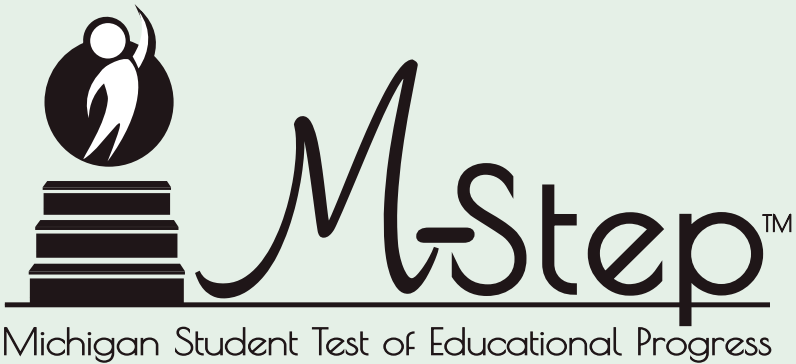


Student Name _____

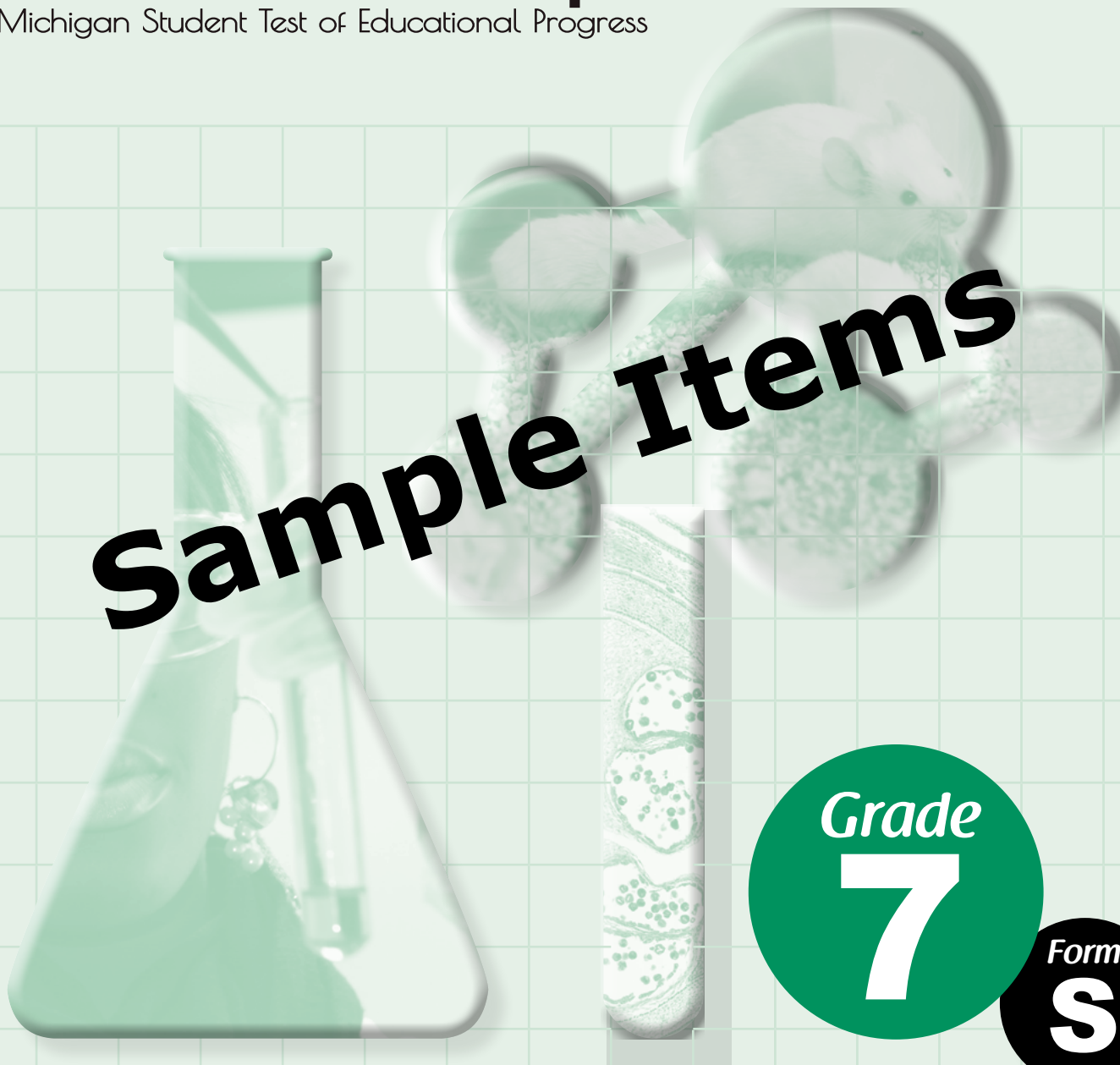


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Sample Items



Grade
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SCIENCE

Spring 2015

MICHIGAN STATE BOARD OF EDUCATION
STATEMENT OF ASSURANCE OF COMPLIANCE WITH FEDERAL LAW

The Michigan State Board of Education complies with all Federal laws and regulations prohibiting discrimination and with all requirements and regulations of the U.S. Department of Education. It is the policy of the Michigan State Board of Education that no person on the basis of race, color, religion, national origin or ancestry, age, sex, marital status, or handicap shall be discriminated against, excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination in any program or activity for which it is responsible or for which it receives financial assistance from the U.S. Department of Education.

The sample items included in this set can be used by students and teachers to become familiar with the kinds of items students will encounter on the paper/pencil summative assessments. The sample items demonstrate the rigor of Michigan's academic content standards. They are not to be interpreted as indicative of the focus of the M-STEP assessments; they are simply a collection of item samples. Every standard is not included in this sample set.

PART X

DIRECTIONS:

In this part, you will answer multiple-choice science questions. Some questions will ask you to read a passage, table, or other science-related information. Use that information with what you know to answer the question.

You must mark all of your answers in your **Answer Document** with a No. 2 pencil. You may underline, circle, or write in this test booklet to help you, but nothing marked in this test booklet will be scored.

Mark only one answer for each question. Completely fill in the corresponding circle on your **Answer Document**. If you erase an answer, be sure to erase completely. Remember that if you skip a question in the test booklet, you need to skip the answer space for that question on the **Answer Document**. If you are not sure of an answer, mark your **best** choice.

A Periodic Table of the Elements has been provided for your reference on the next page.

A sample question is provided for you below.

Sample Multiple-Choice Question:

Pill bugs can often be found underneath rocks and rotting logs. When exposed to light, they immediately try to find a dark place to hide. This reaction by the pill bugs is a result of

- A migration.
- B feeding behavior.
- C energy requirements.
- D changing environmental conditions.

For this sample question, the correct answer is **D**. Circle **D** is filled in for the sample question on your **Answer Document**.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page. If you finish early, you may go back and check your work. Check to make sure that you have answered every question. Do **NOT** look at any other part of the test.

WAIT 

Periodic Table of the Elements

IA																	VIII A
1 H <small>1.0080</small>											2 He <small>4.0026</small>						
IIA												III A	IV A	V A	VI A	VII A	
3 Li <small>6.94</small>	4 Be <small>9.012</small>											5 B <small>10.811</small>	6 C <small>12.0115</small>	7 N <small>14.0067</small>	8 O <small>15.9994</small>	9 F <small>18.9984</small>	10 Ne <small>20.18</small>
11 Na <small>22.9898</small>	12 Mg <small>24.31</small>											13 Al <small>26.9815</small>	14 Si <small>28.086</small>	15 P <small>30.974</small>	16 S <small>32.06</small>	17 Cl <small>35.453</small>	18 Ar <small>39.948</small>
		IIIB	IVB	VB	VIB	VIIB	VIII B			IB	IIB						
19 K <small>39.102</small>	20 Ca <small>40.08</small>	21 Sc <small>44.96</small>	22 Ti <small>47.90</small>	23 V <small>50.94</small>	24 Cr <small>51.996</small>	25 Mn <small>54.938</small>	26 Fe <small>55.847</small>	27 Co <small>58.933</small>	28 Ni <small>58.71</small>	29 Cu <small>63.546</small>	30 Zn <small>65.37</small>	31 Ga <small>69.72</small>	32 Ge <small>72.59</small>	33 As <small>74.9216</small>	34 Se <small>78.96</small>	35 Br <small>79.909</small>	36 Kr <small>83.80</small>
37 Rb <small>85.47</small>	38 Sr <small>87.62</small>	39 Y <small>88.91</small>	40 Zr <small>91.22</small>	41 Nb <small>92.91</small>	42 Mo <small>95.94</small>	43 Tc <small>[97.9]</small>	44 Ru <small>101.07</small>	45 Rh <small>102.91</small>	46 Pd <small>106.4</small>	47 Ag <small>107.868</small>	48 Cd <small>112.40</small>	49 In <small>114.82</small>	50 Sn <small>118.69</small>	51 Sb <small>121.75</small>	52 Te <small>127.60</small>	53 I <small>126.904</small>	54 Xe <small>131.30</small>
55 Cs <small>132.91</small>	56 Ba <small>137.34</small>	57 La <small>138.91</small>	72 Hf <small>178.49</small>	73 Ta <small>180.95</small>	74 W <small>183.85</small>	75 Re <small>186.2</small>	76 Os <small>190.2</small>	77 Ir <small>192.22</small>	78 Pt <small>195.09</small>	79 Au <small>196.97</small>	80 Hg <small>200.59</small>	81 Tl <small>204.37</small>	82 Pb <small>207.2</small>	83 Bi <small>208.98</small>	84 Po <small>[209]</small>	85 At <small>[210]</small>	86 Rn <small>[222]</small>
87 Fr <small>[223]</small>	88 Ra <small>226.0</small>	89 Ac <small>227.0</small>	104 Rf <small>[261]</small>	105 Db <small>[262]</small>	106 Sg <small>[263]</small>												

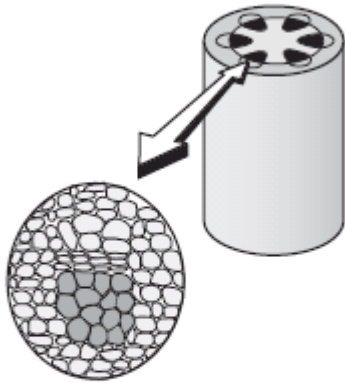
*Lanthanoid series

58 Ce <small>140.12</small>	59 Pr <small>140.91</small>	60 Nd <small>144.24</small>	61 Pm <small>[145]</small>	62 Sm <small>150.4</small>	63 Eu <small>151.96</small>	64 Gd <small>157.25</small>	65 Tb <small>158.9</small>	66 Dy <small>162.50</small>	67 Ho <small>164.93</small>	68 Er <small>167.26</small>	69 Tm <small>168.93</small>	70 Yb <small>173.04</small>	71 Lu <small>174.97</small>
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†Actinoid series

90 Th <small>232.0</small>	91 Pa <small>231.0</small>	92 U <small>238.03</small>	93 Np <small>237.0</small>	94 Pu <small>[244]</small>	95 Am <small>[243]</small>	96 Cm <small>[247]</small>	97 Bk <small>[247]</small>	98 Cf <small>[251]</small>	99 Es <small>[252]</small>	100 Fm <small>[257]</small>	101 Md <small>[258]</small>	102 No <small>[259]</small>	103 Lr <small>[262]</small>
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- 1 Mark sliced a plant's stem into various sections and placed them under a microscope. He noticed that each of the sections had identical cell formations, which created tube-like structures in the stem.



A main function of the stem is to

- A absorb minerals from the soil.
 - B transport food and water.
 - C protect against diseases.
 - D capture sunlight for photosynthesis.
- 2 Which is the first thing that would happen if a plant could **NOT** obtain carbon dioxide?
- A It would not be able to reproduce.
 - B It would not be able to make food.
 - C It would not be able to get rid of waste.
 - D It would not be able to absorb minerals.

- 3 Plants absorb light energy and store that energy in the form of

- A water.
- B carbon dioxide.
- C sugar.
- D oxygen.

- 4 Kim wanted to determine if certain seeds require sunlight to germinate. She placed one seed in a moist paper towel in the sunlight and another seed in an equally moistened paper towel in a dark closet. The seed in the sunlight germinated but the one in the closet did not. Kim reported to the class that this type of seed needs sunlight in order to germinate.

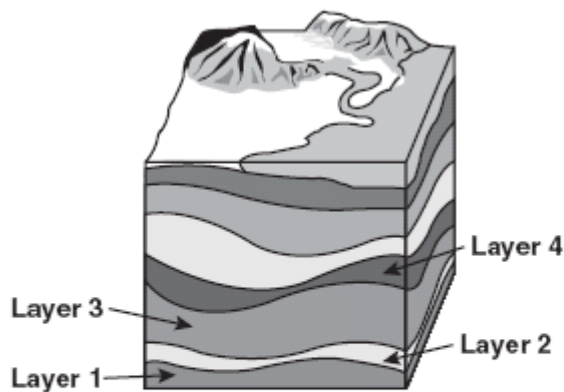
Given this information, which statement would **best** describe an improvement in Kim's experiment that would strengthen her claim?

- A Use many seeds to conduct the experiment.
- B Start the samples on different days.
- C Use different amounts of water.
- D Place the seeds in new locations.

5 Which process will produce igneous rocks?

- A deposition of sediments
- B volcanic action
- C earthquake activity
- D erosion of surface rocks

6 Use the illustration and your knowledge of science to answer the question.



Which layer of sedimentary rock is the oldest?

- A Layer 4
- B Layer 3
- C Layer 2
- D Layer 1

7. Which motion describes molecules in a solid at extremely low temperatures?

- A bumping together with some room to move
- B vibrating while closely packed together
- C moving freely and randomly in a space
- D sliding around one another and colliding

8 Cindy dissected a flowering plant and looked at the stem, roots, leaves, and flower using a microscope. After her observations, Cindy should conclude that all flowering plant structures

- A are not living.
- B have the same function.
- C have cells.
- D are green.

- 9 The following test design was developed by researchers:

Sleep Study

1. Select a volunteer to participate in the study.
2. Ask the volunteer to read a short story just before going to sleep.
3. Give the volunteer a multiple-choice test on the short story the following day.
4. Record the test results.

Which of the following describes the **greatest** flaw with the experimental design?

- A the test results were recorded
- B the volunteer went to sleep
- C the study was done overnight
- D only one volunteer participated

- 10 Some insects consume nectar from flowering plants and help the plant by spreading pollen. Which type of relationship between insects and plants does this demonstrate?

- A parasitic
- B competitive
- C predator-prey
- D mutually beneficial

- 11 Use the food chain and your knowledge of science to answer the question.

Great Lakes Food Chain

plankton → mosquito larvae → sculpin (a small fish) → lake trout

Which of the following would be the **most likely** result of a reduction in the lake trout population?

- A** Sculpin and mosquito larvae populations would both increase.
- B** Sculpin and mosquito larvae populations would both decrease.
- C** The plankton population would decrease.
- D** The sculpin population would increase.
- 12 Which action would have the **greatest** impact on reducing river pollution in a farm area?
- A** planting crops that absorb less water
- B** plowing land earlier in the year
- C** controlling the use of fertilizer
- D** increasing irrigation of crops
- 13 A chemical change could **best** be demonstrated by
- A** burning a piece of paper.
- B** folding a piece of paper.
- C** cutting a piece of paper.
- D** dropping a piece of paper.
- 14 Engineers have recently developed alternative fuels such as ethanol to power vehicles. Ethanol is a fuel that is made from corn or other crops including wheat, barley, and potatoes. E85 is a mixture of 85% ethanol and 15% gasoline.
- The greatest environmental advantage to using E85 would be that
- A** it has gasoline mixed in it.
- B** it is used to power vehicles.
- C** it is made up mostly of renewable resources.
- D** it is made from crops that require powerful fertilizers.

- 15** Many lizards that live in Arizona are unable to live in Michigan. Which statement **best** explains why Arizona lizards have difficulty surviving in Michigan?
- A** They have the ability to live both on land and in the water.
 - B** They are unable to live where temperatures are lower than 30°F (-1.1°C).
 - C** They have the ability to live where temperatures are above 100°F (37.8°C).
 - D** They are unable to live where there is no water.

- 16** Which statement **best** describes organisms in a food web?
- A** Producers acquire energy directly from the consumers.
 - B** Consumers acquire energy indirectly from the Sun.
 - C** Decomposers acquire energy directly from the Sun.
 - D** Producers acquire energy indirectly from the decomposers.

- 17** When a solid substance is heated, individual molecules
- A** move faster.
 - B** move slower.
 - C** break apart into atoms.
 - D** do not change speed or direction.

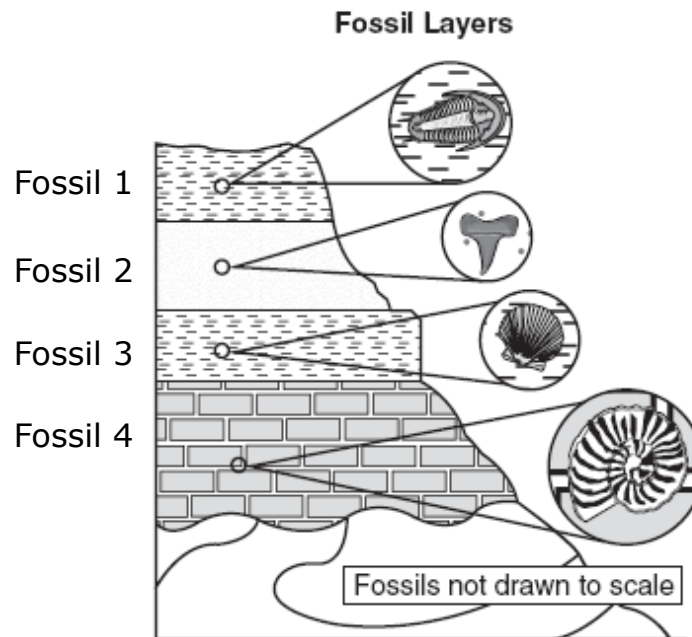
- 18** Fog would **most likely** occur when
- A** cool rain falls on warmer ground.
 - B** air pressure increases and water vapor decreases.
 - C** relative humidity decreases and dew point decreases.
 - D** moist air passes over cooler ground causing condensation.

- 19** Which characteristic of Earth is **most** responsible for our seasons?
- A** Earth's gravitational pull on the moon
 - B** Earth's rotation
 - C** Earth's mass
 - D** Earth's tilt on its axis

- 20** On a hot day, a glass containing ice water slowly collects liquid on the outside of the glass. Which statement **best** explains where this liquid come from?
- A** Air molecules outside of the glass turned to liquid on the outside surface of the glass.
 - B** Water from the inside of the glass seeped to the outside of the glass.
 - C** Water vapor from the air outside of the glass condensed on the outside surface of the glass.
 - D** Water from inside the glass and water from the air outside the glass combined on the outside of the glass.

- 21** During a scientific investigation, when should measurements be recorded?
- A** when forming a hypothesis
 - B** when designing an experiment
 - C** when communicating results
 - D** when gathering data

- 22** The diagram below shows exposed rock layers. Each rock layer contains a fossil of a different organism.



Which fossil **most likely** represents the oldest form of life?

- A** Fossil 1
- B** Fossil 2
- C** Fossil 3
- D** Fossil 4

- 23** Four students work in a group to learn how rocks are formed. The teacher gives each of them a blue crayon and a red crayon and tells them to follow the steps on the board, as shown below.

How Rocks are Formed

Step	Activity
1	Break up the red and blue crayons into tiny pieces.
2	Put the pieces in your hand and squeeze them together to form a red-and-blue-speckled slab.
3	Place the slab in a beaker, and place the beaker on a hot plate to melt the slab.
4	Place the beaker with the melted slab into a bucket of ice to cool it down.

Which step **best** represents how a sedimentary rock is formed?

- A** Step 1
- B** Step 2
- C** Step 3
- D** Step 4

- 24** Joe determined the mass of four rock samples. Then, he put each rock sample in a cup of vinegar for three days. The table below represents the data he collected during his investigation.

Rock Sample Data

Rock Sample	Mass of Rock Before Placed in Vinegar (g)	Mass of Rock After Placed in Vinegar (g)	Observations
1	10	10	no change
2	20	20	no change
3	15	10	some bubbles
4	15	5	many bubbles

Which statement is the **best** conclusion from the rock sample data?

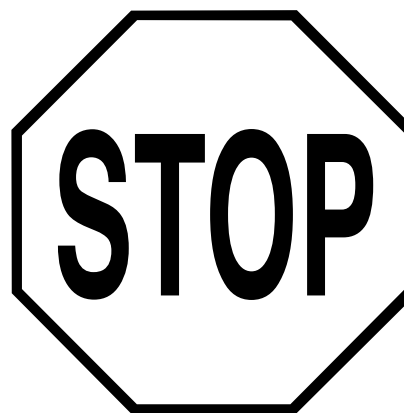
- A** Rocks 1 and 2 are the same type of rock.
 - B** Rock 4 is an igneous rock.
 - C** Rocks 3 and 4 are chemically changed.
 - D** Rocks 1, 2, 3, and 4 are the same type.
- 25** What is the **main** reason for clearly recording the procedures for an experiment?
- A** so the experiment can be modified
 - B** so the experiment can be connected
 - C** so the experiment can be repeated
 - D** so the experiment can be summarized

26 A group of students predicts that folding an index card into a different shape will result in a chemical change. Which step of the scientific process is this?

- A** experiment
- B** observation
- C** hypothesis
- D** conclusion

27 In Michigan, it is warmer in summer than in winter because in summer

- A** Earth is closer to the Sun.
- B** there are fewer clouds.
- C** the Sun's rays hit Michigan more directly.
- D** Michigan is tilted away from the Sun.



You have been working on Part X.

If you finish early, you may go back and check your work for Part X only.

Do NOT work on any other part of this test until you are told to do so.

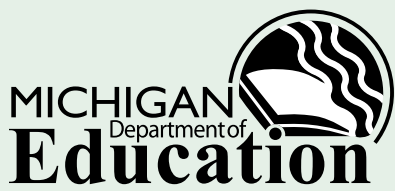
Item Number	Correct Answer	Standard/ Benchmark	Description
1	B	L.OL.07.23	Describe how cells in all multicellular organisms are specialized to take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or organism needs.
2	B	L.OL.07.62	Explain that carbon dioxide and water are used to produce carbohydrates, proteins, and fats.
3	C	L.OL.07.61	Recognize the need for light to provide energy for the production of carbohydrates, proteins and fats.
4	A	S.RS.07.11	Evaluate the strengths and weaknesses of claims, arguments, and data.
5	B	E.SE.06.41	Compare and contrast the formation of rock types (igneous, metamorphic, and sedimentary) and demonstrate the similarities and differences using the rock cycle model.
6	D	E.ST.06.31	Explain how rocks and fossils are used to understand the age and geological history of the Earth (timelines and relative dating, rock layers).
7	B	P.CM.06.11	Describe and illustrate changes in state, in terms of the arrangement and relative motion of the atoms or molecules.
8	C	L.OL.07.21	Recognize that all organisms are composed of cells (single cell organisms, multicellular organisms).
9	D	S.IP.07.12	Design and conduct scientific investigations.
10	D	L.EC.06.21	Describe common patterns of relationships between and among populations (competition, parasitism, symbiosis, predator/prey).
11	D	L.EC.06.23	Predict how changes in one population might affect other populations based upon their relationships in the food web.
12	C	E.ES.07.41	Explain how human activities (surface mining, deforestation, overpopulation, construction and urban development, farming, dams, landfills, and restoring natural areas) change the surface of the Earth and affect the survival of organisms.
13	A	P.CM.07.23	Describe the physical properties and chemical properties of the products and reactants in a chemical change.

Item Number	Correct Answer	Standard/ Benchmark	Description
14	C	S.RS.07.11	Evaluate the strengths and weaknesses of claims, arguments, and data.
15	B	L.EV.05.12	Describe the physical characteristics (traits) of organisms that help them survive in their environment.
16	B	L.OL.06.51	Classify producers, consumers, and decomposers based on their source of food (the source of energy and building materials).
17	A	P.CM.06.11	Describe and illustrate changes in state, in terms of the arrangement and relative motion of the atoms or molecules.
18	D	E.ES.07.81	Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.
19	D	E.ES.05.61	Demonstrate and explain seasons using a model.
20	C	E.ES.07.81	Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.
21	D	S.IP.07.12	Design and conduct scientific investigations.
22	D	E.ST.06.31	Explain how rocks and fossils are used to understand the age and geological history of the Earth (timelines and relative dating, rock layers).
23	B	E.SE.06.41	Compare and contrast the formation of rock types (igneous, metamorphic, and sedimentary) and demonstrate the similarities and differences using the rock cycle model.
24	C	P.CM.07.21	Identify evidence of chemical change through color, gas formation, solid formation, and temperature change.
25	C	S.IP.07.12	Design and conduct scientific investigations.
26	C	S.IP.07.12	Design and conduct scientific investigations.
27	C	E.ES.05.61	Demonstrate and explain seasons using a model.

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