

# MEA 2015–2016

## Science Grade 5

The table below shows the entire fifth-grade science test design. Scores are based on common items only, half of which are released and can be found in this document.

### Test Design

CONTENT AREA	COMMON		FIELD TEST ITEMS		TOTAL ITEMS PER STUDENT		BASE TESTING TIME	POINTS
	MC	CR	MC	CR	MC	CR		
SCIENCE	32	4	8	1	40	5	90 MIN.	48

Each item on the MEA measures a content standard of Maine's 2007 *Learning Results*.

#### Science Content Standards Assessed on the MEA

##### **D. The Physical Setting**

1. Universe and Solar System
2. Earth
3. Matter and Energy
4. Force and Motion

##### **E. The Living Environment**

1. Biodiversity
2. Ecosystems
3. Cells
4. Heredity and Reproduction
5. Evolution

### Item Information Chart

Please refer to the item information chart on the next page for in-depth information on each science released item. The released item numbers in the chart correspond to item numbers in the practice test and on the MEA Item Analysis Report.

### Constructed-Response Scoring Guides

A constructed-response scoring guide includes score point descriptions used to determine the score. Training notes that follow the scoring guide provide in-depth descriptions or particular information also used to determine the score.

### Student Work

At least one sample student response is provided for each score point with annotations that explain the reasoning behind the assigned score.

## Grade 5 Science Released Item Information

Released Item Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Practice Test Page Number	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5
Content Strand (Maine 2007 Learning Results)	D2	E1	D2	E3	D1	D3	E3	E2	E3	D2	E1	D4	D3	D2	E5	D4	D3	E4
Depth of Knowledge Code	1	2	2	2	2	2	3	1	1	2	2	2	3	2	2	2	2	3
Item Type	MC	CR	CR															
Possible Points	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4
Answer Key	C	B	B	D	A	C	B	C	A	D	C	D	B	A	B	C		
% Who Chose A or Earned 1 Point	4	12	4	9	78	2	10	24	53	6	25	10	10	60	14	8	13	21
% Who Chose B or Earned 2 Points	1	70	86	10	13	21	54	3	18	5	22	21	46	4	59	12	10	24
% Who Chose C or Earned 3 Points	92	12	8	39	4	30	17	63	18	4	46	13	32	6	19	38	50	33
% Who Chose D or Earned 4 Points	2	6	2	41	5	46	19	9	11	84	7	55	12	30	7	41	19	16
Statewide Average Student Score																	1.8	1.5

**Content Strands:** See "MDOE Regulation 132–Learning Results: Parameters for Essential Instruction" at <http://www.maine.gov/education/lres/pei/index.html>.

**Item Type:** MC = multiple choice, CR = constructed response

**Answer Key:** the letter of the correct answer choice

# MEA Science Grade 5 Released Items – Student Work

## Constructed-Response Item 17

- 17 A student makes cookie dough using an egg, water, sugar, and flour. The student observes the cookie dough before and after baking.
- Describe **two** observations about the cookie dough before baking.
  - Describe **two** observations about the cookie dough after baking that show a change has occurred.
  - Select **one** observation from part b and describe what caused the change.
- Be sure to label parts a, b, and c in your answer booklet.**

## Scoring Guide for Constructed-Response Item 17

Score	Description
4	The response demonstrates a thorough understanding of the properties of original materials, the new materials formed, and demonstrating that a change has occurred. The response provides observations of the cookie dough before and after baking and how the cookie dough changed after baking. The response has no errors or omissions.
3	The response demonstrates a general understanding of the properties of original materials, the new materials formed, and demonstrating that a change has occurred. The response has one error or omission.
2	The response demonstrates a partial understanding of the properties of original materials, the new materials formed, and demonstrating that a change has occurred. The response has errors or omissions.
1	The response demonstrates a minimal understanding of the properties of original materials, the new materials formed, and demonstrating that a change has occurred. The response is minimal or has one correct piece of information.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

### Training Notes for Constructed-Response Item 17

- The dough is sticky, wet, light colored, sweet tasting, flows/flexible, cooler, not much smell, big clump.
- The cookie is darker, harder, brittle (crumbly), drier, hotter, more of smell.
- Accept correct response from part b with reasonable explanation of how the change to the dough occurred.

Example: The oven heats up and water evaporates, egg hardens, flour hardens, sugar softens.

Each part is 2 pts.

6 pts = 4

5 pts = 3

2–4 pts = 2

1 pt = 1

(A) One observation about the cookie dough before it was baked was that it was soft. Another observation about the cookie dough before it was baked was that it was pale in color.

(B) An observation about the cookie dough after it was baked is that it was harder than before it was baked. Also, the cookie dough was warmer than before it was baked.

(C) The cookie dough was warmer after it was baked than before it was baked because some of the heat from the oven transferred to the cookie dough because it was colder than the oven.

**Summary annotation statement:**

Part A: 2 points; Part B: 2 points; Part C: 2 points = 6 points  
6 points = 4 score.

A) Soft, moldable. B) Hard, Breakable.  
C) It turned soft into hard because of  
the heat

**Summary annotation statement:**

Part A: 2 points; Part B: 2 points; Part C: 1 point = 5 points  
5 points = 3 score.

A. The cookie dough before going in the oven is light, light brown with bark chocolate chips. Um. It come from a can, a box, even from your own ingedeants.

B. When you poute it in the oven. You should put it in at a beges of 335. When they come out of the oven they are dark brown and crispy. But don't touge them they are hot!!

C.

**Summary annotation statement:**

Part A: 1 point; Part B: 2 points; Part C: not answered = 3 points  
3 points = 2 score.

a. cookie dough tastes good

b. cookies taste good  
it was warm

c. it tastes so good

**Summary annotation statement:**

Part A: 0 points; Part B: 1 point; Part C: 0 points = 1 point  
1 point = 1 score.

A) First he have to use flower next you + two or three eggs next you get 1/2 cup of water next you get some liquid stuff too and that's how to make a cookie dough.

B) Next you put the cookie doughs in a long pan next you put it in the oven 36° next you take it out and wait for it to cool down.

C) Next you put the cookies in the bagie to bring for your class mates for a snack for them to eat.

**Summary annotation statement:**

Incorrect: does not address prompt.

### Constructed-Response Item 18

- 18 A farmer raises rabbits. Rabbits can be brown, black, or white. The farmer mates a brown female rabbit with a black male rabbit. This pair has three litters of baby rabbits, as shown in the table below.

**Rabbit Litters**

Litter #	Number of Offspring by Coat Color		
	Brown	Black	White
1	5	2	0
2	5	1	0
3	6	2	0

- Make a conclusion about how the rabbit offspring got their coat colors. Identify the data in the table that supports your conclusion.
- Describe why none of the offspring are white rabbits. Explain your reasoning.

**Be sure to label parts a and b in your answer booklet.**

## Scoring Guide for Constructed-Response Item 18

Score	Description
4	The student demonstrates a thorough understanding of the reasons why organisms differ from or are similar to their parents. The response makes a conclusion about how the rabbit offspring get their coat color AND describes why none of the offspring are white rabbits, and explains the student's reasoning. The response has no errors or omissions.
3	The response demonstrates a general understanding of the reasons why organisms differ from or are similar to their parents. The response has an error/omission.
2	The response demonstrates a limited understanding of the reasons why organisms differ from or are similar to their parents. The response has errors/omissions.
1	The response demonstrates a minimal understanding of the reasons why organisms differ from or are similar to their parents. The response has one piece of correct information.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response.

### Training Notes for Constructed-Response Item 18

- a. Possible responses must include the idea that rabbits inherit coat color from their parents. Possible responses must also include reasonable, supportive data evidence, which may include any of the following:
- Every offspring had the coat color of one of its parents.
  - No offspring was white.
  - All offspring were brown or black.

Note: Evidence from the table may include a qualitative description (e.g. twice as many brown than black, more brown than black, etc.)

- b. Response must include discussion of parents and passing on (mechanism) information (traits). Possible response explanations may include the following:
- Neither parent passed on information for white rabbits, because neither parent is white.

a. The rabbit offspring got their coat color from their genetic coding. In total, 5 rabbits are black because they got the black gene from their father, and 16 rabbits are brown because they got the brown gene from their mother.

b. None of the offspring are white because neither the father or mother is white. They might all have the white gene, but none of them are displaying it.

**Summary annotation statement:**

Full credit was awarded for correct conclusion and sufficient evidence. Part B has the correct statement and explanation that a trait is passed on via gene.

Sample 3-Point Response with Annotations for Constructed-Response Item 18

A. The rabbits got thier coat colors from the colors of thier parents coats.  
B. The rabbits parents didnt have any white fur jeans in there DNA thats why none of the rabbits have white coats.

**Summary annotation statement:**

Part A receives partial credit for the correct conclusion with no evidence. Part B has concise reasoning and explanation for full credit.

Sample 2-Point Response with Annotations for Constructed-Response Item 18

a. The rabbit offsprings get there coat color from there parents.  
b. There are no white offspring cause of the color of there parents the mother is brown and the father is black.

**Summary annotation statement:**

This response shows limited understanding. It is a classic 2-point score demonstrating correct conclusions without support.

A. The brown and black mates had more brown offsprings than black because the femal is brown.

B. None of the offspring rabbits are white because the farmer never mated the white rabbit as shown above the table.

**Summary annotation statement:**

Part A does not receive credit because the conclusion gives genes dominance to motherhood, which is incorrect. Part B receives minimal credit for “the farmer never mating the white rabbit”, meaning that the parents were not white.

- ① White because in the summer they are easier to see brown because they can hid in bushes or in brush black not so good because for durring the day.
- ② None of the offspring rabbits are white because they can be seen.

**Summary annotation statement:**

Parts A and B cite environmental factors for offspring survival. No credit.