Grade 8 Innovative Science and Technology/Engineering Sample Task

Spring 2021

The Department of Elementary and Secondary Education (DESE) is developing an innovative science assessment for grades 5 and 8 that uses a new type of performance task for students. Students engage with meaningful problems through interactive computer simulations to conduct investigations, create and explore models, and solve science or engineering challenges. In Spring of 2021, DESE piloted the assessment with a small cohort of 18 schools with roughly 2,300 students in grades 5 and 8. Three performance tasks were piloted per grade. DESE is publishing one pilot performance task per grade as a sample task.

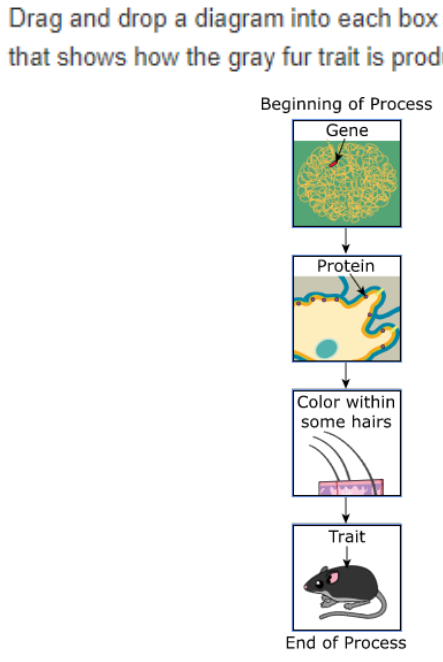
- Sample items from the pilot test are available online at https://ma-innov-sci.mypearsonsupport.com/practice-tests/. The sample items are collected from a mini test called an ePAT (electronic practice assessment tool). Items in the ePAT are displayed in TestNav 8, the testing platform used for the computer-based tests.

This document provides information about each item from the sample task, including the following:

- science content area (reporting category)
- standard covered
- practice category
- item type
- item description
- correct answer (for selected-response and technology-enhanced items)
- percentage of students in the pilot who answered the item correctly (Percent Correct)

Scoring rubrics are provided for constructed-response and simulation items.

Task Set Item No.	Reporting Category	Standard	Practice Category	Item Type*	Item Description	Answer	Percent Correct
(1)	Life Science	8.LS.3.3	Evidence, Reasoning, and Modeling	TE	Students will model the process for how the gray fur trait is produced.	*See image*	50%



(2)	Life Science	8.LS.3.4	Evidence, Reasoning, and Modeling	TE	Students will use a model to determine the genotype that represents the tan fur phenotype in mice.	*see image*	49%

Select the genotype or genotypes of offspring with tan fur.

	G	g
G	GG	Gg
g	Gg	gg

(3)	Life Science	8.LS.3.4	Evidence, Reasoning, and Modeling	TE/SR	Students will use evidence from a model to determine the genotypes and phenotypes for the recessive fur color.	Part A: *see image* Part B: B	Part A: 30% Part B: 26%

Part A:

Select from the drop-down menu to correctly complete the sentence.

The genetic cross that provides the **best** evidence that tan fur color is a recessive trait is the cross between Female Mouse L and Male Mouse R .

Part B:

Which statement explains why the cross selected in Part A provides evidence that tan fur color is a recessive trait in the mice?

- A. A recessive trait can be observed in the offspring only when both parents have this trait.
- B. A recessive trait can be observed in the offspring when this trait is absent in the parents.
- C. All offspring will have the dominant trait when one parent has the dominant trait and the other parent has the recessive trait.
- D. Most of the offspring will have the recessive trait when one parent has the dominant trait and the other parent has the recessive trait.

(4)	Life Science	8.LS.3.4	Investigations and Questioning Evidence, Reasoning, and Modeling	Part A: SIM/SR Part B: TE	Students will develop and use a model to determine the genotypes for the given mice.	*see images*	Part A: 53% Part B: 65%

Part A:

Select the **two** simulation trials that **best** helped you determine the genotype of Male Mouse R and Male Mouse S.

- ☐ A. Trial A
- ☐ B. Trial B
- ☐ C. Trial C
- ☐ D. Trial D
- ☐ E. Trial E

Performance (Points)
In the trials identified in Part A, the student includes one cross between any female mouse and Male Mouse R and one cross between any female mouse and Male Mouse S. (1)
Student makes only one or none of the crosses indicated above. (0)

Part B:

Select from the drop-down menus to complete the table indicating the genotype of each male mouse.

Mouse	Genotype
R	Gg
S	GG

(5)	Life Science	8.LS.3.4	Evidence, Reasoning, and Modeling	TE	Students will construct a Punnett square to identify the parent genotypes that will produce a specific genotype in offspring.	*see image*	20%

Select from the drop-down menus to correctly complete the sentence.

In the simulation, one way to conduct a cross that will produce the highest percentage of heterozygous offspring (Gg) is to use Female Mouse [J] and Male Mouse [S].

or

Select from the drop-down menus to correctly complete the sentence.

In the simulation, one way to conduct a cross that will produce the highest percentage of heterozygous offspring (Gg) is to use Female Mouse [K] and Male Mouse [S].

(6)	Life Science	8.LS.3.1	Evidence, Reasoning, and Modeling	TE	Students will use models to determine advantages and disadvantages caused by genetic mutations.	*see image*	77%

Select from the drop-down menus to correctly complete the sentence.

In Location M, a mutation that causes darker fur is [beneficial] because mouse offspring with darker fur [blend into] this environment.

(7)	Life Science	8.LS.4.4	Evidence, Reasoning, and Modeling	TE	Students will determine factors that impact a genetic change in a population over time.	*see image*	22%

Complete the table to indicate whether each statement would make the student's claim more likely or less likely to be correct.

Statement	Makes the Claim More Likely	Makes the Claim Less Likely
Some mice from Location N move to Location O.	○	◉
The number of owls at Location O increases.	◉	○
Many mice at Location O are heterozygous (**Gg**) for the fur color gene.	○	◉

(8)	Life Science	8.LS.4.4	Evidence, Reasoning, and Modeling	CR	Students will determine factors that impact a genetic change in a population over time.	*see Scoring Guide***	See Percent of Students Scoring Table

Percent of Students Scoring	0 points	1 point	2 points	3 points
	29%	35%	29%	7%

Scoring Guide	
Score	Description
3	The response demonstrates a thorough understanding of the task by: • Identifying that the number of gray mice at Location X increased after the volcanic eruption. • Explaining how having gray or tan fur became an advantage/disadvantage due to the dark rocks created by the volcanic eruption. • Explaining that the gray/tan mice were more/less likely to reproduce and pass their traits on to their offspring.
2	The response demonstrates a general understanding of the task by correctly responding to two of the three bullets.
1	The response demonstrates a minimal understanding of the task by correctly responding to one of the three bullets.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

* Item types are selected-response (SR), technology-enhanced (TE), and constructed-response (CR).
** Sample responses and scoring guidelines for constructed-response items will be posted to the Department's website later this year.