46 [1] Allow 1 credit for correctly identifying a variable that should be held constant.

Correct answers include:
— temperature
— amount of sunlight
— amount of water
— same location
— same kind of plant/seed
— grow plants in the same kind of soil

47 [1] Allow 1 credit for any height from 9.0 to 10.0 centimeters.

48 [1] Allow 1 credit for stating how the feeding relationships of the mice are different from the feeding relationships of the other organisms in this food web.

Correct answers include:
— The mouse is an omnivore.
— The mouse eats both plants and meat.
— The mouse is both an herbivore and a carnivore.
— The mouse eats both plants and other animals.
— Mice are primary and secondary consumers.
— The mouse eats both producers and herbivores.

49 [1] Allow 1 credit for explaining the connection between the Sun and the plants.

Correct answers include:
— The Sun is used by plants to make food.
— Green plants use the energy from the Sun to produce sugar, then an herbivore eats the plants, and other animals eat the herbivore.
— The plant uses the Sun's energy to produce food, which it passes on to the animals.
— The carnivores get energy from the herbivores. The herbivores get energy from the plants. The plants get energy from the Sun.
— All animals get energy from plants in some way (by eating plants or by eating other animals that eat plants) and plants get their energy from the Sun.

Note: Do *not* allow credit for "The Sun is our main source of energy," as this is stated in the question.

Incorrect answers include*:*
— The Sun gives the food to the plants.
— The Sun makes the plants.
— The Sun is food for plants.

50 [3] • Allow 1 credit for correctly identifying a carnivore: **frogs** *or* **owls** *or* **snakes**

• Allow 1 credit for correctly identifying a producer: **green plants** *or* **plants** *or* **plant**

• Allow 1 credit for correctly identifying a herbivore: **grasshoppers**

Note: The mice are omnivores. Do *not* allow credit for mice in these categories.

51 [1] Allow 1 credit for correctly describing one difference in the patterns of development.

Correct answers include:
— The grasshopper egg develops into a creature that looks like a small adult, while the adult butterfly looks different from the larva.
— The grasshopper just gets bigger, while the butterfly's appearance changes.
— no larva or pupa in grasshopper
— no nymph in butterfly

52 [1] Allow 1 credit for correctly explaining why the rat was identical to its mother.

Correct answers include:
— Because only the mother's skin cell was used in her egg cell, so the baby rat will only have the mother's genes.
— The egg cell was implanted with a complete set of the mother rat's genes, so an identical baby was produced.
— The baby has the same genes and DNA as the mother.
— The baby rat will be the same because it inherited only its mother's genes.
— It is asexual reproduction, so there is only one parent, so all the baby's genes are identical to the parent.
— was no sperm cell
— Asexual reproduction took place.
— Only the mother's DNA (genes) was used.
— cloning
— It is a cloned baby.
— The skin cell contained all the mother's DNA.

Note: Do *not* accept a simple restatement of the information in the diagram. Answers should indicate that all genetic material comes from the same parent.

53 [1] Allow 1 credit for correctly explaining why the babies will not be genetically identical to the mother.

Correct answers include:
— In sexual reproduction, half of the genes come from each parent.
— Sexually reproduced offspring are not identical to either parent.
— The baby rats will be different because they received both the mother's and father's genes.

54 [2] Allow a maximum of 2 credits, 1 credit for each correct way that food is changed as it passes through the digestive system.

Correct answers include:
— Food is compacted in the large intestine.
— Food is turned into liquid.
— Food decomposes in the stomach.
— Food is mechanically digested in the mouth—it is chewed into small pieces.
— Food is chemically digested in the stomach—acids break the food down into liquid.
— Food is broken down.
— Nutrients are separated from waste materials.
— Saliva in the mouth breaks down carbohydrates.
— Stomach acids break down some food.
— Minerals are separated/absorbed.
— It gets broken up.
— chemical changes
— mechanical changes
— physical changes

Incorrect answers include:
— Food is digested.

55 [3] Allow a maximum of 3 credits, 1 for each correct structure accompanied by a correct function.

Correct answers include:

Letter	Plant Structure	Function of Structure
A	Leaf	— respiration — photosynthesis — produce food — absorbs sunlight — transpiration — storage/stores food
B	Stem	— transport nutrients — support — storage — respiration — transpiration — produce food — photosynthesis
C	Roots	— absorption of nutrients/water — transport — anchors the plant — respiration — storage/stores food

56 [1] Allow 1 credit for correctly naming **both** structures: **chloroplast** and **cell wall**

57 [1] Allow 1 credit for **DNA** *or* **genes** *or* **chromosomes**.

Note: Do *not* allow credit for "genetic material."

58 [1] Allow 1 credit for correctly explaining how blubber helps whales to maintain a constant body temperature.

Correct answers include:
— The blubber acts as a layer of insulation from cold ocean waters, keeping body heat inside.
— The blubber keeps the body warm in cold water.
— The blubber provides fuel to burn for heat and energy.
— acts as an insulator

59 [1] Allow 1 credit for correctly explaining how sweating helps humans to maintain a constant body temperature.

Correct answers include:
— The water in the perspiration cools the body when it evaporates.
— Sweating may release heat.
— When sweat evaporates, it causes a cooling effect.

60 [1] Allow 1 credit for correctly explaining how ear size helps foxes to maintain a constant body temperature.

Correct answers include:
— Because heat is lost from the body through the ears, so the size of the ears affects the amount of heat lost.
— The small surface area of the ears of the arctic fox keep heat from being lost to the cold environment.
— Heat can be lost more easily from the large surface area of the ears of the desert fox.
— The size of the ears determines the amount of heat lost from the body.
— Foxes with small ears will release less body heat and foxes with big ears will release more body heat.

61 [1] Allow 1 credit for correctly explaining that some energy is transformed from mechanical energy to heat energy.

Correct answers include:
— The shaking makes the particles move faster and rub against each other and create heat.
— The grains of sand collide when shaken and cause friction.
— Mechanical energy changed to heat.
— Atoms hitting each other increases motion, therefore heat.
— Shaking created friction between the sand particles.
— friction
— The molecules moving against each other cause friction and this causes heat.

62 [1] Allow 1 credit for an appropriate hypothesis.

Correct answers include:
— The temperature of the pebbles will rise when shaken.
— The temperature of the pebbles will stay the same.
— The temperature of the pebbles will decrease when shaken.
— If you shake a container of pebbles, then the temperature will rise because of friction.

63 [1] Allow 1 credit for correctly identifying the dependent (responding) variable.

Correct answers include:
— temperature
— heat of the pebbles
— making the temperature rise
— making the temperature lower
— the pebbles warming up
— the pebbles cooling down

Note: Do *not* allow credit for "friction." Friction is a force and it is not being measured in this experiment.

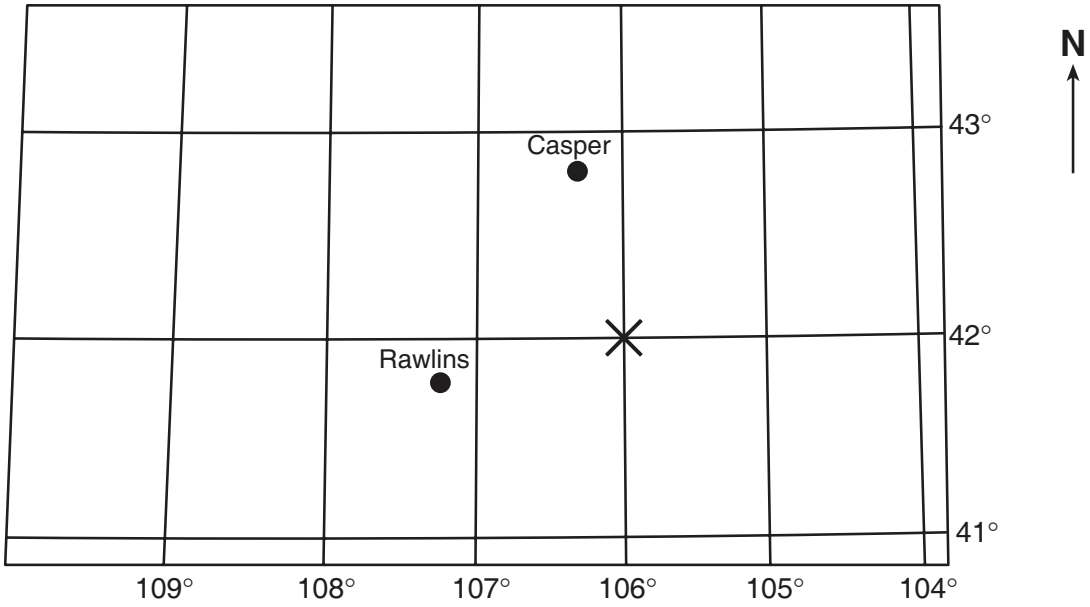
64 [1] Allow 1 credit for correctly explaining why sunrise in Casper, Wyoming, occurs 4 minutes earlier than in Rawlins, Wyoming.

Correct answers include:
— Earth rotates west to east/counterclockwise.
— Casper is located east of Rawlins.
— Earth has to rotate more to receive sunlight.
— Rawlins is west of Casper.
— rotation of Earth
— Casper is 1° east longitude or Rawlins.
— Casper has a lower longitude value.
— Casper is more east than Rawlins and Sun rises in the east.
— Casper is farther east, which is where the Sun rises.
— Because the Earth rotates, so when the Sun rises, Casper will move in front of the Sun before Rawlins.

Incorrect answers include:
— It is farther north.
— because of the tilt of Earth

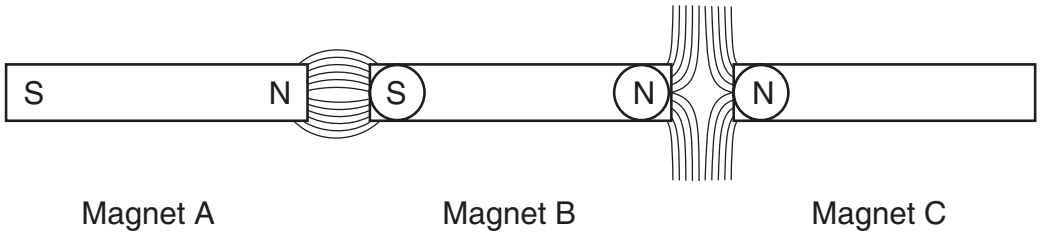
65 [1] Allow 1 credit for correctly placing an **X** on the map, as shown below.

Note: Allow credit if the student uses something other than an **X** as long as the location is shown correctly.



66 [2] *a* Allow 1 credit if all three circled poles are labeled correctly on magnets *B* and *C*.

Example of a correct response:

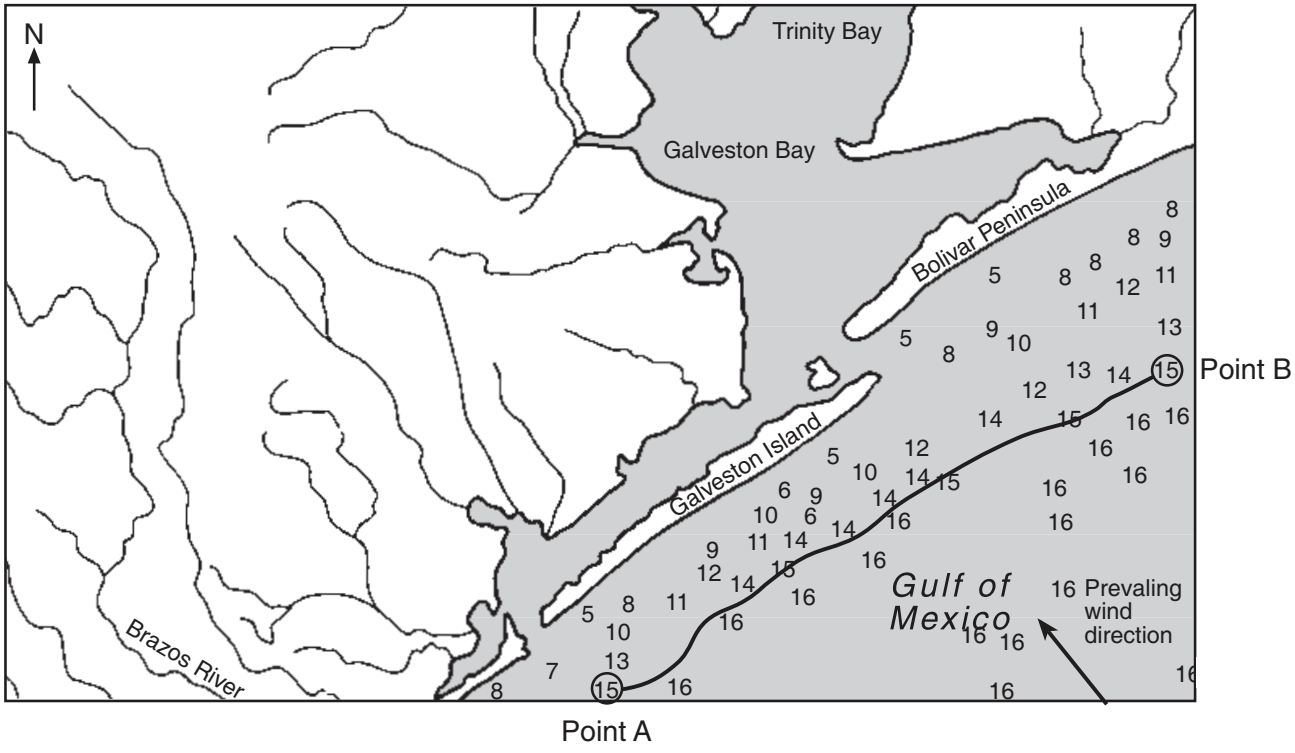


b Allow 1 credit for correctly stating the scientific principle used to label the poles.

Correct answers include:
— Opposite poles attract each other.
— Like poles repel each other.
— North and south poles stick to each other.
— Same poles push away from each other.
— North poles cannot go with north; south cannot go with south.

67 [1] Allow 1 credit for correctly drawing a 15-meter isoline. The line must extend from point *A* to point *B*. It must pass through all 15s and between the 14 and 16 for points where there is no number 15.

Example of a 1-Credit Response



68 [1] Allow 1 credit for a correctly explaining why the gulf sides of the islands have smoother coastlines.

Correct answers include:
— erosion by ocean waves
— wave action
— wind action
— tides
— The waves are constantly hitting the outside edges and that smoothes them out. The inside doesn't have waves, so the edges are rougher.
— Because the gulf water is constantly beating against the coastline, unlike the calmer inland waters.
— The outer coast of the islands are the first thing that the ocean water hits, so the waves smooth them out. The inner coast does not get hit by waves, so it is not as smooth.

69 [1] Allow 1 credit for **Sun** *or* **solar.**

70 [1] Allow 1 credit for correctly identifying one activity in the diagram that requires the use of fossil fuels.

Correct answers include:
— driving cars
— fuel oil heating or cooling the house
— cooking with a gas grill
— fuel-oil truck

71 [1] Allow 1 credit for correctly identifying a renewable resource shown in the diagram.

Correct answers include:
— the Sun (solar)
— trees (wood)
— air (wind)
— water (hydrant or water hose)
— watering the grass

72 [1] Allow 1 credit for correctly describing an energy transformation that occurs as the children play baseball.

Correct answers include:
— chemical energy to mechanical
— mechanical energy to mechanical energy
— potential energy to kinetic energy
— mechanical energy to sound
— kinetic to potential
— chemical to heat
— mechanical to heat
— kinetic to mechanical

Note: Do *not* allow credit for "muscular."

73 [1] Allow 1 credit for correctly stating an observation that would indicate that a chemical reaction is taking place in the test tubes.

Correct answers include:
— formation of bubbles
— A new substance is being formed.
— Gas is being formed.

Note: Do *not* allow credit for "change in temperature" or "heat."

74 [1] Allow 1 credit for correctly stating what effect the temperature of the acid has on the rate of the reaction.

Correct answers include:
— As the temperature increases, the reaction rate increases.
— a direct relationship
— The reaction occurs more slowly at lower temperatures.

75 [2] Allow a maximum of 2 credits, 1 for each correct action the student could take to increase the reaction rate.

Correct answers include:
— Heat the acid.
— Heat the aluminum.
— Use a catalyst.
— Increase the number of collisions (stir or shake the test tube).
— Increase the surface area of the aluminum (cut or chop the pieces).
— change acid
— Increase the concentration of the acid.
— Make the acid stronger.
— Change the metal used in the test tubes.

Incorrect answers include:

— a smaller piece of aluminum
— more acid
— less acid

76 [1] Allow 1 credit for correctly explaining why the oil floats after the stirring stops.

Correct answers include:
— The oil floats because it less dense than water.
— The oil floats because its density is less than 1 g/cm^3.
— The oil floats because its density is less than 1.
— Oil and water have different densities.
— Oil is less dense than the sand.

Incorrect answers include:
— The oil weighs less than the water.
— The oil is lighter than the water.

77 [1] Allow 1 credit for correctly explaining why the salt is no longer visible after the stirring stops.

Correct answers include:
— The salt dissolved in the water.
— Salt is soluble in water.
— The water has absorbed the salt molecules.

Incorrect answers include:
— The salt disintegrated.

78 [1] Allow 1 credit for correctly identifying a way to remove the sand from the mixture in the beaker.

Correct answers include:
— The sand could be removed from the water by filtering.
— The sand could be removed using a strainer/sifter.
— filtering
— sifting
— decanting/pouring off the liquid/drain off the liquid

Incorrect answers include:
— evaporation
— dig/scoop it out by hand