to 1 just as the percent correct for a multiple-choice item could vary. It can be interpreted as an indication of where on the 0-1 scale for the item that an “average” student might score. For instance, if the mean item score for a 3-category constructed-response item is .8, then an “average” student would be expected to have a response in either category 2 (worth 1/2 or .5 of a point) or category 3 (worth 1 point). In fact it is a little more likely that the student would have a response in category 3, since .8 is closer to 1.0 than to .5.

Item Number: 1 Accession Number: HE001475

Key: D

Classification Codes:
N27S 1 PS A SI NA NA MC

Item Number: 2 Accession Number: HE001432

Key: D

Classification	Codes:					
N27S 1	ES	A	CU	NA	NT	MC

Item Number: 3 Accession Number: HE001435

Key: C

Classification	Codes:						
N27S 1	PS	C	CU	NA	NA	MC	

Item Number: 4 Accession Number: HE001449

Key: NONE

Classification Codes:
N27S 1 ES D CU NA NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates an understanding of the apparent size of an object being related to the distance of that object from the observer.

3 = Complete - Student responds that the Sun is closer than the stars and, therefore, looks bigger or that stars are farther away from the Earth than the Sun. (An indication of distance)

1 = Unsatisfactory/Incorrect - Student does not mention that the Sun is closer to Earth than the stars or explain that this difference in distance accounts for the apparent small size of the stars. Student does not use distance as part of explanation.

Item Number: 5 Accession Number: HE001442

Key: NONE

Classification Codes:

N27S 1 ES A CU PC NA SCR

Scoring Guide

Scoring Rationale: Student can identify or describe the effects of time/weathering on features of the Earth's surface.

3 = Complete - Student chooses picture A and explains why by referring to both the mountain and the river.

2a = Partial - Student chooses picture A and explains why by referring to the mountains only.

2b = Partial - Student chooses picture A and explains why by referring to the river only.

1 = Unsatisfactory/Incorrect - Student chooses neither picture or chooses A or B but does not explain why.

Credited responses include:

Picture A

Mountains

Rounded

Smaller

Worn down

Smoother

River

Many curves or bends

Bigger or wider

Item Number: 6 Accession Number: HE001348

Key: A

Classification Codes:
N27S 1 ES B CU SYS NA MC

Item Number: 7 Accession Number: HE001431

Key: B

Classification Codes:

N27S 1 ES D CU SYS NA MC

Item Number: 8 Accession Number: HE001455

Key: A

Classification Codes:
N27S 1 ES C CU SYS NA MC

Item Number: NONE Accession Number: VK000004

Key: NONE

Classification Codes:

N27S 1 LS D SI NA NS NA

Item Number: 9 Accession Number: HE001516

Key: NONE

Classification Codes:
N27S 1 LS D SI NA NS SCR

Scoring Guide

Scoring Rationale: Student demonstrates an ability to analyze the appropriateness of an experimental design for testing whether beetles prefer to live in bright light or in the shade.

3 = Complete - Student states that the experimental design is not appropriate and clearly explains that a dish of water should be provided on both the lighted side and the shaded side of the container.

2 = Partial - Student states that the experimental design is not appropriate and offers no explanation or an incorrect explanation.

1 = Unsatisfactory/Incorrect - Student states that the experimental design is appropriate for testing the hypothesis - this may or may not be accompanied by an explanation.

Item Number: 10 Accession Number: HE001520

Key: NONE

Classification Codes:
N27S 1 LS D SI NA NS SCR

Scoring Guide

Scoring Rationale: Student demonstrates an ability to analyze the appropriateness of an experimental design for testing whether beetles prefer to live in bright light or in the shade.

3 = Complete - Student states that the experimental design is not appropriate and that the beetles should have a choice between bright light and shade.

2 = Partial - Student states that the experimental design is not appropriate and offers no explanation, or an incorrect explanation.

1 = Unsatisfactory/Incorrect - Student states that the experimental design is appropriate for testing the hypothesis - this may or may not be accompanied by an explanation.

Item Number: 11 Accession Number: HE001521

Key: NONE

Classification Codes:

N27S 1 LS D SI NA NS SCR

Scoring Guide

Scoring Rationale: Student demonstrates an ability to analyze the appropriateness of an experimental design for testing whether beetles prefer to live in bright light or in the shade.

3 = Complete - Student states that the experimental design is appropriate because the beetles are provided with a choice of bright light or shade and/or have a dish of water in bright light and in the shade, or states that the only condition that changes on each side is the light - all other conditions are the same.

2 = Partial - Student states that the experimental design is appropriate and offers no explanation, or an incorrect explanation.

1 = Unsatisfactory/Incorrect - Student states that the experimental design is not appropriate for testing the hypothesis - this may or may not be accompanied by an explanation.

Student Sample Responses

4. Explain why many stars look smaller than the Sun even though they are really bigger than the Sun.

Stars are farther away from earth.

Level:

Complete (3)

4. Explain why many stars look smaller than the Sun even though they are really bigger than the Sun.

Because stars are small. And the sun is supposed to be big. And we need sunlight.

Level:

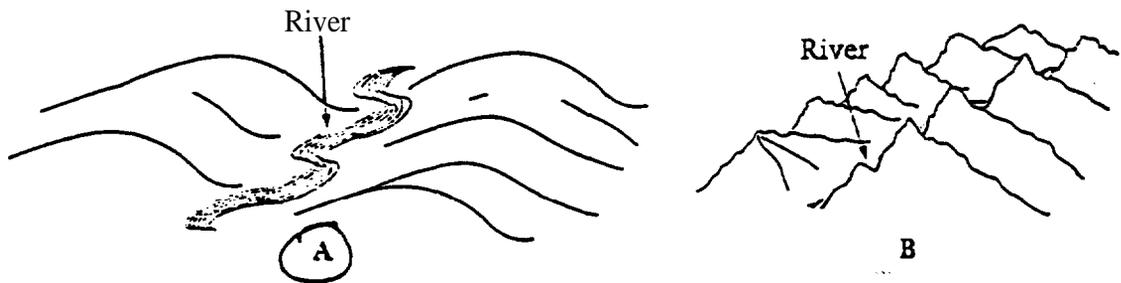
Unsatisfactory/Incorrect (1)

Student Sample Responses and Assigned Scores

Grade : 4

Block : S1S11

5. The pictures below show the same river and mountains but one picture shows how they looked millions of years ago, and the other picture shows how they look now. Circle the letter under the picture that shows how the river and mountains look now. Explain how you can tell this.

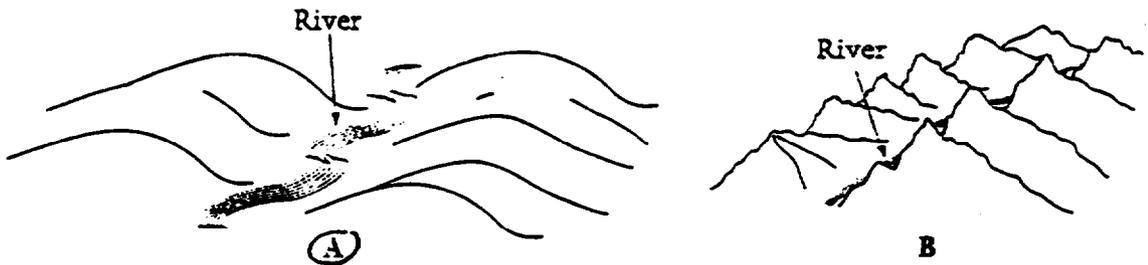


A looks like the river now
because its bigger and the
mountains are worn down a lot.

Level:
Complete (3)

Student Sample Responses

5. The pictures below show the same river and mountains. but one picture shows how they looked millions of years ago, and the other picture shows how they look now. Circle the letter under the picture that shows how the river and mountains look now. Explain how you can tell this.



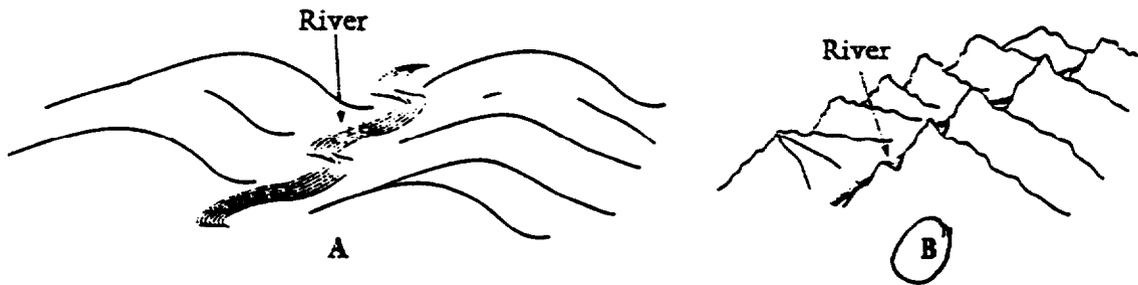
The reason it not have
big mountains is because
the water made erosion to
the rock

Level:

Partial (2)

Student Sample Responses

5. The pictures below show the same river and mountains, but one picture shows how they looked millions of years ago, and the other picture shows how they look now. Circle the letter under the picture that shows how the river and mountains look now. Explain how you can tell this.



long ago they did not have
points at the top and
now they do.

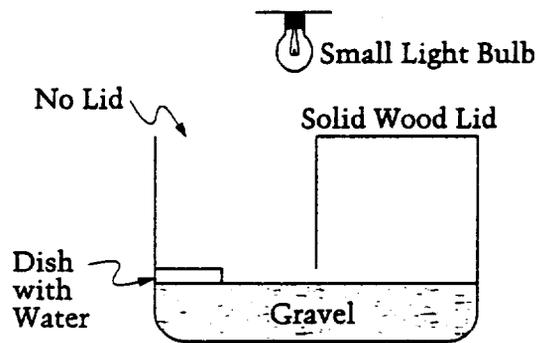
Level:

Unsatisfactory/Incorrect (1)

Student Sample Responses

Questions 9-11

Some fourth-grade students were doing a project for their science class. They were trying to find the answer to the question “Do beetles choose to live in bright light or in the shade?” The next three pictures show the ways that three different students set up an experiment to find out if beetles choose to live in bright light or in the shade.



9. Is this a good way to set up this experiment? Tell why or why not.

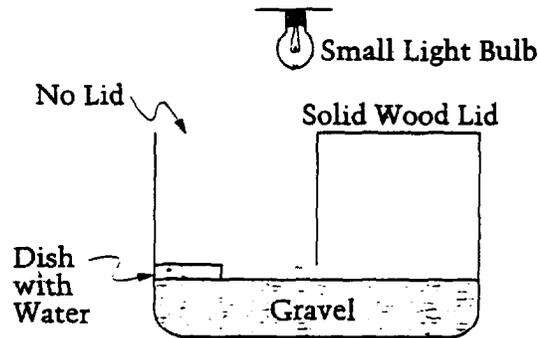
No because it has its water bowl in the light and maybe the beetle likes to be in the shade. how will it get its water?

Level:
Complete (3)

Student Sample Responses

Questions 9-11

Some fourth-grade students were doing a project for their science class. They were trying to find the answer to the question "Do beetles choose to live in bright light or in the shade?" The next three pictures show the ways that three different students set up an experiment to find out if beetles choose to live in bright light or in the shade.



9. Is this a good way to set up this experiment? Tell why or why not.

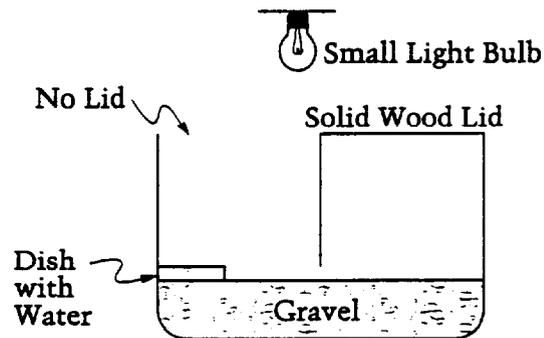
No, I don't think so because
it's just not good for this
experiment

Level:
Partial (2)

Student Sample Responses

Questions 9-11

Some fourth-grade students were doing a project for their science class. They were trying to find the answer to the question “Do beetles choose to live in bright light or in the shade?” The next three pictures show the ways that three different students set up an experiment to find out if beetles choose to live in bright light or in the shade.

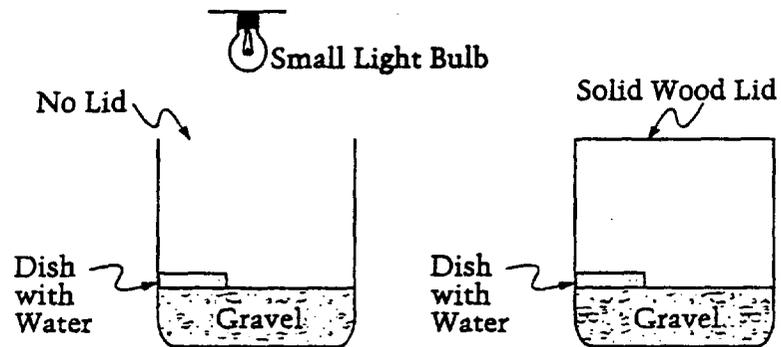


9. Is this a good way to set up this experiment? Tell why or why not.

Yes, I think it is a really good
Idea because it has a small light
bulb. It has a dish of water
Plus it has gravel. So yes I
do think it is a good experiment.

Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

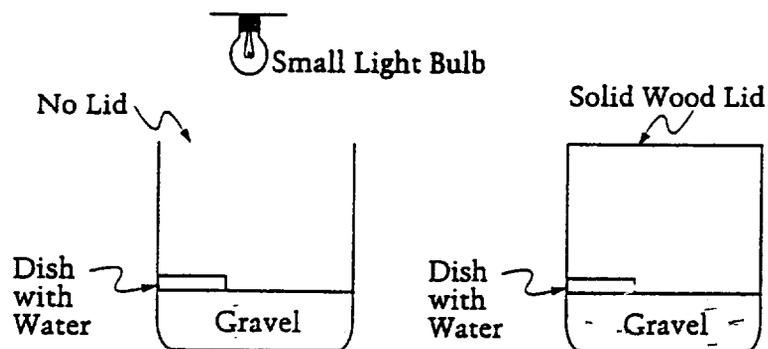


10. Is this a good way to set up this experiment? Tell why or why not.

No because it can't get to
the lit place to the shady
place

Level:
Complete (3)

Student Sample Responses

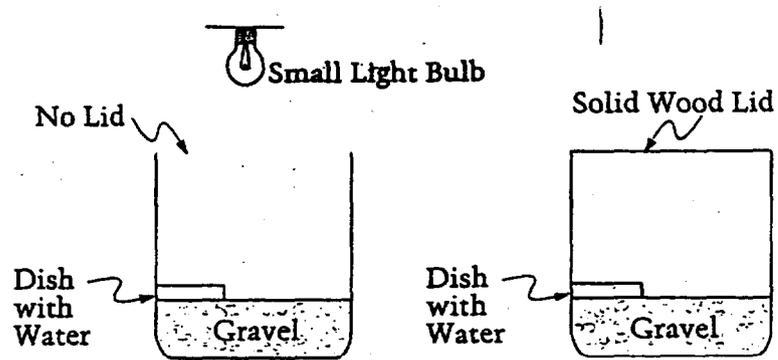


10. Is this a good way to set up this experiment? Tell why or why not.

it is not because the
better has no air

Level:
Partial (2)

Student Sample Responses

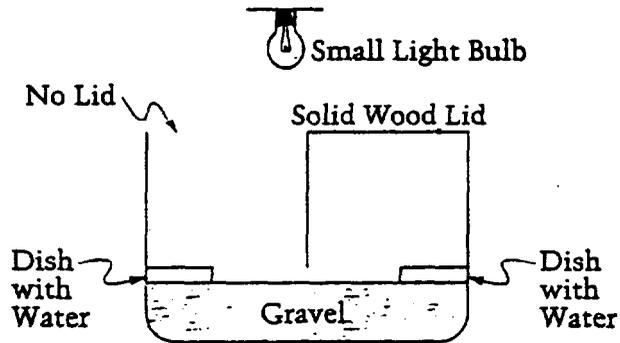


10. Is this a good way to set up this experiment? Tell why or why not.

Yes! Because beetles sometime like shade or light

Level:
Unsatisfactory/Incorrect (1)

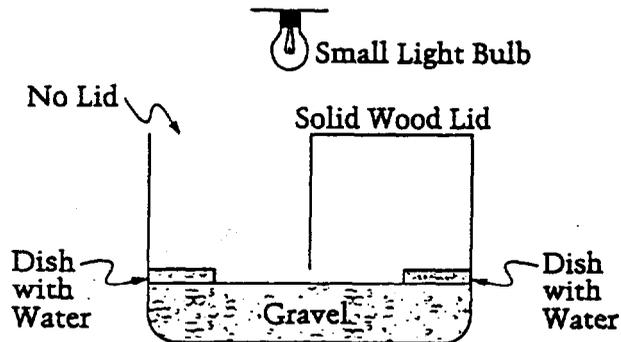
Student Sample Responses



11. Is this a good way to set up this experiment? Tell why or why not.

I think this is the best one,
because the beetle can choose
where it wants to go and still get
water.

Level:
Complete (3)

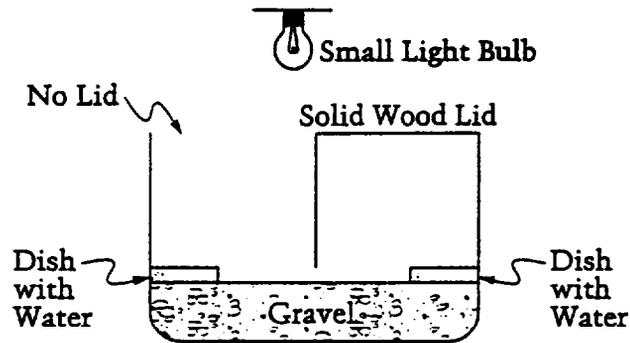


11. Is this a good way to set up this experiment? Tell why or why not.

this is a good way
to set it up.

Level:
Partial (2)

Student Sample Responses



11. Is this a good way to set up this experiment? Tell why or why not.

NO. Because there
is one lid on and
one lid off

Level:
Unsatisfactory/Incorrect (1)

SECTION 123

Section 123

In this section, you will have 20 minutes to answer 11 questions. Mark your answers in your booklet. Fill in only one oval for each question or write your answer on the lines. Please think carefully about your answers. When you are writing your answers, be sure that your handwriting is clear.

Do not go past the STOP sign at the end of the section. If you finish before time is called, you should go over your work again.

PLEASE TURN THE PAGE AND BEGIN NOW.

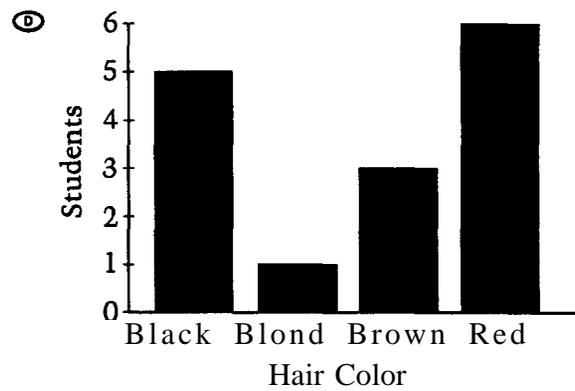
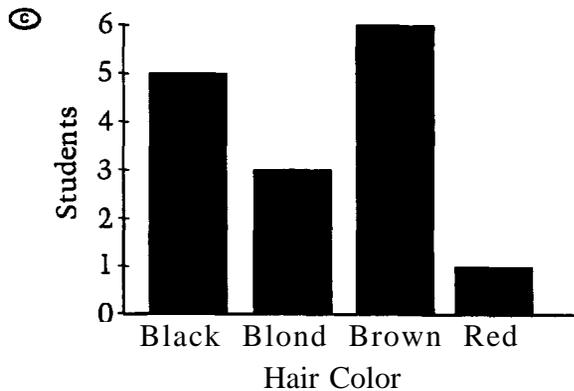
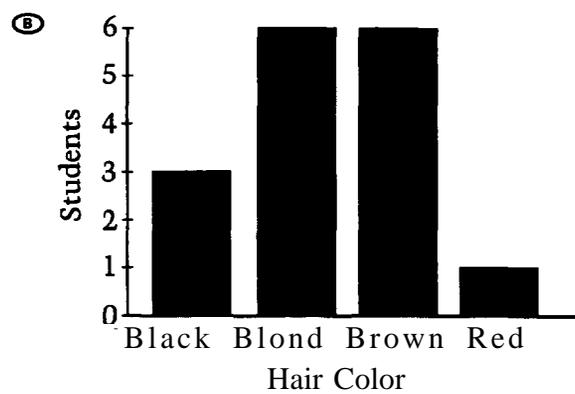
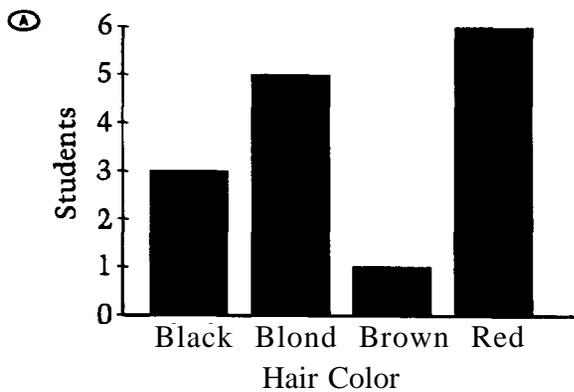
Section 123

1. Kristen was listening to a portable radio one afternoon and forgot to turn it off. The next morning the radio would not work. What is the best explanation for why the radio would not work?
- Ⓐ All the radio stations stopped broadcasting.
 - Ⓑ The energy stored in the batteries was all used up.
 - Ⓒ It was too cold the next morning for the radio to play.
 - Ⓓ The radio speaker broke because it was left on for so long. HE001980

2. Data about the hair color of fifteen students are shown in the table below.

Hair Color			
Red	Black	Brown	Blond
1	5	6	3

Which of the following bar graphs represents the data shown in the table?



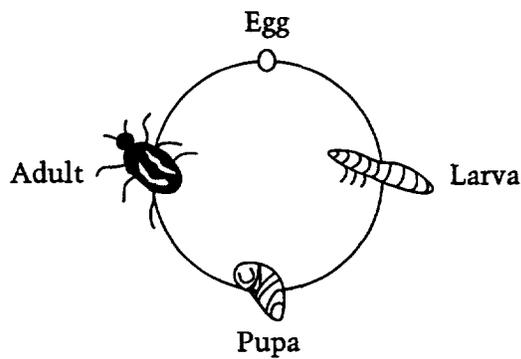
HE001962

Section 123

3. Of the following, which is the best evidence that the Earth is very

- Ⓐ A forest with big trees
- Ⓑ A sand dune
- Ⓒ A small pond
- Ⓓ A coal deposit

HE001840



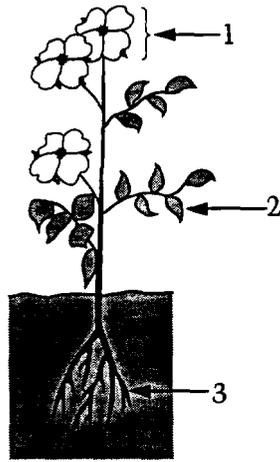
4. The life cycle of a mealworm is pictured above. What would happen if this larva were eaten by a bird?

- Ⓐ The larva would die before it could reproduce.
- Ⓑ The bird would become sick.
- Ⓒ The mealworm species would be wiped out.
- Ⓓ The mealworm eggs would be spread by the bird.

HE001942

5. Name the parts of the plant below that are labeled 1,2, and 3. Explain the function of each part.

HE001777



Name of Part

Function

- 1. _____
- 2. _____
- 3. _____

Section 123

6. Natural forces are always changing features of the Earth's surface. Some changes happen quickly and some changes happen slowly.

(a) Name one natural force that can change a part of the Earth's surface over a period of days.

How is the Earth's surface changed?

(b) Name one natural force that can change a part of the Earth's surface over a period of hundreds of years.

How is the Earth's surface changed?

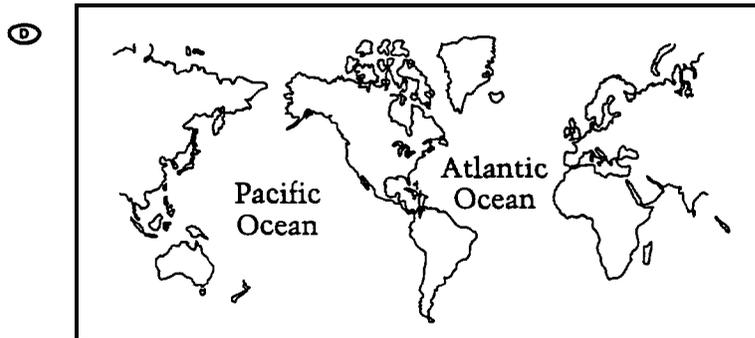
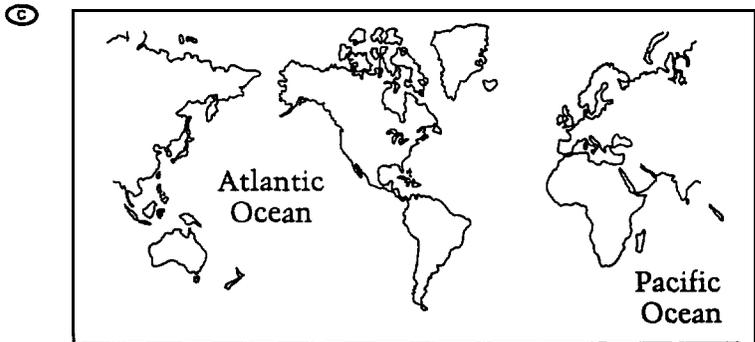
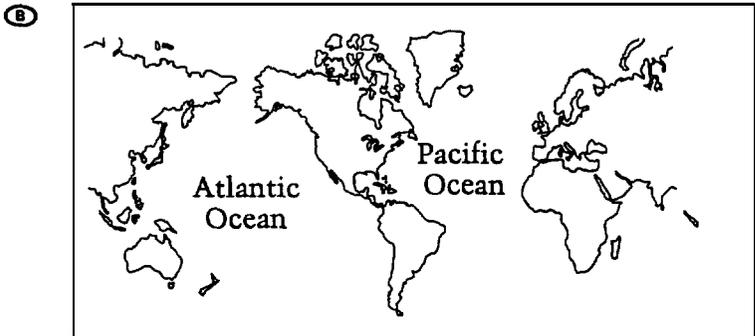
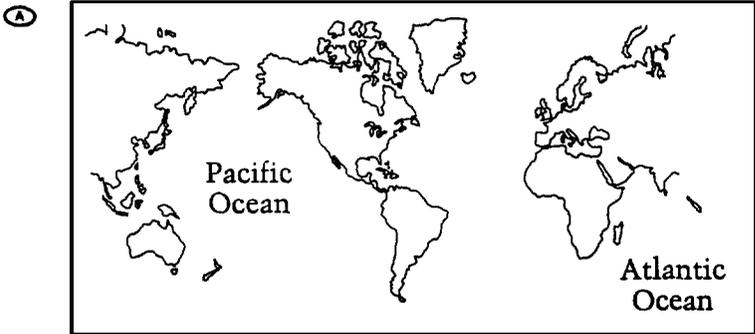
HE001945

7. Which group below contains three mammals?

- A Duck, eagle, robin
- B Cow, human, dog
- C Lizard, snake, turtle
- D Salamander, frog, toad

HE001938

8. Look at the world maps below. Which map has the Atlantic and Pacific Oceans correctly labeled?



HE001947

Section 123

9. A nail becomes warm when it is hammered into a piece of wood.

Tell why the nail becomes warm.

HE001816

10. Many things are made of metal, such as pots, pans, tools, and wire.
Give two reasons why metals are used to make many different things.

HE001976

11. Name three ways water is used in and around your home.

- 1. _____

- 2. _____

- 3. _____

For each way, describe a practical, safe method that can be used to help conserve water. HE001841

- 1. _____

- 2. _____

- 3. _____



**INFORMATION ABOUT THE FRAMEWORK CLASSIFICATION CODES
AVAILABLE FOR EACH ITEM**

Following this description of the classification codes, there is a single sheet with NAEP ID numbers, short descriptions of the items, item keys(1-4 if the item is multiple-choice; blank if the item is open-ended), as well as the mean p-values for the items in the released block.

The classification codes for each item can be viewed within each item in the scoring guide.

- Field 1) Program Profile:**
N27S NAEP, year 27 of Science
- Field 2) Grade:**
1 Grade 4 only item
1/2 Grade 4/8 overlap item
2 Grade 8 only item
2/3 Grade 8/12 overlap item
3 Grade 12 only item
- Field 3) Field of science:**
P S Physical Science
E S Earth Science
L S Life Science
Field science of subcontent area:
The letter corresponds to the subcontent areas described in the Science Assessment and Exercise specifications for the 1996 National Assessment of Educational Progress.
- Field 4) Physical Science:**
A Matter and Its Transformations
B Energy and Its Transformations
C Motion
Earth Science:
A Solid Earth (lithosphere)
B Water (hydrosphere)
C Air (atmosphere)
D Earth in Space
Life Science:
A Change and Evolution
B Cells and Their Functions
C Organisms
D Ecology
- Field 5) Ways of knowing and doing science:**
S I Scientific Investigation
P R Practical Reasoning
C U Conceptual Understanding

Field 6)

Theme:

SYS Systems
MOD Models
PC Patterns of Change
NA Not Applicable

Field 7)

Nature of Science/Technology:

NS Nature of Science
NT Nature of Technology
NA Not Applicable

Field 8)

Item Type:

MC Multiple-Choice
SCR Short Constructed-Response
ECR Extended Constructed-Response
NA Not Applicable

1996 Science Items

GRADE: 04 BLOCK: 27S20

<u>ITEM</u>	<u>NAEP ID</u>	<u>SHORT DESCRIPTION</u>	<u>KEY</u>	<u>CONTENT</u>	<u>PROCESS</u>	<u>P-VALUE</u>	<u>RELEASE STATUS</u>
1	K038401	REASON FOR NON-WOKING RADIO MC	2	1	2	0.847	P
2	K038501	TRANSFER OF DATA IN TABLE TO GRAPH MC	3	3	1	0.642	P
3	K038601	BEST EVIDENCE EARTH IS VERY OLD MC	4	2	3	0.297	P
4	K038701	MEALWORM LIFECYCLE WHAT HAPPENS IF LARVA EATEN MC	1	3	3	0.574	P
5A	K038801	NAME/FUNCTION PARTS OF PLANT OE		3	3	0.416	P
6A	K038901	FORCES THAT CHANGE EARTH'S SURFACE OE		2	3	0.167	P
7	K039001	IDENTIFY 3 MAMMALs MC	2	3	3	0.666	P
8	K039101	IDENTIFY PACIFIC/ATLATNIC OCEANS MC	4	2	3	0.516	P
9A	K039201	WHY DOES NAIL BECOME WARM OE		1	3	0.114	P
10A	K039301	PROERTIES OF METALS OE		1	2	0.362	P
11A	K039401	USER/CONERVATION OF WATER OE		2	2	0.441	P

Content: 1 = Physical Sciences
 2 = Earth & space sciences
 3 = Life sciences

Process: 1 = Scientific investigation
 2 = Practical reasoning
 3 = Conceptual understanding

Information about the Item Difficulty Available for Each Item

Item identification, a short item description, and the key (for multiple-choice items) are provided, in addition to information about the item difficulty, for each item. The items are identified by their position within a block and by their NAEP IDs. The NAEP IDs are used to identify items during the analysis of NAEP data in the summary of item level results in data almanacs, and in the secondary user data sources.

The numbers in the column labeled “P-Value” on the item statistic sheet vary for item types (multiple-choice and 2-category constructed-response items and constructed-response items with more than two categories). For the multiple-choice items and for the 2-category constructed-response items that were scored correct or incorrect the number in that column is the percent of students correctly responding to the item. This value is often called the p-value or the P+ for an item. For constructed-response items with more than two categories, the value in the column is the mean item score for the item.

For example, if the number of categories for a constructed-response item is 3 with a category/unsatisfactory/incorrect (category 1) worth 0 points, a partial category (category 2) worth 1/2 of a point and a complete category (category 3) worth 1 point, then a student can receive either 0, 1/2 or 1 point for his response to the item. The mean item score is the number that you would get if the scores on this item are averaged for all of the students in the assessment. This value varies from 0 to 1 just as the percent correct for a multiple-choice item could vary. It can be interpreted as an indication of where on the 0-1 scale for the item that an “average” student might score. For instance, if the mean item score for a 3-category constructed-response item is .8, then an “average” student would be expected to have a response in either category 2 (worth 1/2 or .5 of a point) or category 3 (worth 1 point). In fact it is a little more likely that the student would have a response in category 3, since .8 is closer to 1.0 than to .5.

Item Number: 1 Accession Number: HE001980

Key: B

Classification Codes:

N27S 1 PS B PR NA NS MC

Item Number: 2 Accession Number: HE001962

Key: C

Classification Codes:
N27S 1 LS A SI NA NS MC

Item Number: 3 Accession Number: HE001840

Key: D

Classification Codes: N27S 1 ES D CU PC NA MC

Item Number: 4 Accession Number: HE001942

Key: A

Classification Codes:
N27S 1 LS C CU PC NA MC

Item Number: 5 Accession Number: HE001777

Key: NONE

Classification Codes:
N27S 1 LS A CU NA NA ECR

Scoring Guide

Scoring Rationale: Student demonstrates understanding of plants by identifying major structures and associating the structures with their functions. There are 6 parts that need to be addressed.

4 = Complete - Student response correctly identifies the three structures and gives a function for each (6 parts).

3 = Essential - Student response correctly names two or three structures and gives two corresponding functions (4-5 parts) .

2 = Partial - Student response correctly responds to 1-3 parts of the item.

1 = Unsatisfactory/Incorrect - Student response does not correctly name any of the three structures or state their function.

Credited responses include:

- 1) Flower (blossom, petals, or the name of any flower bud) - the reproductive structure where seeds are produced. Accept - store pollen, make pollen, protect seeds, develop into fruit.
- 2) Leaves - part of the plant where food or sugar is produced, carries out photosynthesis.
- 3) Roots - part of the plant that takes in nutrients or water, anchors the plant, holds the plant in place.

Note: If the function for a part is correct but not the name, it is counted as correct because the numbers are pointing to specific parts of the plant.

Item Number: 6 Accession Number: HE001945

Key: NONE

Classification Codes:
N27S 1 ES A CU PC NA ECR

Scoring Guide

Scoring Rationale: Student demonstrates an understanding of how natural forces change features of the Earth's surface and can describe those changes.

4 = Complete - Student response identifies two forces and describes how each force changes the Earth's surface.

3 = Essential - Student response identifies two forces and describes how one of the forces changes the Earth's surface.

2a = Partial - Student response identifies one force and describes how the force changes the Earth's surface.

2b = Partial - Student response identifies one or two forces that change the Earth's surface, but does not describe how they change the Earth's surface.

1 = Unsatisfactory/Incorrect - Student response does not identify forces that change the Earth's surface.

Credited responses include:

SHORT TERM:

Volcanoes, earthquakes, storms, hurricanes, tornadoes, fires - rapid changes.
Volcanoes: can blow off part of a mountain top; cover areas with lava; create new rock
Earthquakes: can up-lift land; cover up land; create cracks in the surface
Storms: can change coastline, cause flooding, mudslides
Fire: can change habitats, plant life

LONG TERM:

Erosion and weathering - more gradual changes
Erosion: gradual washing away-of top soil; washing away of river banks
Weathering: water freezing and cracking rocks apart; wind shaping rocks over time
Glaciers: shaping of land forms, movement of rocks, soil
Volcanoes: build up Earth's surface

Item Number: 7 Accession Number: HE001938

Key: B

Classification Codes:

N27S 1 LS A CU NA NA MC

Item Number: 8 Accession Number: HE001947

Key: D

Classification Codes:

N27S 1 ES B CU MOD NA MC

Item Number: 9 Acession Number: HE001816

Key: NONE

Classification Codes:
N27S 1 PS B CU NA NA SCR

Scoring Guide

Scoring Rationale: Student demonstrates an understanding that heat is a form of energy that can be produced when one form of energy is transformed to another form of energy.

3 = Complete - Student response indicates that the energy of hammering the nail (or movement), is transferred into heat, or explains that the friction or rubbing between the nail and the wood causes the nail to become warm. (Must specifically mention the wood, but does not have to re-iterate that friction causes the heating).

2 = Partial - Student response shows some understanding by saying that the warmth is caused by friction, but an incorrect or no explanation is given.

1 = Unsatisfactory/Incorrect - Student response does not indicate any understanding of why a nail becomes warm when it is hammered into a piece of wood.

Item Number: 10 Accession Number: HE001976

Key: NONE

Classification Codes:
N27S 1 PS A PR NA NT SCR

Scoring Guide

Scoring Rationale: Student demonstrates ability to identify useful properties of common materials.

3 = Complete - Student response lists two properties of metal.

2 = Partial - Student response lists one property of metal.

1 = Unsatisfactory - Student response does not list any properties of metal.

Credited responses include:

Metals are generally hard
Metals can be magnetic
Metals conduct electricity
Metals can be made into different shapes
Metals conduct heat
Metals are strong, will not break
Metals last a long time (idea that they don't wear down easily)

Item Number: 11 Accession Number: HE001841

Key: NONE

Classification Codes:
N27S 1 ES B PR NA NA ECR

Scoring Guide

Scoring Rationale: Student demonstrates an understanding of how water is used and how water can be conserved or used more wisely.

4 = Complete - Student response names 3 ways water is used in and around the home and for each way describes how water can be conserved.

3 = Essential - Student response names 1,2 or 3 ways water is used in and around the home and for 1 or 2 of the ways describes how water can be conserved.

2 = Partial - Student response names 1,2 or 3 ways water is used in and around the home.

1 = Unsatisfactory/Incorrect - Student response does not demonstrate understanding of how water is used in and around the home, nor does it tell how water can be conserved.

Note: Count as one description - Don't leave it running, turn if off after using it etc.

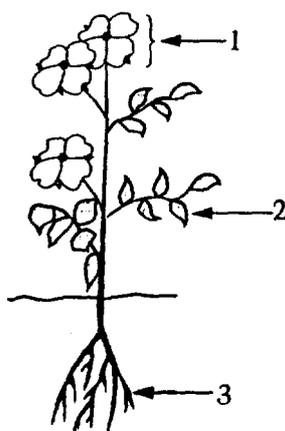
Credited responses include:

Uses: showering, washing dishes, watering lawn or garden, brushing teeth, drinking, cooking, flushing toilets.

Ways to conserve: shower in less time, only run dishwasher when it is full, water when it is cool or late at night, turn off water when brushing teeth, fill glass with only as much water as you will drink, use toilets with smaller tanks.

Student Sample Responses

5. Name the parts of the plant below that are labeled 1, 2, and 3. Explain the function of each part.

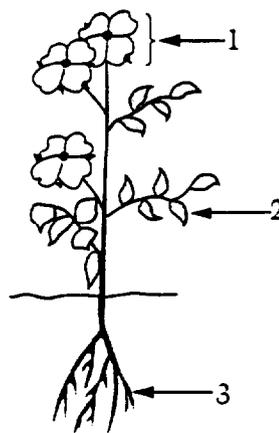


	<u>Name of Part</u>	<u>Function</u>
1.	flower	make more life
2.	leaves	to suck up energy from the sun
3.	root	to suck up moisture from the ground.

Level:
Complete (4)

Student Sample Responses

5. Name the parts of the plant below that are labeled 1, 2, and 3. Explain the function of each part.

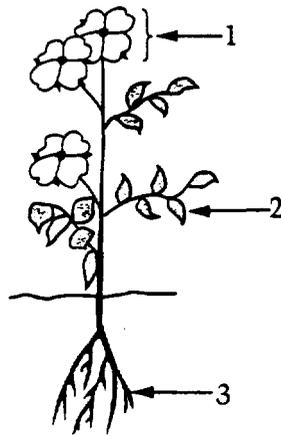


<u>Name of Part</u>	<u>Function</u>
1. flowers	Produce seeds
2. leaves	
3. roots	soke up minerals

Level:
Essential (3)

Student Sample Responses

5. Name the parts of the plant below that are labeled 1, 2, and 3. Explain the function of each part.



Name of Part

Function

1. flowers
2. leaves
3. roots

Level:
Partial (2)

Student Sample Responses

5. Name the parts of the plant below that are labeled 1, 2, and 3. Explain the function of each part.



Name of Part

Function

1. Root is to give it water
2. _____
3. _____

Level:

Unsatisfactory/Incorrect (1)

Student Sample Responses

6. Natural forces are always changing features of the Earth's surface. Some changes happen quickly and some changes happen slowly.

(a) Name one natural force that can change a part of the Earth's surface over a period of days.

Volcanos make the earth come by blowing up.

How is the Earth's surface changed?

The earth's surface changes by ash, lava.

(b) Name one natural force that can change a part of the Earth's surface over a period of hundreds of years.

Rivers

How is the Earth's surface changed?

The river will carve into the rock, just like the grand canyon.

Student Sample Responses

6. Natural forces are always changing features of the Earth's surface. Some changes happen quickly and some changes happen slowly.

- (a) Name one natural force that can change a part of the Earth's surface over a period of days.

The ground shaking
alot to cause a
earthquake.

How is the Earth's surface changed?

The Earth's surface changes
sometimes be eathquakes,

- (b) Name one natural force that can change a part of the Earth's surface over a period of hundreds of years.

Up in the mountains
water freezes in cracks
of rock.

How is the Earth's surface changed?

When the water freezes
it expands making the
rock's crack bigger,

Student Sample Responses

6. Natural forces are always changing features of the Earth's surface. Some changes happen quickly and some changes happen slowly.

(a) Name one natural force that can change a part of the Earth's surface over a period of days.

a earth quack can damage the surface of the earth.

How is the Earth's surface changed?

the earthquake makes a big crack in the earth.

(b) Name one natural force that can change a part of the Earth's surface over a period of hundreds of years.

a volcano erupting and having lava everywhere.

How is the Earth's surface changed?

it destroys trees, ponds, and animals.

Student Sample Responses

6. Natural forces are always changing features of the Earth's surface. Some changes happen quickly and some changes happen slowly.

- (a) Name one natural force that can change a part of the Earth's surface over a period of days.

cutting down big trees that help us.

How is the Earth's surface changed?

it becomes smooth and there's no trees there.

- (b) Name one natural force that can change a part of the Earth's surface over a period of hundreds of years.

trees that die and decompose takes hundreds of years

How is the Earth's surface changed?

it helps keep soil in its place so it doesn't go in to the ocean.

Level:

Unsatisfactory/Incorrect (1)

Student Sample Responses

9. A nail becomes warm when it is hammered into a piece of wood.

Tell why the nail becomes warm.

because of the friction
between the wood and
the nail

Level:
Complete (3)

9. A nail becomes warm when it is tiered into a piece of wood.

Tell why the nail becomes warm.

Because of friction.

Level:
Partial (2)

9. A nail becomes warm when it is hammered into a piece of wood.

Tell why the nail becomes warm.

because in side of the
tree is warm.

Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

10. Many things are made of metal, such as pots, pans, tools, and wire. Give two reasons why metals are used to make many different things.

Because when a pot gets warm on a stove it heats the food, The metal for a tool is hard, It doesn't break easy. And the wire easy lets electricity travel through it.

Level:
Complete (3)

10. Many things are made of metal, such as pots, pans, tools, and wire. Give two reasons why metals are used to make many different Things.

Metal is a good conductor.

Level:
Partial (2)

10. Many things are made of metal, such as pots, pans, tools, and wire. Give two reasons why metals are used to make many different things.

so peple dont do
it by hand.

Level:
Unsatisfactory/Incorrect (1)

Student Sample Responses

11. Name three ways water is used in and around your home.

1. it is used to drink.

2. clean stuff with.

3. to take a shower.

For each way, describe a practical, safe method that can be used to help conserve water.

1. drink it all out of the cup. OK

2. use other cleaners to do the job

3. don't take so long.

Level:
Complete (4)

Student Sample Responses

11. Name three ways water is used in and around Your home.

1. showers
2. drinking
3. cooking

For each way, describe a practical, safe method that can be used to help conserve water.

1. do not leave the tap on when not used.
2. do not forget to turn off the water fountain.
3. _____

Level:
Essential (3)

Student Sample Responses

11. Name three ways water is used in and around your home.

1. Water is used to drink.

2. Water is used for sick.

3. Water is used for ice cubes.

For each way, describe a practical, safe method that can be used to help conserve water.

1. _____

2. _____

3. _____

Level:
Partial (2)

Student Sample Responses

11. Name three ways water is used in and around your home.

1. wood
2. water
3. Warm

For each way, describe a practical, safe method that can be used to help conserve water.

1. water
2. Practical
3. conserve

Level:

Unsatisfactory/Incorrect (1)