

NJSLA-S Practice Test Answer and Alignment Document

Science: Grade 8 – Unit 1

Item 1

Domain: Life Science

Phenomenon: Movement in earthworms (multicellular organisms) requires interaction between the nervous system and the muscular system.

Item 1

Item Type: Technology Enhanced

Standards Alignment: DCI: LS1.A; SEP: CEDS; CCC: S & SM

Screen Reader (SR)/Assistive Technology (AT)/Paper Key: Box Y: C; Box Z: A

Key: A correct response will look like this:

Nerve cells different parts of the body. As a
result, muscular tissues , causing the worm to move.

Rationale: The nervous system, which consists of nerve cells, is responsible for coordinating all the actions of an organism by sending signals to all its body systems, including the muscular system.

Items 2–4

Domain: Life Science

Phenomenon: An individual's chance of expressing an inherited trait is dependent on the alleles passed on from its parents.

Item 2

Item Type: Technology Enhanced

Standards Alignment: DCI: LS3.A; SEP: UMCT; CCC: S, P, and Q

SR/AT/Paper Key: D

Key: A correct response will look like this:

The probability of Individual E being able to taste the bitter
chemical is %.

Rationale: Based on the genotypes of Individuals A and B, Individual D will have the Tt genotype. Therefore, both parents of Individual E will have the Tt genotype. This means that Individual E has a three of four chance of inheriting at least one T allele, which would cause Individual E to have the bitter-taste trait.

Item 3

Item Type: Technology Enhanced

Standards Alignment: DCI: LS3.A; SEP: AID; CCC: PAT

SR/AT/Paper Key: A, B, E, F, G, and H

Key: Individuals I-1, I-2, II-4, III-1, III-2, and III-4 should be selected. A correct response will look like this:

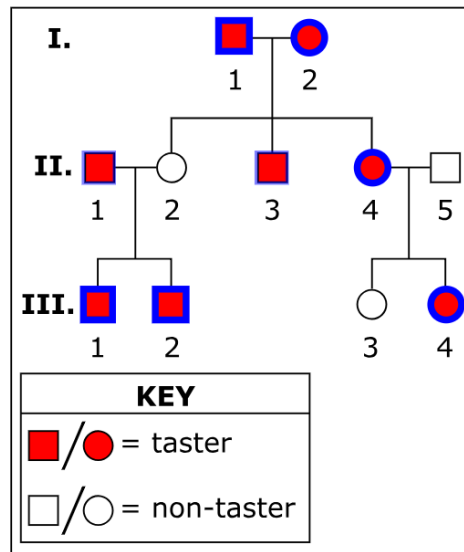


Figure 2. Inheritance of the Bitter-Taste Trait in a Second Family

Rationale: The ability to taste the bitter chemical is a dominant trait, so non-tasters must inherit two copies of the non-tasting allele from their parents. Individuals I-1, I-2, and II-4 are all tasters who have at least one child who is a non-taster. That means each of these individuals must carry a copy of the recessive allele that they passed on to their children. Individuals III-1, III-2, and III-4 are tasters who have one parent who is a non-taster. That means that each of these individuals must have inherited a copy of the recessive non-tasting allele from the non-taster parent.

Item 4

Item Type: Technology Enhanced

Standards Alignment: DCI: LS3.A; SEP: CEDS; CCC: SF

SR/AT/Paper Key: A and F

Key: The student should select the following two sentences:

Individual A and Individual B each have only one copy of the bitter-taste gene.

The protein made from the *t* allele is what causes Individual C to taste the bitter chemical.

Rationale: Individuals A and B each have two copies of the bitter-taste gene: Individual A has two copies of the tasting allele, and Individual B has two copies of the non-tasting allele. Individual C is able to taste the bitter chemical because of the dominant *T* allele.

Items 5–7

Domain: Earth and Space Science

Phenomenon: Fossils in rock strata can be used to compare the geologic age of two or more areas.

Item 5

Item Type: Technology Enhanced

Standards Alignment: DCI: ESS1.C; SEP: CEDS; CCC: PAT

SR/AT/Paper Key: Box W: B; Box X: A; Box Y: A; Box Z: B

Key: A correct response will look like this:

Layer and Layer are the same age. Each layer contains the same type of because they formed during time periods.

Rationale: The rock strata show that Layer D and Layer J have similar soil and fossils from the same types of organisms, which indicates that they formed during similar time periods. Layers formed during different time periods show more significant soil differences and fossils from different organisms.

Item 6

Item Type: Technology Enhanced

Standards Alignment: DCI: ESS1.C; SEP: DUM; CCC: SC

SR/AT/Paper Key: Layer B: B; Layer C: C; Layer D: B; Layer E: A

Key: A correct response will look like this:

Layer	Supports That the Land Was Covered by Water	Supports That the Land Was Exposed to Air	Not Enough Evidence to Support Either Claim
B	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
C	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
D	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
E	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Rationale: The presence of terrestrial animal fossils in Layer B supports the presence of an atmosphere during formation. The formation of Layer C is inconclusive because of a lack of fossils. The presence of fossilized feathers in Layer D supports an environment exposed to air. Fossils of aquatic dwellers in Layer E support the presence of an aquatic environment.

Item 7

Item Type: Technology Enhanced

Standards Alignment: DCI: ESS1.C; SEP: AID; CCC: PAT

SR/AT/Paper Key: D

Key: A correct response will look like this:

Oldest	→	→	Youngest
Layer G	Layer E	Layer D	Layer B

Rationale: The law of superposition can be used to classify the relative ages of layers in this undisturbed section of rock. Because they were created first, older layers are located below younger layers. Of the layers listed, Layer B is the youngest and Layer G is the oldest because of their positions.

Item 8

Domain: Life Science

Phenomenon: Onions are living and made of cells.

Item 8

Item Type: Technology Enhanced

Standards Alignment: DCI: LS1.A; SEP: EAE; CCC: S, P, and Q

Key: C, E

Rationale: The onion root under a microscope clearly shows that it is made up of many cells (C) and shows many of its cells in various stages of reproduction (E). All living things have these traits and they can be detected on the microscope slide.

Answers A, B, and D are invalid because the characteristics they describe are not verifiable in the microscope slide.

Items 9–10

Domain: Life Science

Phenomenon: Earthworms help plants grow.

Item 9

Item Type: Multiple Choice

Standards Alignment: DCI: LS2.A; SEP: PACI; CCC: SC

Key: D

Rationale: Even small changes to one part of a system can cause large changes elsewhere, and testing two plants does not provide conclusive evidence to support such a change.

Answer A is invalid because although the garden is likely a less stable system, the two systems (potted plants vs. garden) have different variables. The fact that the garden is a less stable system is a major difference.

Answer B is invalid because a system's stability does not prevent changes from taking hold in the system, and each potted plant does represent a stable system.

Answer C is invalid because the variables are not similar.

Item 10

Item Type: Multiple Choice

Standards Alignment: DCI: LS2.B; SEP: CEDS; CCC: E&M

Key: C

Rationale: The improved growth of plants exposed to earthworms suggests that the plants received additional nutrients. Decomposers enrich soil with materials useful to producers.

Answer A is invalid because only other plants compete with plants for nutrients, and the plants exposed to earthworms were all similar and all flourished.

Answer B is invalid because earthworms are not capable of carrying out photosynthesis.

Answer D is invalid because there is no evidence that the potting soil included the decaying biomass needed by scavengers.

Item 11–12

Domain: Life Science

Phenomenon: Similarities in embryos indicate a relationship between organisms.

Item 11

Item Type: Multiple Choice

Standards Alignment: DCI: LS4.A; SEP: AID; CCC: PAT

Key: A

Rationale: The third row in the progression diagram shows more similarities between the tortoise and the chicken than between the tortoise and the rabbit.

Answer B is invalid because only the first row in the progression diagram supports this assertion. The third row in the progression diagram shows that differences exist.

Answer C is invalid because the first row in the progression diagram shows common characteristics, such as gill slits and the presence of a tail, which support common ancestry.

Answer D is invalid because the third row in the progression diagram shows more differences between the fish and the rabbit than between the fish and the chicken.

Item 12

Item Type: Multiple Choice

Standards Alignment: DCI: LS4.A; SEP: AQDP; CCC: PAT

Key: B

Rationale: Figure 1 shows distinctive similarities and differences in the development progression of diverse organisms.

Answer A is invalid because there are no time references in the figure.

Answer C is invalid because there is no reference for differentiating ancient organisms from modern organisms, and the organisms listed could all be considered modern.

Answer D is invalid because there are no structures presented in the figure that are diverse enough to support the assertion.

Item 13

Domain: Earth and Space Science

Phenomenon: The discovery of new oil reserves impacts the amount of oil available for human consumption.

Item 13

Item Type: Technology Enhanced

Standards Alignment: DCI: ESS3.A; SEP: CEDS; CCC: SC

SR/AT/Paper Key: Box X: A; Box Y: B; Box Z: B

Key: A correct response will look like this:

Based upon the data in the graph, discoveries of new oil reserves beyond the year 2000 . Oil is a resource, which means the supply replenishes than human demand.

Rationale: Based on the trends in the graph, the number of exploratory drilling sites for oil has been decreasing. This will lead to an overall decrease in the amount of available oil because oil is a non-renewable resource that requires such a long time to produce that its supply can be considered finite.

Items 14–16

Domain: Earth and Space Science

Phenomenon: Moon shapes are repeated each month.

Item 14

Item Type: Multiple Choice

Standards Alignment: DCI: ESS1.A; SEP: DUM; CCC: C and E

Key: C

Rationale: The Moon changes positions as it revolves around Earth. The portion of the Moon that is illuminated by the Sun and visible from Earth changes in each position. The Moon appears full during Observation 1, indicating that it is in Position 1. Only the side of the Moon that is closest to the Sun is illuminated by the Sun in Observation 2, indicating that the Moon has moved to Position 3.

Answers A and B are invalid because it is the Moon's position relative to Earth, not Earth's rotation, that determines the Moon's phase.

Answer D is invalid because, in that position, the opposite side of the Moon would be illuminated by the Sun.

Item 15

Item Type: Technology Enhanced

Standards Alignment: DCI: ESS1.A; SEP: DUM; CCC: PAT

SR/AT/Paper Key: Box W: D; Box X: B; Box Y: C; Box Z: A

Key: A correct response will look like this:

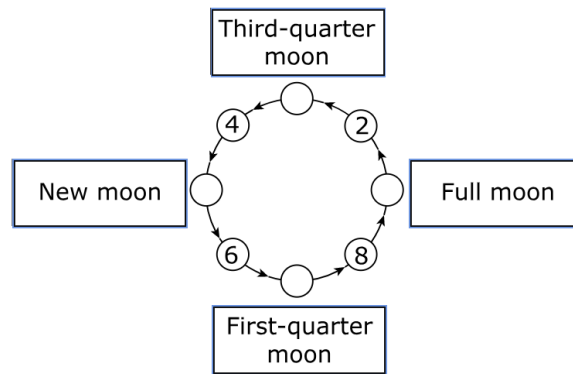


Figure 3. Moon Phases

Rationale: Half of the Moon's surface is always illuminated by the Sun. A new moon occurs when the entire side of the Moon illuminated by the Sun faces away from Earth. The first-quarter moon occurs between the new moon and the full moon. The full moon occurs when the entire side of the Moon illuminated by the Sun faces Earth. The third-quarter moon occurs between the full moon and the new moon.

Item 16

Item Type: Technology Enhanced

Standards Alignment: DCI: ESS1.A; SEP: UMCT; CCC: S, P, and Q

SR/AT/Paper Key: Box X: B; Box Y: C; Box Z: D

Key: A correct response will look like this:

Number of Days Passed	Moon's Position
8	Position 4 ▼
22	Position 8 ▼
36	Position 4 ▼

Rationale: It takes the Moon a little more than 27 days to revolve around Earth once. That means that every two positions shown in Figure 1 represent a span of about 1 week ($27/8 = \text{about } 3.5$ days per position). From a starting point of Position 2, 8 days (about 1 week) involves moving two positions to Position 4. Position 8 is about 3 weeks (22 days) from Position 2, and 36 days (about 5 weeks) from Position 2 is indicated by Position 4.

Items 17–20

Domain: Physical Science

Phenomenon: Heat transfers from objects of warmer temperature to objects of cooler temperatures.

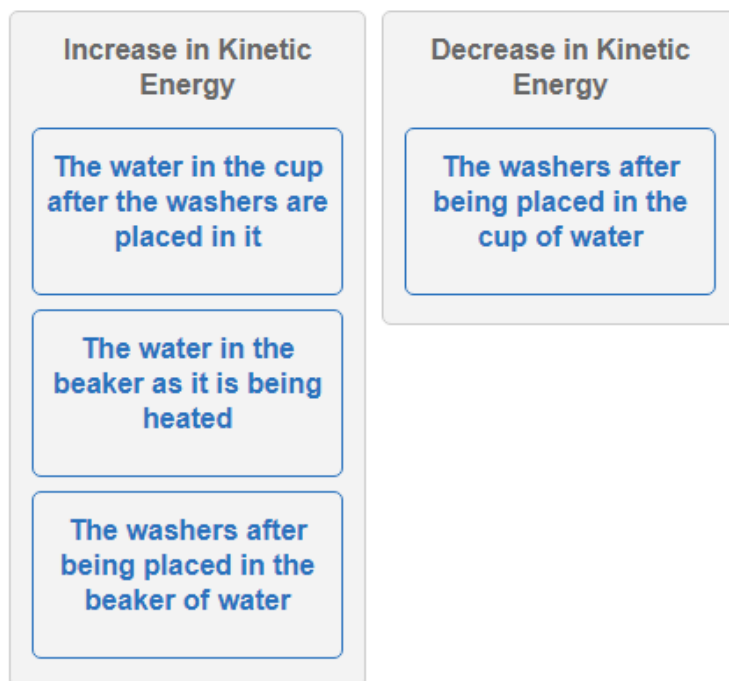
Item 17

Item Type: Technology Enhanced

Standards Alignment: DCI: PS3.A; SEP: CEDS; CCC: C and E

SR/AT/Paper Key: B

Key: A correct response will look like this:



Rationale: Thermal energy flows from warmer regions to cooler regions. As the particles within a region gain heat, they begin to move more quickly and gain kinetic energy. The opposite happens to particles within a region that loses heat. Therefore, the kinetic energy of the particles increases in each of the following materials:

- The water in the cup after the washers are placed in it
- The water in the beaker as it is being heated
- The washers after being placed in the beaker of water

The kinetic energy of the particles decreases in the following material:

- The washers after being placed in the cup of water

Item 18

Item Type: Technology Enhanced

Standards Alignment: DCI: PS3.A; SEP: CEDS; CCC: E&M

SR/AT/Paper Key: A

Key: A correct response will look like this:

Water in the beaker after it comes to a boil

Water in the cup after the washers are added

Water in the cup before the washers are added

Rationale: The kinetic energy of a given material increases as the speed of the material's individual particles increases, and the hotter a material is, the faster its particles move. Therefore, arranging the options from warmest temperature to coolest temperature orders them by decreasing kinetic energy. Based on the heat transfers that occur during the investigation, the boiling water in the beaker has the greatest amount of kinetic energy, while the water in the cup before the washers are added has the least amount of kinetic energy.

Item 19

Item Type: Technology Enhanced

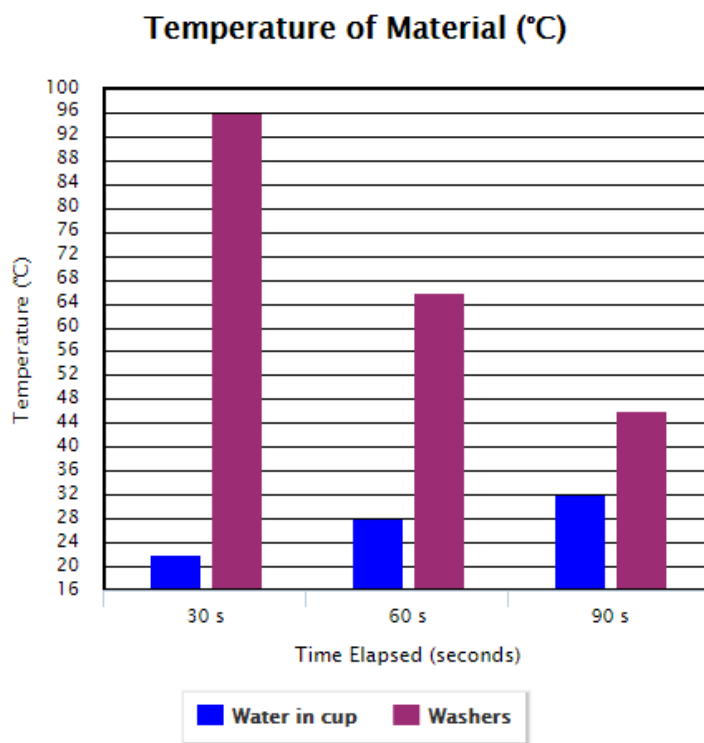
Standards Alignment: DCI: PS3.A; SEP: AID; CCC: PAT

SR/AT/Paper Key: Part A: B; Part B: Box X: A; Box Y: B; Box Z: A

Key:

Part A

From left to right, the values for the bars that represent the water in the cup should be 22, 28, 32, and the values for the bars that represent the washers should be 96, 66, 46. A correct response will look like this:



Part B

As the experiment goes longer than 90 seconds, the temperature of the water in the cup will , and the temperature of the washers will

. This will continue

.

Rationale: Thermal energy is transferred from warmer objects to cooler objects. In this investigation, the washers are initially much warmer than the water in the cup. Therefore, the data in the first row of the table that show decreasing temperatures over time represent the washers, and the data in the second row that show increasing temperatures represent the water in the cup. Applying these data to the bar graph, the water in the cup should be 22°C at 30 s, 28°C at 60 s, and 32°C at 90 s. The washers should be 96°C at 30 s, 66°C at 60 s, and 46°C at 90 s. Thermal energy will continue to be transferred from the warmer washers to the cooler water in the cup until the temperature of the washers is the same as the temperature of the water in the cup.

Item 20

Item Type: Constructed Response

Standards Alignment: DCI: PS3.A; SEP: CEDS; CCC: C and E

Sample student response:

When the washers are placed in the cup, thermal energy is transferred from the washers to the water. This causes the water molecules to move faster and causes the temperature of the water to increase. If twice as much water was in the cup, the washers would still transfer thermal energy to the water, but it wouldn't have as much of an effect on the molecules in the water, because there are twice as many. The water molecules would start moving faster, and the temperature would increase—but not as quickly as in the original experiment.

Key: This item has 4 quality points:

- 1 point for explaining increased speed/kinetic energy after the washers are inserted.
- 1 point for explaining transfer of heat energy.
- 1 point for explaining increase in temperature.
- 1 point for recognizing that temperature change is less because of larger volume of water.

Rationale: The student needs to recognize that thermal energy would still be transferred from the warmer object (the washers) to the cooler object (the water in the cup), causing the water molecules to move faster and the molecules within the washers to move more slowly. However, since the temperature of an object reflects the average kinetic energy of all the molecules in the object, the increase in the volume of water means that it would take a greater input of energy to increase the temperature of the water as much as in the original investigation.