Grade 5

meap™
Michigan Educational Assessment Program

Item Descriptors

5th

8th

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SCIENCE
FALL 2011

MICHIGAN STATE BOARD OF EDUCATION

STATEMENT OF ASSURANCE OF COMPLIANCE WITH FEDERAL LAW

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NOTE: For each item listed throughout this booklet, the first statement is the Michigan Science Curriculum Framework (MSCF) benchmark and the second statement is the descriptor for the item's stem or question. Note that some items only occur in certain forms as indicated by the form numbers in parenthesis after the item numbers (i.e., F1=Form 1, F2=Form 2, etc.).

Students were instructed to read the directions below silently as the test administrator read them aloud.

PART 1

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 Part 1 of 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. No additional paper may be used.

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 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 in Part 1 of the test **ONLY**. Check to make sure that you have answered every question. Do **NOT** look at any other part of the test.

NOTE: The directions for Part 2 are the same as the above instructions.

1 **L.OL.03.31:** Describe the function of the following plant parts: flower, stem, root, and leaf.

Based on the observed characteristics of a plant stem and data about plant stem process, draw the correct conclusion regarding a function of a plant stem.

A selected a conclusion that misinterprets the characteristics and data

B selected a conclusion that has no basis in the provided characteristics and data

C correct, selected a function of a plant stem

D selected a conclusion that has no basis in the provided characteristics and data

2 **(F1) L.OL.04.16:** Determine that animals require air, water, a source of energy, and building material for growth and repair.

Given a table of data that compares the number of similar animals observed during different seasons of the year when temperatures vary greatly, select the reason that best explains the difference in the number of animal counts.

A selected a reason not supported by the seasonal characteristics or the animal counts

B selected a reason not supported by the seasonal characteristics or the animal counts

C correct, recognized the animal count difference is supported by the availability of resources by season

D selected a reason that uses a fact not implied by season, nor agrees with the animal count numbers

2 **(F2) L.OL.04.15:** Determine that plants require air, water, light, a source of energy, and building material for growth and repair.

Based on the description of the environment, the care a plant received, and its subsequent poor appearance, select the most likely cause for the plant's appearance.

A incorrectly selected a plant resource that was not lacking, not a reason for the plant's poor appearance

B incorrectly selected a plant resource that was not lacking, not a reason for the plant's poor appearance

C incorrectly selected a plant resource that was not lacking, not a reason for the plant's poor appearance

D correct, selected the most likely cause for the plant's appearance

2 **(F3) L.OL.04.15:** Determine that plants require air, water, light, a source of energy, and building material for growth and repair.

Recognize the need for plants to store energy.

A selected a concept that does not provide nutrition needed by the plant

B correctly recognized how the plant used stored energy to survive

C selected a concept that does not provide nutrition needed by the plant

D selected a concept that does not provide nutrition needed by the plant

2 (F4) L.OL.03.32: Identify and compare structures in animals used for controlling body temperature, support, movement, food-getting, and protection (for example: fur, wings, teeth, scales).

Recognize the three distinct animal body features that enable it to survive against a specified environmental threat.

A selected a set of three features where only two protect the animal from the environmental threat

B selected the three body features that shield the animal from the environmental threat

C selected a set of three features where only one protects the animal from the environmental threat

D selected a set of three features where only two protect the animal from the environmental threat

2 (F5) L.OL.03.41: Classify plants on the basis of observable physical characteristics (roots, leaves, stems, and flowers).

When classifying live plants by observed characteristics, recognize which method requires handling the plant to observe the classifying characteristic.

A selected a characteristic that can be observed without handling a plant

B selected a characteristic that can be observed without handling a plant

C correct, a researcher would need to disturb a plant in its environment to observe this characteristic.

D selected a characteristic that can be observed without handling a plant

3 L.OL.03.42: Classify animals on the basis of observable physical characteristics (backbone, body coverings, limbs).

Given two sets of three animal pictures by type, identify a physical characteristic that is common to one set of animals but not present in the other set of animals.

A correct, identified the common characteristic

B selected a characteristic not common within either set of animals

C selected a characteristic not common within either set of animals

D selected a characteristic that exists in both sets of animals, but is not common within either set

4 S.IA.04.11: Summarize information from charts and graphs to answer scientific questions.

Given a bar graph with data on animal population size across 20-year intervals, estimate the koala bear population size for the upcoming future 20-year period, based on trend.

A selected an underestimate of the future koala bear population

B selected an underestimate of the future koala bear population

C selected an overestimate of the future koala bear population

D recognized the correct estimate of the future koala bear population

5 **S.IP.04.11:** Make purposeful observation of the natural world using the appropriate senses.

Based on an observation about the different shapes of the same body part between two animals, identify the appropriate research question regarding the observed differences in the animal feature.

A selected a research question that considers an animal characteristic not necessarily related to the observed body part

B correct, selected the research question that considers how the different shapes and sizes of the body part affect the function of the body part.

C selected a research question that disregards the observed difference in the common body part

D selected a research question that disregards the observed difference in the common body part

6 **(F1) S.IA.04.11:** Summarize information from charts and graphs to answer scientific questions.

Using data provided in a chart regarding organism growth in relation to the presence or absence of a treatment variable, draw the correct conclusion on the effects of the treatment variable.

A selected a conclusion about organism growth not reflected by the variability of the growth data

B selected a conclusion about organism growth for which data were not provided

C correct, selected the conclusion indicating how treatment variable affects organism growth

D selected a conclusion about organism growth not reflected by the variability of the growth data

6 **(F2) S.IA.04.11:** Summarize information from charts and graphs to answer scientific questions.

Given summary information in a bar graph, recognize a correct conclusion based on the graph.

A selected a fact not based on information provided by the graph

B selected a conclusion and evaluation that was not based on the information provided by the graph

C selected an opinion that could be another research inquiry based on the graph

D selected the correct conclusion based on the information provided by the graph

6 **(F3) S.IA.04.12:** Share ideas about science through purposeful conversation in collaborative groups.

Recognize the best methods for communication of scientific results.

A left the understanding of the investigation results to uncontrolled interpretation

B left the understanding of the investigation results to uncontrolled interpretation

C left the understanding of the investigation results to uncontrolled interpretation

D selected the best form of communication and information presentation of the results

6 **(F4) S.IA.04.12:** Share ideas about science through purposeful conversation in collaborative groups.

Given four choices, select the best method to share and communicate information regarding the specified task.

A selected a communication method that addressed a limited audience

B correct, selected a method that would present results to the broadest audience

C selected a communication method that addressed a limited audience

D selected a communication method that addressed a limited audience

6 **(F5) S.IA.04.13:** Communicate and present findings of observations and investigations.

Given four methods, identify the tool and activity a researcher would use to best share his research findings.

A correctly selected the tool and activity that provides the research findings to an audience

B selected a tool and activity that only shows how research data were gathered

C selected a tool and activity that only shows how the researcher carried out a data gathering trial

D selected a tool and activity that only shows how the researcher carried out data calculations

7 **P.PM.04.16:** Measure the weight (spring scale) and mass (balances in grams or kilograms) of objects.

Based on an illustrated use of a spring scale to measure two different objects, draw the correct conclusion regarding how the objects differ.

A selected an incorrect conclusion for which a spring scale does not provide a measure

B selected an incorrect conclusion for which a spring scale does not provide a measure

C correct, selected the conclusion how the two objects differ based on measurement using a spring scale

D selected an incorrect conclusion for which a spring scale does not provide a measure

8 (F1) P.PM.04.23: Compare and contrast the states (solids, liquids, gases) of matter.

Identify water by its name as it exists in three separate states of matter.

A correct, identified names of water where it exists as a solid, as a liquid, and as a gas

B selected one name for water as a solid, and two for it as a liquid

C selected three names for water as it exists in a liquid state

D selected two names for water as a solid, and one for it as a liquid

8 (F2) P.PM.02.14: Measure the volume of liquids using common measuring tools (graduated measuring cups, measuring spoons, graduated cylinders, and beakers).

Identify the measuring units provided by the specified measurement tool.

A selected incorrect units of measure provided by the measurement tool

B selected incorrect units of measure provided by the measurement tool

C selected incorrect units of measure provided by the measurement tool

D correct, selected the units of measure provided by the measurement tool

8 (F3) P.PM.03.51: Demonstrate how some materials are heated more than others by light that shines on them.

Predict the most likely outcome of an investigation, based on the effect of sunlight on different color objects.

A selected a prediction that implies no understanding regarding the effects of sunlight on different color objects

B correctly identified the likely outcome from the effect of incident sunlight on different color objects

C selected a prediction that implies no understanding regarding the effects of sunlight on different color objects

D selected a prediction that implies no understanding regarding the effects of sunlight on different color objects

8 (F4) P.PM.04.34: Demonstrate that non-magnetic objects are affected by the strength of the magnet and the distance away from the magnet.

Given pictures of two magnets indicating each magnet's relative strength, identify the best magnet for a specified task.

A selected incorrect magnet though appropriate distance for demonstration of the magnet's force

B selected incorrect magnet and the wrong distance for demonstration of the magnet's force

C correctly selected the magnet and the appropriate distance for demonstration of the magnet's force

D selected the correct magnet, however the wrong distance for demonstration of the magnet's force

8 **(F5) P.PM.04.23:** Compare and contrast the states (solids, liquids, gases) of matter.

Identify water by its name as it exists in three separate states of matter.

A correct, identified names of water where it exists as a solid, as a liquid, and as a gas

B selected one name for water as a solid, and two for it as a liquid

C selected three names for water as it exists in a liquid state

D selected two names for water as a solid, and one for it as a liquid

9 **P.PM.02.13:** Measure the length of objects using rulers (centimeters) and meter sticks (meters).

Given an illustration in which a scientific tool is used to measure an object, select the best estimate of the specified measure.

A selected an incorrect estimate of the specified measure

B selected an incorrect estimate of the specified measure

C correctly estimated the specified measure of the object

D selected an incorrect estimate of the specified measure

10 **P.PM.02.12:** Describe objects and substances according to their properties (color, size, shape, texture, hardness, liquid or solid, sinking or floating).

Given seven common objects arranged in pairs, identify which pair of objects will float and which pair of objects will sink in water

A made an incorrect choice where one object sinks among the pair that is indicated to float

B made an incorrect choice where both objects sink among the pair that is indicated to float

C made an incorrect choice where both objects sink among the pair that is indicated to float

D correctly selected the pair of objects that float and the pair of objects that sink

11 **(F1) P.PM.04.53:** Identify objects that are good conductors or poor conductors of heat and electricity.

Given a set of four properties which describe an inanimate material, select the type of material.

A selected material that cannot exhibit one of the four properties

B selected material that cannot exhibit one of the four properties

C selected material that cannot exhibit two of the four properties

D correct, selected material that can exhibit all four properties

11 (F2) P.PM.04.17: Measure volumes of liquids in milliliters and liters.

Given a container with a known volume, use a specified proportion of that volume as comparison to estimate an unknown volume.

A did not select a proportional volume

B over estimated the unknown volume

C correctly determined the estimated volume of the specified container

D underestimated the unknown volume

11 (F3) P.PM.02.12: Describe objects and substances according to their properties (color, size, shape, texture, hardness, liquid or solid, sinking or floating).

Given a set of three familiar objects, identify three properties common to all three objects.

A selected a set of three properties where one property is absent for all three objects

B selected a set of three properties where one property is absent for all three objects

C selected a set of three properties where two properties are absent for all three objects

D correctly selected the set of three properties common across all three objects

11 (F4) P.PM.04.53: Identify objects that are good conductors or poor conductors of heat and electricity.

Given a set of four properties that describe an inanimate material, select the type of material.

A selected material that cannot exhibit one of the four properties

B selected material that cannot exhibit one of the four properties

C selected material that cannot exhibit two of the four properties

D correct, selected material that can exhibit all four properties

11 (F5) P.PM.04.16: Measure the weight (spring scale) and mass (balances in grams or kilograms) of objects.

Select the appropriate scientific tool to measure a specified characteristic of an object.

A selected the wrong tool to measure the specified characteristic

B selected the wrong tool to measure the specified characteristic

C selected the wrong tool to measure the specified characteristic

D correctly selected the appropriate scientific tool to measure the specified characteristic of the object

12 **P.PM.03.52:** Explain how we need light to see objects: light from a source reflects off objects and enters our eyes.

Understand the path light travels from source, object, and eyes in order to see an object.

A selected an incomplete light path that does not enable vision

B selected an incorrect and incomplete light path that does not enable vision

C selected an incorrect light path that does not enable vision

D selected the correct light path that does enable vision

13 **P.CM.04.11:** Explain how matter can change from one state (liquid, solid, gas) to another by heating and cooling.

Understand why the amount of liquid, after time, is missing from the original amount of the liquid placed on a heat source.

A selected an incorrect reason that indicated the missing liquid happened when a change in state occurred in the air around the liquid

B correct, reasoned that the heat source caused some of the liquid to change and escape as an invisible state of matter

C selected an incorrect reason that indicated the liquid appears to have decreased because it reflects light

D selected an incorrect statement that indicated the gas around the liquid caused the liquid to change from a solid to a liquid

14 **(F1) P.FM.03.42:** Identify changes in motion (change direction, speeding up, slowing down).

Based on the description, recognize the correct change in direction and correct change in speed of a specified object relative to the group of remaining objects

A selected an incorrect description about the object's change in speed and direction relative to the group of objects

B selected correct description of the specified object's change in speed and direction relative to the group of objects

C selected an incorrect description about the object's change in speed and direction relative to the group of objects

D selected an incorrect description about the object's change in speed and direction relative to the group of objects

14 **(F2) P.FM.03.22:** Identify the force that pulls objects towards Earth.

Recognize how the force of gravity acts on a specified object in Earth's atmosphere.

A selected an effect that is opposite of gravity's actual effect on the object

B selected the correct description of gravity's effect on the object

C selected a change in the object that is not caused by gravity

D selected a change in the object that is not caused by gravity

14 (F3) P.FM.03.35: Describe how a push or a pull is a force.

Recognize the source of the force used to move an object.

A selected an incorrect source of force

B correctly recognized the source of the force that moved the object as described

C selected an incorrect source of force

D selected an incorrect source of force

14 (F4) P.FM.03.36: Relate a change in motion of an object to the force that caused the change of motion.

Identify the type of force needed to change the specified motion of an object.

A selected a type of force that would not change the motion of the object

B selected the correct type of force, however incorrectly described how the force would change the object's motion

C correctly selected the type of force that would change the specified motion of the object

D selected a type of force that would not change the motion of the object

14 (F5) P.FM.03.42: Identify changes in motion (change direction, speeding up, slowing down).

Based on the description, recognize the correct change in direction and correct change in speed of a specified object relative to the group of remaining objects

A selected an incorrect description about the object's change in speed and direction relative to the group of objects

B selected correct description of the specified object's change in speed and direction relative to the group of objects

C selected an incorrect description about the object's change in speed and direction relative to the group of objects

D selected an incorrect description about the object's change in speed and direction relative to the group of objects

15 **S.IA.04.14:** Develop research strategies and skills for information gathering and problem solving.

Given a mixture of two common, different substances of approximately the same grain size, identify the correct procedure to separate the two substances of the mixture

A selected an incorrect procedure and tools to separate the two substances that relied on non-existent substance properties

B selected an incorrect procedure and tools to separate the two substances since the tools were inadequate for substance separation

C selected the correct procedure and tools to separate the two substances based on different properties between substances

D selected the correct procedure and tools but did not recognize the difference in properties of the substances, so the results anticipated will not be obtained

16 **E.SE.03.14:** Recognize that rocks are made up of minerals.

From a list of four substances, select the type of substance that forms rocks.

A selected a substance that is not a solid mineral

B correctly selected a mineral substance

C selected a substance that is not a mineral

D selected a substance that is not a solid mineral

17 **(F1) E.FE.02.13:** Describe the properties of water as a liquid (visible, flowing, shape of container) and recognize rain, dew, and fog as water in its liquid state.

From a listing of three properties of matter, identify the correct pair of properties that apply to a liquid.

A selected two properties of matter that are not properties of a liquid

B selected two properties of matter where one is not a property of a liquid

C selected two properties of matter where one is not a property of a liquid

D correctly identified the two properties of matter that apply to a liquid

17 **(F2) E.FE.02.13:** Describe the properties of water as a liquid (visible, flowing, shape of container) and recognize rain, dew, and fog as water in its liquid state.

Recognize the name for liquid water that occurs under the described weather conditions.

A correctly selected the name for liquid water that forms under the described conditions

B selected a name for solid water

C selected the name for a water cycle process

D selected the name for a water cycle process

17 (F3) E.FE.02.14: Describe the properties of water as a solid (hard, visible, frozen, cold) and recognize ice, snow, and hail as water in its solid state.

Based on the data provided, select the category having most time where water occurred in a specified state of matter.

A selected a category having more time with water in states of matter other than the specified state

B selected a category having less time with water in the specified state of matter than another category

C selected the correct category having most time with water in the specified state of matter

D selected a category having more time with water in states of matter other than the specified state

17 (F4) E.FE.02.14: Describe the properties of water as a solid (hard, visible, frozen, cold) and recognize ice, snow, and hail as water in its solid state.

Identify the name for solid water that occurs as a result of specified weather and temperature conditions.

A selected a name for a type of liquid water

B selected a name for solid water not formed under the specified conditions

C correctly named the type of solid water based on described conditions

D selected a name for solid water not formed under the specified conditions

17 (F5) E.FE.02.21: Describe how rain collects on the surface of Earth and flows downhill into bodies of water (streams, rivers, lakes, oceans) or into the ground.

Recognize the direction in which water is most likely to flow.

A selected an incorrect reason to explain the basis for water flow

B selected an incorrect reason to explain the basis for water flow

C selected an incorrect reason to explain the basis for water flow

D selected the correct basis for the direction in which water flows

18 E.SE.03.31: Identify Earth materials used to construct some common objects (bricks, buildings, roads, glass).

Relate existing Earth materials to man-made products.

A selected a wrong product as derived from the specified Earth material

B selected a wrong product as derived from the specified Earth material

C selected the product that is made from the specified Earth material

D selected a wrong product as derived from the specified Earth material

19 **E.ES.03.44:** Recognize that paper, metal, glass, and some plastics can be recycled.

From the list of four human conservation behaviors, identify which behavior is a recycling activity.

A selected a reuse conservation behavior

B selected a reuse conservation behavior

C selected a reuse conservation behavior

D correct, selected a behavior that recycles a resource for a yet-to-be-determined later use

20 **(F1) E.ST.04.21:** Describe the orbit of the Earth around the Sun as it defines a year.

From a list of four fact statements regarding the orbits or motion of the Earth, moon, and Sun, identify the correct statement in terms of time.

A selected an incorrect statement about a celestial object's motion and time

B correctly selected the statement about the time required for the described motion of a specific celestial object

C selected an incorrect statement about a celestial object's motion and time

D selected an incorrect statement about a celestial object's motion and time

20 **(F2) E.ST.04.11:** Identify the Sun and moon as common objects in the sky.

Understand the size illusion of the moon compared to larger objects in Space.

A selected a wrong concept as basis for the size illusion of the moon

B selected a wrong concept as basis for the size illusion of the moon

C selected a wrong concept as basis for the size illusion of the moon

D recognized how smaller yet closer objects can appear to be bigger

20 **(F3) E.ST.04.21:** Describe the orbit of Earth around the Sun as it defines a year.

Recognize the type of motion Earth completes in a specified period of time.

A correctly recognized the motion Earth completes in the specified unit of time

B selected a motion in which the Earth does not engage

C selected a motion in which the Earth does not engage

D selected a motion in which the Earth does not engage

20 (F4) E.ST.04.22: Explain that the spin of Earth creates day and night.

Recognize Earth's motion that produces daytime and nighttime.

A selected an incorrect statement about Earth's motion which cannot produce the daytime and nighttime cycle

B correctly recognized the motion of Earth that produces the daytime and nighttime cycle

C selected an incorrect statement about Earth's motion which cannot produce the daytime and nighttime cycle

D selected an incorrect statement about Earth's motion which cannot produce the daytime and nighttime cycle

20 (F5) E.ST.04.23: Describe the motion of the moon around Earth.

Understand moon motion in relation to Earth.

A correctly recognized the motion of the moon relative to Earth

B incorrectly selected a statement about Earth's motion relative to the moon

C incorrectly selected a statement about Earth's motion relative to the moon

D incorrectly selected a statement about the moon's motion relative to Earth

21 E.ES.03.52: Describe helpful or harmful effects of humans on the environment (garbage, habitat destruction, land management, renewable, and non-renewable resources).

Given a land management situation regarding removal of excess water, identify the best method to remove the excess water.

A selected a land management activity that will enable more excess water accumulation

B selected a land management activity that will enable more excess water accumulation

C correct, selected the best land management method to remove excess water and prevent excess water accumulation

D selected a land management method that will merely move, if successful, the excess water from one location to another location, which would then have excess water

22 **S.IP.04.13:** Plan and conduct simple and fair investigations.

Given a list of four research activities, identify the best activity that will substantiate a previously made scientific conclusion.

A selected a research activity that will only lead to hypotheses from which to study the conclusion

B selected a research activity that will only process or reprocess the existing basis for the scientific conclusion

C selected a research activity that only engenders plans for future research

D correctly selected the research process that will gather additional data to further support or detract from the scientific conclusion

23 **S.RS.04.16:** Identify technology used in everyday life.

Among four sources of evidence, identify the best technology used to confirm a specified conclusion.

A inappropriately selected outdated records as the best reference to confirm a modern conclusion

B correct, selected the best source of evidence based on technology to support the conclusion

C selected a source of incomplete evidence as the best to confirm the conclusion

D selected a source of incomplete evidence as the best to confirm the conclusion

24 **(F1) S.IP.04.14:** Manipulate simple tools that aid observation and data collection (for example: hand lens, balance, ruler, meter stick, measuring cup, thermometer, spring scale, stop watch/ timer, graduated cylinder/beaker).

Given a list of four scientific tools, identify the two tools most useful to measure a specific human performance task.

A selected a pair of tools among which both would not have the most accurate application to measure the task

B selected a pair of tools among which one tool would not have the most accurate application to measure the task

C selected a pair of tools among which one tool would not have the most accurate application to measure the task

D correctly selected the pair of tools that would provide the most accurate measure of data for the performance task

24 **(F2) S.IP.04.11:** Make purposeful observations of the natural world using the appropriate senses.

Identify the best pattern description of an illustrated natural phenomena.

A selected a description that does not fit the displayed pattern

B selected a description that does not fit the displayed pattern

C selected a description that does not fit the displayed pattern

D selected the best description of the pattern displayed in the illustration

24 (F3) S.IP.04.11: Make purposeful observations of the natural world using the appropriate senses.

Using a table of results from a described investigation, select the appropriate conclusion for the investigation.

A selected a conclusion that is not supported by the data from the investigation

B selected a conclusion that is not supported by the data from the investigation

C selected the correct conclusion based on the investigation's data

D selected a conclusion that is not supported by the data from the investigation

24 (F4) S.IP.04.12: Generate questions based on observations.

Identify the research question associated with a described observation scenario.

A selected a research question for which variable manipulation did not occur.

B correctly identified the research question based on the observation of outcomes after systematic manipulation of variables

C selected a research question for which variable manipulation did not occur.

D selected a research question for which variable manipulation did not occur.

24 (F5) S.IP.04.16: Construct simple charts and graphs from data and observations.

Given a table of data, recognize the graph that accurately presents specified data from the table.

A correct, selected the graph that accurately represents the data by category

B selected a graph that misrepresents the data by category

C selected a graph that misrepresents the data by category

D selected a graph that misrepresents the data by category

25 S.RS.04.16: Identify technology used in everyday life.

Among a list of four scientific tools or devices, identify the best tool for preparation of a graph.

A selected a tool that can prepare a picture of a graph, not prepare the graph.

B correct, selected the tool that can process entered data and illustrate the data in many graph forms

C selected a tool that can present a picture or video of a graph, not prepare the graph

D selected a tool that can present a picture or video of a graph, not prepare the graph

26 **S.RS.04.11:** Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.

Given a list of four different methods of presentation to a group, select the best practice to demonstrate a specified model of planetary rotation.

A selected a practice that only presents an audio description of planetary motion

B selected a practice that only represents a two-dimensional illustration of planetary motion

C correct, recognized the best practice, which provides a three-dimensional model of planetary motion

D selected a presentation that does not address the subject of interest

27 **E.FE.02.12:** Identify household uses of water (drinking, cleaning, food preparation).

From the list of four water uses, identify which of the four is a household use of water.

A correct, selected the household use of water

B selected a community use of water

C selected a business use of water

D selected a business use of water

28 **(F1) E.SE.03.13:** Recognize and describe different types of Earth materials (mineral, rock, clay, boulder, gravel, sand, soil, water, and air).

Recognize a characteristic of a specified Earth material and the basis for its specified used.

A selected a characteristic that does not meet the requirement of the material needed

B selected a characteristic that is not a property of the specified Earth material

C selected a characteristic that does not meet the requirement of the material needed

D correctly selected a characteristic of the Earth material which will meet the specified material requirements

28 **(F2) E.SE.03.14:** Recognize that rocks are made up of minerals.

Recognize the characteristic that universally applies to rocks

A selected an untrue statement since there is no difference in this feature between the rock and its components

B selected a statement about rock characteristics and its component's characteristics that is not true

C selected the correct characteristic regarding rock composition

D selected a statement that incorrectly reverses the scale of a rock and its components

28 (F3) E.SE.03.31: Identify Earth materials used to construct some common objects (bricks, buildings, roads, glass).

Recognize which Earth materials are used for construction.

A misclassified the listed Earth materials

B misclassified the listed Earth materials

C correctly classified the Earth materials used for construction

D misclassified the listed Earth materials

28 (F4) E.SE.02.21: Describe the major landforms of the surface of the Earth (mountains, plains, plateaus, valleys, hills).

Identify the pair of landforms in which both have the specified feature.

A selected a pair of landforms where only one had the specified feature

B correct, both landforms in the pair have the specified feature

C selected a pair of landforms where only one had the specified feature

D selected a pair of landforms where only one had the specified feature

28 (F5) E.SE.02.21: Describe the major landforms of the surface of Earth (mountains, plains, plateaus, valleys, hills).

Distinguish a specified landform based on its typical characteristics.

A selected a land form that does not exhibit the typical characteristics provided

B selected a land form that does not exhibit the typical characteristics provided

C correctly identified the landform that exhibits the characteristics provided

D selected a land form that does not exhibit the typical characteristics provided

29 E.FE.02.14: Describe the properties of water as a solid (hard, visible, frozen, cold) and recognize ice, snow, and hail as water in its solid state.

Given four statements, recognize the statement that best describes examples of water as a solid.

A selected an incorrect statement regarding the state of matter of one of the examples

B selected the correct statement regarding the state of matter for both examples

C selected an incorrect statement regarding the state of matter of one of the examples

D selected an incorrect statement regarding the state of matter of both examples

30 **E.ST.04.12:** Compare and contrast the characteristics of the Sun, moon and Earth, including relative distances and abilities to support life.

A Venn diagram shows features common to Earth and the moon. Identify, from a list of four other features, that feature also common to both Earth and moon.

A correct, selected a feature that is common for both Earth and moon

B selected a feature that only applies to Earth

C selected a feature that only applies to Earth

D selected a feature that only applies to Earth

31 **(F1) E.ES.03.51:** Describe ways humans are dependent on the natural environment (forests, water, clean air, Earth materials) and constructed environments (homes, neighborhoods, shopping malls, factories, and industry).

Given a list of four pairs of natural resource materials, identify the pair of resources most used as materials to build a specified public infrastructure.

A selected a pair of natural resource materials where only one is readily used to build the specified infrastructure

B selected a pair of natural resource materials that historically were used to build the specified infrastructure, but are no longer used for this purpose

C selected a pair of natural resource materials where one material was used in prior years, but is no longer used to build the specified infrastructure, the other material has no use in construction of the infrastructure

D correct, selected the pair of natural resource materials that are readily used to build the specified infrastructure

31 (F2) E.ES.03.41: Identify natural resources (metals, fuels, fresh water, fertile soil, and forests).

Distinguish natural resources from processed resources.

A incorrectly recognized the natural resource as processed and the processed resource as natural

B correctly recognized the natural resource and the processed resource

C correctly recognized the natural resource but also recognized the processed resource as natural

D incorrectly recognized the natural resource as a processed resource, but did recognize the processed resource

31 (F3) E.ES.03.43: Describe ways humans are protecting, extending, and restoring resources (recycle, reuse, reduce, renewal).

Identify the benefits from reusing materials in a specified situation.

A misidentified reuse with another conservation activity, the stated benefit will not occur via reuse

B misidentified the benefit from reuse, the stated benefit does not occur from reuse activity

C misidentified the benefit from reuse, the stated benefit does not occur from reuse activity

D correct, recognized the benefit; reusing materials will decrease demand on limited resources

31 (F4) E.ES.03.44: Recognize that paper, metal, glass, and some plastics can be recycled.

Given a choice of four materials, identify the material that can be recycled.

A selected a material that cannot be recycled

B selected a material that cannot be recycled

C correctly identified the recyclable material

D selected a material that cannot be recycled

31 (F5) E.ES.03.51: Describe ways humans are dependent on the natural environment (forests, water, clean air, Earth materials) and constructed environments (homes, neighborhoods, shopping malls, factories, and industry).

Understand the extent of the processing steps required for the use of various natural resources to build a specified structure.

A selected a natural resource that needs more processing than the correct answer resource before it is used for the intended purpose

B correctly selected the natural resource needing the least processing before its intended use

C selected a natural resource that needs more processing than the correct answer resource before it is used for the intended purpose

D selected a natural resource that needs more processing than the correct answer resource before it is used for the intended purpose

32 **E.ST.04.31:** Explain how fossils provide evidence of the history of the Earth.

Identify the relative age of fossils based on finding these fossils in a specified layer of rock.

A correct, determined the relative fossil age based on the fossil location in layered rock

B the incorrect relative age based on the fossil location in layered rock

C selected a conclusion about the type of animal fossil that might or might not be true

D the incorrect relative age by not using the rock layer location as evidence

33 **(F1) S.RS.04.14:** Use data/samples as evidence to separate fact from opinion.

Given a table of monthly average temperatures in Detroit, identify the correct statement of opinion, rather than fact, based on information in the table.

A selected a statement of fact

B selected a statement of fact

C correct, selected the opinion statement

D selected a statement of fact

33 **(F2) S.RS.04.11:** Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.

Recognize the best type of evidence to verify the hypothesis.

A selected evidence that does not verify the hypothetical properties of the substance

B correctly selected evidence that confirms the hypothetical properties of the specified substance

C selected evidence that does not verify the hypothetical properties of the substance

D selected evidence that does not verify the hypothetical properties of the substance

33 **(F3) S.RS.04.15:** Use evidence when communicating scientific ideas.

Use evidence from a graph to promote the greatest technology change

A a change recommendation that will not provide the greatest change based on evidence

B selected the technology change recommendation supported by the most evidence

C a change recommendation that will not provide the greatest change based on evidence

D a change recommendation that will not provide the greatest change based on evidence

33 (F4) S.RS.04.15: Use evidence when communicating scientific ideas.

Recognize the best scientific technique used to validate a new scientific claim.

A correctly selected the best technique for evaluation of scientific results

B selected a technique that would rely on second hand opinion about the scientific claim and that could include opinions from those not proficient in the specific science

C selected a technique that could be biased and would not include independent review

D selected a technique that enables scientist discussion and opinion sharing but does not repeat the research to check the evidence

33 (F5) S.RS.04.17: Identify current problems that may be solved through the use of technology.

From the four options, select the best technological application to address the specified problem.

A selected a technology that does not satisfy the specified problem

B selected a technology that does not satisfy the specified problem

C selected a technology that does not satisfy the specified problem

D correct, selected a valid and reliable technology that addresses and eliminates the specified problem

34 S.IA.04.12: Share ideas about science through purposeful conversation in collaborative groups.

Given four different methods by which to share and learn the results from all groups who completed the same lab task, identify the best method for communication.

A selected a communication method the does not share all groups' lab results with each lab group

B correct, selected the best communication method where all groups share their own lab results with every other group

C selected a communication method that only shares some of the groups' results with other groups

D selected a communication method where only one group presents its lab results to all other groups

35 P.FM.03.38: Demonstrate when an object does not move in response to a force, it is because another force is acting on it.

Recognize the correct reason why an object does not move though an observed effort (i.e., force) is made to move it.

A selected an incorrect statement that no force was applied to the object

B selected the correct statement that another force is concurrently being applied to the object

C selected the incorrect statement that gravity has no effect on the object

D selected the incorrect statement that gravity increases as a force is applied to the object

36 (F1) P.FM.03.35: Describe how a push or a pull is a force.

Given six items, each made of a common substance, select the pair of objects attracted to a magnet.

A selected a pair of objects where neither is attracted to a magnet

B selected a pair of objects where only one is attracted to a magnet

C correct, selected the pair of objects where each is attracted to a magnet

D selected a pair of objects where neither is attracted to a magnet

36 (F2) P.FM.03.35: Describe how a push or a pull is a force.

Identify the source of the force causing the motion of the specified object.

A misidentified the source of energy enabling the force to move the object

B correct, selected the force acting on the object that causes the object to move in the specified direction

C selected an incorrect force as causing the object to move

D selected an incorrect direction of force that would cause the object to move

36 (F3) P.FM.03.36: Relate a change in motion of an object to the force that caused the change of motion.

Given a situation, recognize the force that caused an object's change in motion.

A correct, recognized the force that acted on the object to change its motion

B selected a force that did not act on the object to change its motion

C selected a statement that stated that energy was a force

D selected a force that did not act on the object to change its motion

36 (F4) P.FM.03.37: Demonstrate how the change in motion of an object is related to the strength of the force acting upon the object and to the mass of the object.

Recognize the effect of a constant force on an object while a changing opposing force is also acting upon the object.

A selected the opposite effect of the constant force in regard to the opposing force

B correct, recognized the effect of the constant force on the object as the opposing force changed

C incorrectly selected a concept that another constant force on the object will change due to the application of the specified constant force

D incorrectly selected a concept that the application of the specified force would eliminate another constant force on the object

36 **(F5) P.FM.03.37:** Demonstrate how the change in motion of an object is related to the strength of the force acting upon the object and to the mass of the object.

Recognize the amount of force required to move objects.

A selected an insufficient amount of force to move the object

B selected an insufficient amount of force to move the object

C correctly recognizes the amount of force needed to move the object

D selected an insufficient amount of force to move the object

37 **P.FM.03.43:** Relate the speed of an object to the distance it travels in a standard amount of time.

An object moved a given distance in a specified time; calculate the object's speed.

A selected an incorrect rate of speed

B selected an incorrect rate of speed

C selected an incorrect rate of speed

D correctly calculated the object's speed

38 **(F1) P.EN.04.51:** Demonstrate how electrical energy is transferred and changed through the use of a simple circuit.

Given six components used in electrical circuits, select the set of three that are needed to prepare a functional closed circuit.

A selected a set of three components that does not include a power source

B selected a set of three components that does not include material to carry the current

C correct, selected the set of three components that can form a complete functional closed circuit

D selected a set of three components that does not include material to carry the current

38 **(F2) P.EN.03.21:** Demonstrate that light travels in a straight path and that shadows are made by placing an object in a path of light.

Understand how shadows occur.

A selected an incorrect statement indicating that shadows are associated with light frequency change

B selected an incorrect statement about light transmission as necessary for shadows to occur

C correct, recognized how shadows occur regarding light transmission

D selected an incorrect statement about the path of light necessary for shadows to occur

38 (F3) P.EN.03.22: Observe what happens to light when it travels from air to water (a straw half in the water and half in the air looks bent).

Understand why objects, reflecting light to the eye through water, appear different compared to the same object reflecting the light to the eye not through water.

A selected the wrong effect regarding light transmission from the object

B correctly recognized that different media (e.g., water) bends the path of light as it transmits through the media to the eye.

C selected the wrong effect regarding light transmission from the object

D selected the wrong effect regarding light transmission from the object

38 (F4) P.EN.03.21: Demonstrate that light travels in a straight path and that shadows are made by placing an object in a path of light.

Understand how shadows occur.

A selected an incorrect statement indicating that shadows are associated with light frequency change

B selected an incorrect statement about light transmission as necessary for shadows to occur

C correct, recognized how shadows occur regarding light transmission

D selected an incorrect statement about the path of light necessary for shadows to occur

38 (F5) P.EN.04.51: Demonstrate how electrical energy is transferred and changed through the use of a simple circuit.

Given six components used in electrical circuits, select the set of three that are needed to prepare a functional closed circuit.

A selected a set of three components that does not include a power source

B selected a set of three components that does not include material to carry the current

C correct, selected the set of three components that can form a complete functional closed circuit

D selected a set of three components that does not include material to carry the current

39 P.EN.04.41: Demonstrate how temperature can be increased in a substance by adding energy.

Describe what will happen to the temperature of a cooler object as soon as a warmer object is placed inside and in contact with the cooler object.

A selected an incorrect description of how the temperature of the cooler object will change

B selected an incorrect description of how the temperature of the cooler object will change

C selected an incorrect description of how the temperature of the cooler object will change

D selected the correct description of how the temperature of the cooler object will change due to heat transfer

40 **P.EN.03.11:** Identify light and sound as forms of energy.

Describe lightning and thunder, using the statements provider.

A selected an incorrect description of lightning and thunder as forms of the same type of energy

B selected an incorrect description of lightning and thunder as forms of the same type of energy

C correctly selected the description of lightning and thunder as forms of energy

D selected an incorrect description of lightning and thunder as forms of the same type of energy

41 **(F1) P.EN.04.52:** Demonstrate magnetic effects in a simple electric circuit.

From a list of six common objects of known material, select the set of three objects needed to make an electromagnet.

A correctly identified the three objects needed to make an electromagnet

B selected an incorrect set of three objects, of which one object cannot be used to make an electromagnet

C selected an incorrect set of three objects, of which one object cannot be used to make an electromagnet

D selected an incorrect set of three objects, of which one object cannot be used to make an electromagnet

41 **(F2) P.EN.03.22:** Observe what happens to light when it travels from air to water (a straw half in the water and half in the air looks bent).

Understand why an object in water is at a location other than where the object is perceived to be when a person views the object from an air environment.

A selected a statement that does not explain the perceptual difference

B selected a statement that does not explain the perceptual difference

C correctly explained the perceptual difference by recognizing that light can be displaced by the media through which it travels

D selected a statement that does not explain the perceptual difference

41 **(F3) P.EN.03.31:** Relate sounds to their sources of vibrations (for example: a musical note produced by a vibrating guitar string, the sounds of a drum made by the vibrating drum head).

Understand how sounds are produced.

A selected a physical process that does not produce sound

B selected a physical process that does not produce sound

C selected a physical process that does not produce sound

D correctly recognized the physical process that produces a sound wave

41 (F4) P.EN.04.42: Describe heat as the energy produced when substances burn, certain kinds of materials rub against each other, and when electricity flows through wire.

Recognize which form of energy is associated with a specified action to obtain that energy as well as obtained as a by product from use of other forms of energy.

A selected the wrong form of energy

B selected the correct form of energy

C selected the wrong form of energy

D selected the wrong form of energy

41 (F5) P.EN.04.43: Describe how heat is produced through electricity, rubbing, and burning.

Recognize that production, intended to produce one type of energy, can concurrently produce other types of energy as a byproduct

A selected an incorrect concept regarding the production of the byproduct energy

B correct, recognized how the production process generated two types of energy

C selected an incorrect concept regarding the production of the byproduct energy

D selected an incorrect concept regarding the production of the byproduct energy

42 P.EN.03.32: Distinguish the effect of fast or slow vibrations as pitch.

Recognize how relative pitch is determined using a illustration and description of a common musical instrument.

A selected an incorrect statement about pitch differences

B selected an incorrect statement about pitch differences

C correctly recognized the basis for pitch difference based on described features of the musical instrument

D selected an incorrect statement about pitch differences

43 (F1) S.RS.04.15: Use evidence when communicating scientific ideas.

Consider and identify a first type of evidence that demonstrates a specified effect from a change in the ecosystem.

A correct, identified one of the first effects from the specified change in the ecosystem

B selected an effect unlikely to happen after the specified change

C selected an effect unlikely to happen after the specified change

D selected an effect that would not be an initial effect after the specified change

43 (F2) S.RS.04.18: Describe the effect humans and other organisms have on the balance of the natural world.

Recognize a negative consequence of human activity within a specified environment.

A correctly identified a negative consequence of the described human activity in a specified environment

B selected a consequence that does not occur due to the human activity

C selected a consequence that does not occur due to the human activity

D selected a positive consequence that would occur due to the human activity

43 (F3) S.RS.03.18: Describe the effect humans and other organisms have on the balance of the natural world.

Recognize the extent of change in an ecosystem, that was previously devoid of human participation, after human construction occurs in the ecosystem.

A selected a incorrect concept that organism population levels remain unchanged in the ecosystem

B selected an unlikely event that the construction will lead to complete elimination for a class of organisms

C selected the incorrect conclusions that one class of organisms will be eliminated, while another class of organisms, though dependent on the missing class, will benefit

D correct, recognized that the prior number of organisms will change after construction, but may or may not be detrimental to long term survival of the ecosystem's organisms

43 (F4) S.RS.04.14: Use data/samples as evidence to separate fact from opinion.

Given a described lab exercise and a table of data based on the exercise, recognize the best source of evidence that supports the conclusion from the lab work.

A correct, recognized the best source of evidence to support the conclusion of the lab project

B selected a process from the lab exercise that is unrelated to the conclusion of the lab project

C selected a step in the scientific process which, if it alone supported the conclusion, would make the lab project unnecessary

D incorrectly indicated that a majority of opinion offset the valid empirical evidence obtained from the project

43 (F5) S.RS.04.15: Use evidence when communicating scientific ideas.

Consider and identify a first type of evidence that demonstrates a specified effect from a change in the ecosystem.

A correct, identified one of the first effects from the specified change in the ecosystem

B selected an effect unlikely to happen after the specified change

C selected an effect unlikely to happen after the specified change

D selected an effect that would not be an initial effect after the specified change

44 S.IP.04.12: Generate questions based on observations.

Identify the research question that would best apply to a specified research topic.

A selected a question that is off topic regarding the specified research topic

B selected a question that is off topic regarding the specified research topic

C selected a question that is off topic regarding the specified research topic

D correct, identified the question that would lead to a relevant, testable hypothesis regarding the specified research topic

45 L.EC.04.21: Explain how environmental changes can produce a change in the food web.

Based on a brief description about an organism and a display of the organism within a food web, identify the most harmful threat to the organism's survival.

A selected a statement that does not reasonably threaten the organism's survival

B selected a statement that would promote the organism's survival

C selected a statement that would have no threat to the organism's survival

D correctly selected the statement where the organism's survival would be threatened by a specific environmental change

46 **L.EV.03.12:** Relate characteristics and functions of observable body parts to the ability of animals to live in their environment (sharp teeth, claws, color, body coverings).

Given one function of an animal's specified body part, identify another function for which the animal can use the same body part.

A selected a survival function not offered by use of this body part

B correct, selected an additional survival function for which the animal can use the specified body part

C selected a survival function not offered by use of this body part

D selected a behavior not exhibited by the type of animal specified nor a possible function of the body part

47 **(F1) L.EV.03.12:** Relate characteristics and functions of observable body parts to the ability of animals to live in their environment (sharp teeth, claws, color, body coverings).

Identify the type of enhanced animal characteristic that would best provide, for the animal, the ability to carry out a specified survival behavior.

A selected an enhanced characteristic not related to the specified animal survival behavior

B selected an enhanced characteristic not related to the specified animal survival behavior

C correct, selected an enhanced characteristic that would facilitate the specified animal survival behavior

D selected an enhanced characteristic not related to the specified animal survival behavior

47 (F2) L.EV.03.11: Relate characteristics and functions of observable parts in a variety of plants that allow them to live in their environment (leaf shape, thorns, odor, color).

Recognize the plant characteristic that is adaptive for survival in a specified environment.

A selected a plant characteristic that is not adaptive for survival in the specified environment

B selected a plant characteristic that is not adaptive for survival in the specified environment

C correctly selected the plant characteristic best adaptive for plant survival in the specified environment

D selected a plant characteristic that is not adaptive for survival in the specified environment

47 (F3) L.EV.04.22: Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.

Recognize how a specified animal relies on its body characteristic to survive.

A selected the body feature that will enable the animal to obtain food and defend itself

B selected a body feature that will reduce the animal's ability to obtain food and defend itself

C selected a body feature that will reduce the animal's ability to obtain food and defend itself

D selected a body feature that will reduce the animal's ability to obtain food and defend itself

47 (F4) L.EV.04.22: Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.

Recognize that differences in observed body features across different types of animals within the same species relate to a unique survival advantage in its environment.

A recognized that the different characteristics between the two animals of the same body part relate to survival advantage (camouflage) specific to each animal's environment

B selected a distinction between the animals that does not necessarily relate to the differences in the specified body feature

C selected a distinction between the animals that does not necessarily relate to the differences in the specified body feature

D selected a true effect regarding the difference between the animal's similar body part; however, this effect is not related to the animal's survival in its unique environment

47 **(F5) L.EV.04.22:** Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.

Using a table of characteristics for 2 plants, identify the characteristic that gives one plant a survival advantage over the other in the specified environment.

A selected a characteristic that is the same for both plants, no advantage

B selected a characteristic that is the same for both plants, no advantage

C selected a characteristic that is the same for both plants, no advantage

D correctly selected the characteristic that gives one plant the survival advantage over the other in the specified environment

48 **L.HE.02.13:** Identify characteristics of plants (for example: leaf shape, flower type, color, size) that are passed on from parents to young.

Identify the best method to predict an attribute of a young organism body feature before this feature can be directly observed.

A selected the use of an observable feature of the young organism though the attribute of this feature is not related to the feature of interest

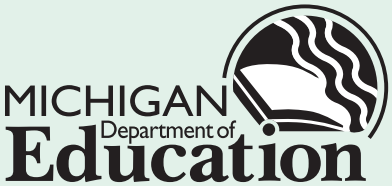
B correct, selected the source of observable data that would provide the best prediction on the attribute of the organism's feature

C selected the use of an observable feature of a similar organism where this feature has no attribute relationship to the feature of interest

D selected the use of an observable feature of the young organism though the attribute of this feature is not related to the feature of interest

5th

8th



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