ROBERT L. MERRITT MIDDLE SCHOOL

8TH Grade Learn-At-Home Packet

Science

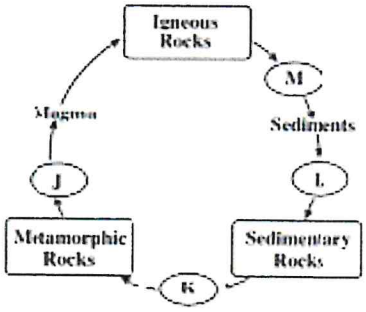
Week 1

Name: _____ Per: _____

8th Grade Science

Rock Cycle

1. Parts of the rock cycle are shown in the diagram below. Ice forms within the crevices of basalt rock formations, and breaks some rock into smaller pieces. At which point in the rock cycle diagram below would the process of breaking down rock take place?



A. J
B. K
C. L
D. M

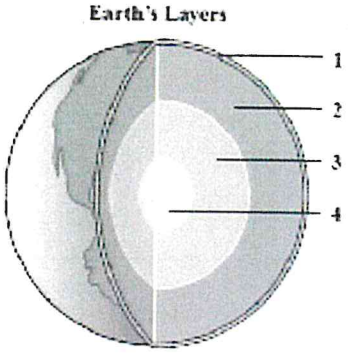
2. Many places, including the Grand Canyon, were created by various physical and chemical processes that continue to shape Earth, such as the water and rock cycles. How does the water cycle influence the rock cycle within a region like the Grand Canyon?

A. Decreased rainfall makes the rocks hard and brittle, so that they crumble into pebbles
B. Too much rain soaking into the ground slows the rate of new rock formation
C. Large amounts of flowing water increase the rate of weathering and erosion
D. Sudden evaporation of water removes moisture from rock layers in the walls of the Grand Canyon.

3. Earth's oldest rock formation was found on the shoreline of the Hudson Bay in Canada, and was found to have formed 4.28 billion years ago. In order for the scientist to determine the rock's age to a more accurate extent, what information would he or she need?

A. The thickness of younger rock layers that cover the rock.
B. The amount of weathering present on the rock's surface.
C. The amount of radioactive element present in the rock.
D. The percentage of each mineral that makes up the rock.

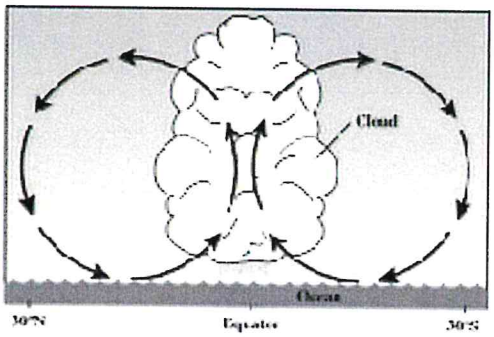
4. Interactions between Earth's layers lead to convection currents that move crustal plates. The diagram below shows four layers of Earth. Within what layer of Earth would you expect convection currents to directly result in motion of tectonic plates?



A. 1
B. 2
C. 3
D. 4

Atmosphere and Weather

5. Several factors are responsible for the weather patterns in the atmosphere. The image below demonstrates how air movement around the equator can create thunderstorms. Which process is the primary source of this movement?



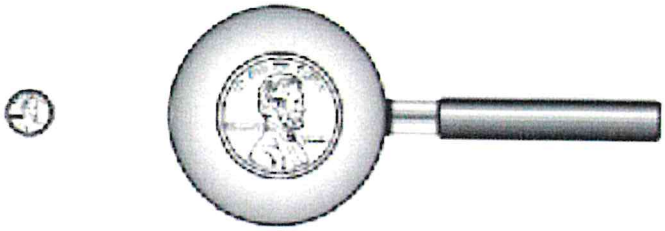
A. Movement of ocean currents
B. Decrease in relative humidity
C. Warming of the upper atmosphere
D. Heating by the Sun's energy

6. Earth's oceans can experience an impact from the interaction between the hydrosphere and the cryosphere. Which of the following serves as an example for the interaction between the two layers?

A. Evaporation of water from oceans at the equator
B. Release of fresh water into ocean water as icebergs melt
C. Decomposition of organic matter at the bottom of oceans
D. Release of large amounts of salt from icebergs into the ocean

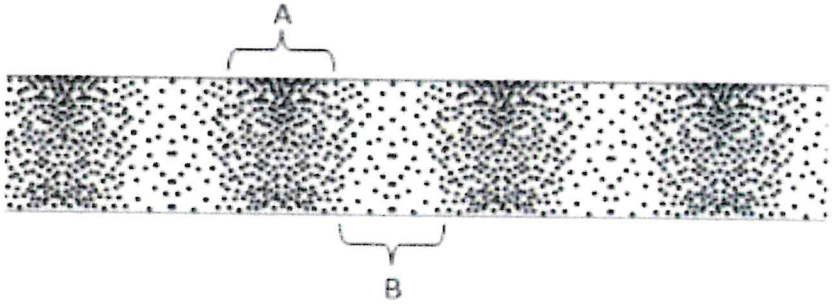
Wave Motion

7. The image below shows a magnifying lens making a penny look larger than it really is. What property of the lens most allows is to magnify the penny?



A. It can reflect light.
B. It can refract light.
C. It can increase the intensity of light.
D. D. It can increase the wavelength of light.

Questions 8-9 refer to the image below:



8. Rarefaction is labeled what part of the wave?

A. A
B. B
C. Neither
D. Both

9. Compression is labeled what part of the wave?

A. A
B. B
C. Neither
D. Both

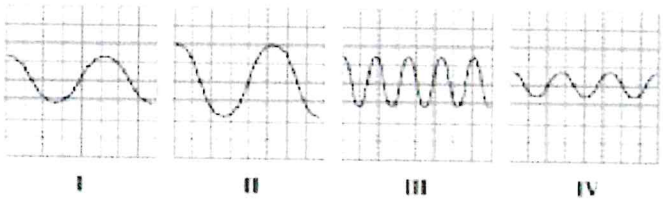
10. Light moves the fastest and slowest, respectively, through which of the following?

A. Vacuum, liquid
B. Liquid, solid
C. Vacuum, solid
D. Solid, gas

11. Sound moves the fastest and slowest, respectively, through which of the following?

A. Solid, vacuum
B. Liquid, solid
C. Vacuum, liquid
D. Liquid, gas

12. An oscilloscope can be used to display and analyze the properties of waves. Maria studies four pictures of waves from an oscilloscope. Which picture below displays waves with the shortest wavelength?



Waves

A. I B. II C. III D. IV

13. Sunlight is made up of energy that is visible to humans and energy that is not visible to humans. Which statement below describes how the visible energy from the Sun differs from the invisible energy?

A. It travels at another speed.
B. It has a different wavelength.
C. It has a different amplitude.
D. It travels at a different distance.

14. Lia is experimenting with different materials to see which one will transmit sound the fastest. She knows that the density of a solid will affect the speed that a wave travels through it. Through which of the following materials will sound waves travel the slowest?

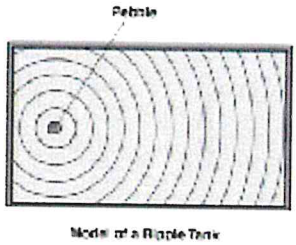
A. Aluminum
B. Iron
C. Lead

Material	Density [kg/m³]
Aluminum	2500
Iron	7800
Lead	11350
Steel	7800

D. Steal

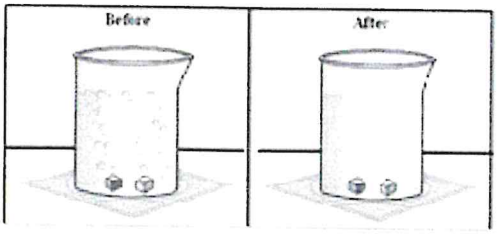
15. Iris and Julissa are using a jump rope to model a typical wave. The wave they produce has a frequency of 4.2 hertz (Hz), an amplitude of 2.5 meters (m), and a wavelength of 5 m. What is the velocity, in meters per second (m/s), of this wave?

16. A ripple tank is a shallow container of water used to demonstrate the properties of a wave. Giselle tossed a pebble into the tank and counted the wave crests as they passed by a certain point. She counted 6 waves in 30 seconds. Calculate the wave frequency in hertz (Hz).



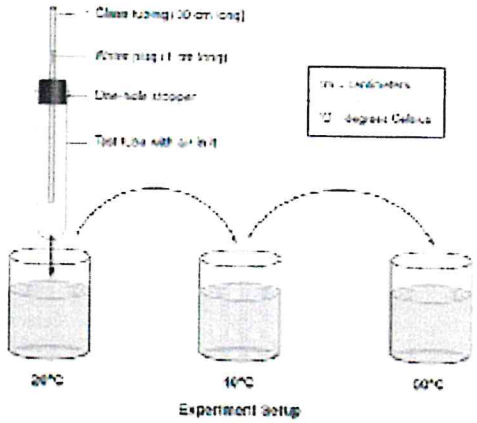
Heat Transfer

17. Dr. Market added a Cu cube that is at room temperature, and an Al cube that she just removed from the freezer, to a beaker of boiling water. She left the cubes in the water for three hours. Which of the following would describe the heat flow that transpired during that time period?



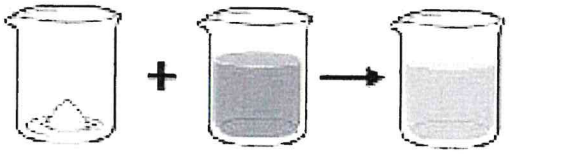
A. From the Al cube to the beaker
B. From the Cu cube to the boiling water
C. From the Al cube to the Cu cube
D. From the boiling water to the Al cube

18. Ms. Roque places a test tube into containers of water of varying temperatures. The water plug in the glass tubing will move up as the temperature increases. Which of the following statements explains why the water plug moves upward as the temperature in the test tube increases?



A. The capillary action moves the water plug.
B. The air pressure decreases in the test tube.
C. The water plug becomes more dense.
D. The air molecules in the test tube increase in energy.

19. Physical properties can be used as a means for comparing and classifying substances. The processes below demonstrate a physical property of sugar?



A. Solubility
B. Density
C. Thermal conductivity
D. Melting point

20. The physical property that determines that how easily heat and electricity pass through a material is?

A. Conductivity
B. Density
C. Weight
D. Hardness

21. In a chemical reaction, if you heat the reactants, the reaction usually occurs…?

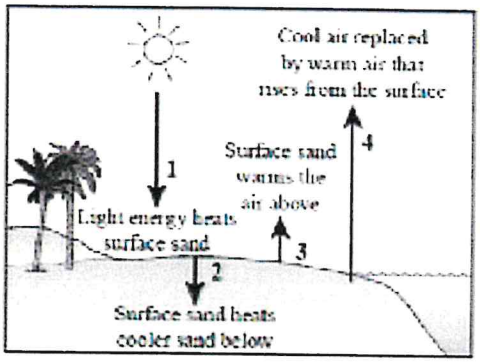
A. Slower
B. Faster
C. At the same rate

D. In a smaller volume

22. Christophe places some ice cubes into freshly made tea that is still quite warm. Which of the following correctly describes what happens to the ice cubes?

A. Some of the heat from the tea is transferred to the ice cubes and causes them to melt.
B. The temperature of the ice cubes remains the same as the temperature of the tea drops.
C. The cold from the ice cubes is transferred into the tea and causes the cubes to warm up and melt.
D. Heat is transferred between the ice cubes and the tea, which causes the temperature of the tea to increase.

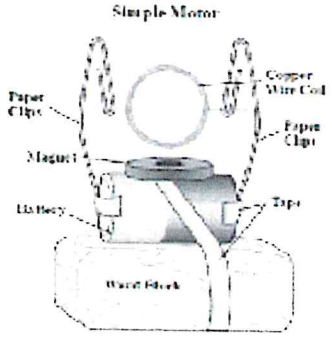
23. The arrows in the diagram below display several ways that heat is transferred from the Sun and strikes sand on the beach's surface. Which arrow shows convection?



A. 1
B. 2
C. 3
D. 4

Energy Conversions

24. Harold made a simple motor. When connected the right way, the coil of copper wire begins to spin. Which of the following describes the energy transformation that is taking place between the spinning coil and the paper clips?



ROBERT L. MERRITT MIDDLE SCHOOL

8TH Grade Learn-At-Home Packet

Science

Week 2

A. Mechanical energy becoming electric energy
B. Electrical energy becoming mechanical energy
C. Chemical energy becoming electrical energy
D. Mechanical energy becoming chemical energy

25. Brian has a container for making frozen juice bars. He transfers the juice into a container, and then he places that container into the freezer for twelve hours. What would you expect to happen to the juice molecules in the container during this time period?

A. They lose chemical energy
B. They lose kinetic energy
C. They gain electrical energy
D. They gain gravitational energy

26. Charlie's track coach advised him to eat well-balanced meals so that he would have sufficient energy for their upcoming meet. To which transformation of energy is his coach referring to?

A. Heat energy to mechanical energy
B. Mechanical energy to electrical energy
C. Chemical energy to mechanical energy
D. Thermodynamic energy to thermal energy

27. A radiometer is a device with fins that spin when light energy strikes them. A picture of a radiometer is shown below. As part of an experiment, a light source was placed 50 centimeters (cm) from a radiometer. The light source gave off four different-colored lights for 30 seconds (s) each. After each color of light was turned off, the amount of time the fins on the radiometer spun was recorded. The results are shown in the table. Which color of light provided the greatest amount of light energy according to the data in the table?

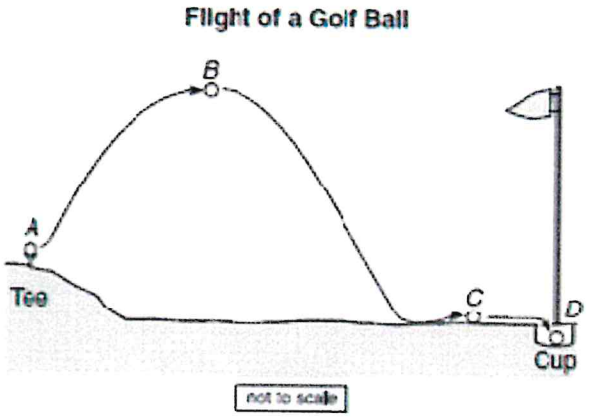
A. Red
B. Green
C. Blue
D. White

Color of Light	Spinning Time (s)
Red	55
Green	55
Blue	72
White	75

28. When an object moves, its energy changes form. When a ball bounces, it has changing amounts of potential energy and kinetic energy. Eventually, however, the ball will stop bouncing. Why does the ball stop bouncing?

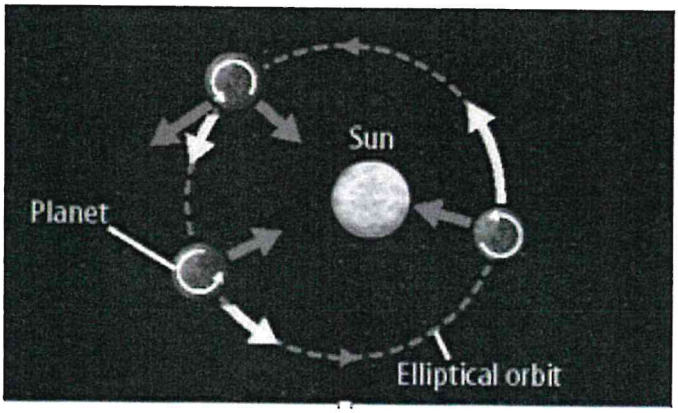
A. The ball's energy gets used up each time it bounces
B. The mass of the ball is too small to allow it to continue its own motion.
C. The ball's energy gets transferred to other energy types like heat and sound that don't help it bounce.
D. The pull of gravity is stronger than the energy in the ball, which makes the ball slow down to a stop.

29. Louis hits a golf ball from the tee into the cup. At point A, the ball is stationary on the tee. At point B, the ball is at its maximum point in the air. At point C, the golf ball is rolling on the ground. At point D, the ball is stopped in the cup. The diagram below shows the path the ball traveled. Explain the changes in potential and kinetic energy as the ball leaves the tee (A), moves through the air (B), falls to the ground (C), and rolls into the cup (D).



Forces

30. What causes planets and other objects in space to revolve around the Sun rather than going off in a straight line trajectory as indicated by the solid lines in the image below?



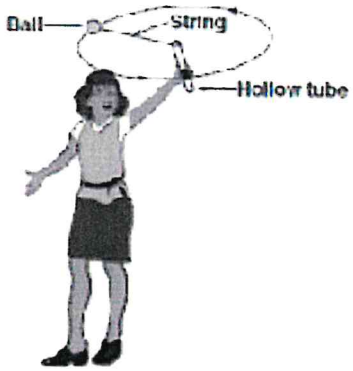
A. Inertia

B. Pressure
C. Gravity - Sun pulls object towards it
D. Gravity - Object is pulling Sun towards it

31. Amina rubbed a balloon on her hair and held it next to the wall. She saw that the balloon stuck to the wall. Which of the following is responsible for the balloon sticking to the wall?

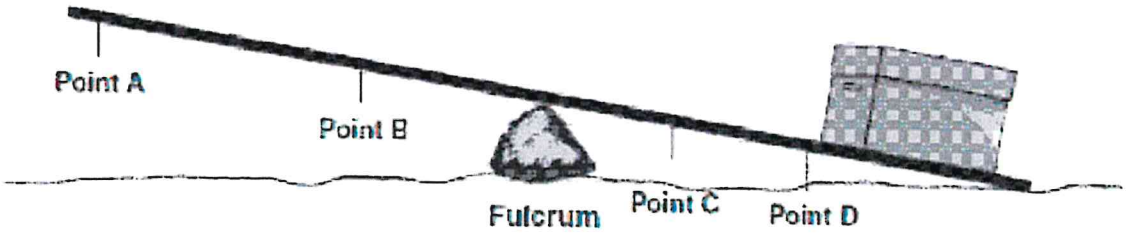
A. Friction
B. Gravity
C. Electric force
D. Magnetic force

32. Angelina used a string, ball, and hollow tube as a handle to make the model shown below. Holding the handle at the center, she swung the ball in a circle to demonstrate how a planet orbits around a star. She knows that a planet's orbit depends upon the gravitational pull of the star. Which model component demonstrates the effect of gravity?



A. The ball
B. The string
C. The handle
D. The rotation direction

33. Carlos wants to help his friend lift a box using a rock and a board. Where should Carlos place the fulcrum in order to minimize the amount of friction needed to lift the box?



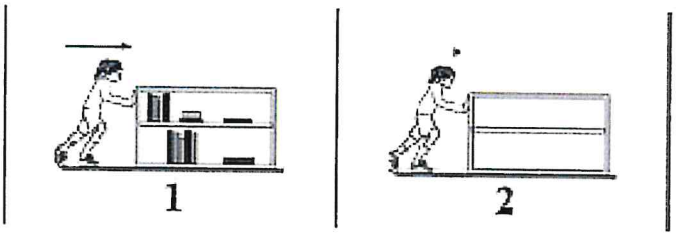
A. Point A
B. Point B
C. Point C

D. Point D

34. An object is moving through space with balanced forces acting on it. Which of the following statements best describes the speed and direction of the object as long as the forces acting on it remain in balance?

A. Speed and direction of object both change.
B. Speed and direction of object remain constant.
C. Speed changes but direction remains constant.
D. Speed remains constant but direction will change.

35. Mia started pushing a bookcase across the room, as shown in picture 1. She then removed the books and continued to push with the same force and direction, as shown in picture 2. How does removing



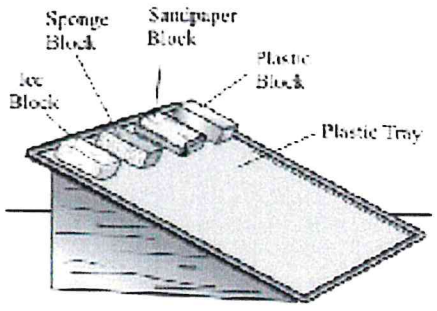
the books affect the motion of the bookcase?

A. The mass is decreased, making the bookcase move faster.
B. The gravity is increased, making the bookcase move slower.
C. The friction is increased, making the bookcase move slower.
D. The mechanical energy is decreased, making the bookcase move faster.

36. Elvin throws a paper airplane. It flies for several meters and then it slows down before it begins to fall to the ground. What two forces cause the airplane to slow down and fall to the ground?

A. Friction from his hand makes it slow down, and a magnetic force pulls it to Earth.
B. Air resistance slows it down, and gravity pulls it to Earth.
C. Gravity makes it slow down, and the pull of the Moon makes it fall to Earth.
D. Gravity makes it speed up, and the pull of the Moon makes it fall to Earth.

37. Rolando and Michelle were studying forces and decided to do an experiment. They placed four equally sized blocks made of different materials on an elevated plastic tray. They watched each of the blocks move down the tray. Their setup is shown below. Which of the following conclusions can Rolando and Michelle make about the forces that cause the blocks to move down the tray?



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8TH Grade Learn-At-Home Packet

Science

Week 3

A. The force of friction is the same on each block.
B. The force of friction causes the speed of each block to increase.
C. The force of gravity causes all the blocks to move at the same speed.
D. The force of gravity is greater than the force of friction on all the blocks.

38. Yarelys and Brayn are moving a dresser. They are bickering about which direction to move it. Yarelys is pushing the dresser with a force of 5 newtons towards Brayn. Brayn is pushing the dresser towards Yarelys with a force of 10 newtons. What happens to the dresser?

A. The dresser does not move.
B. The dresser moves towards Yarelys.
C. The dresser moves towards Brayn.
D. The dresser moves towards Brayn, and then back towards Yarelys.

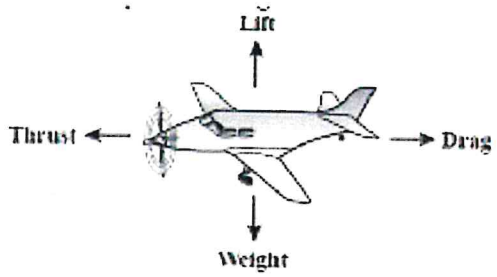
Motion

39. The students in Dr. Market's class were using catapults to launch small and large marshmallows across the classroom. The table below displays the distances in centimeters (cm) that the marshmallows traveled. Which of the following statements best describes the students' data?

	Small	Large
Trial 1	12 cm	8 cm
Trial 2	30 cm	10 cm
Trial 3	27 cm	6 cm
Trial 4	36 cm	12 cm
Trial 5	25 cm	11 cm
Trial 6	12 cm	7 cm
Trial 7	25 cm	8 cm
Trial 8	20 cm	11 cm
Mean	25 cm	9 cm

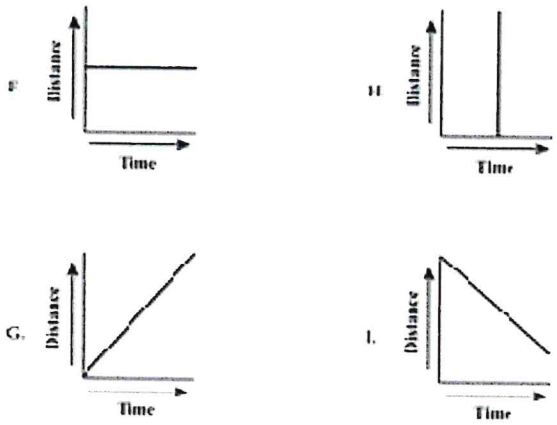
A. Small marshmallows travel an average of 9 cm.
B. Large marshmallows travel an average of over 20 cm.
C. On average, the small marshmallows travel father than the large ones.
D. On average, the large marshmallows go higher in the air than the small ones.

40. The diagram below shows the forces that act on a model airplane. Both its speed and height above the ground are constant. Which of the following conditions would cause the model airplane to descend toward the ground?



A. The lift is equal to the drag.
B. The lift is less than the weight.
C. The thrust is equal to the weight.
D. The thrust is greater than the drag.

41. Dr. Fajet drives his car away from his house at a constant speed. Which of the following graphs best shows the relationship between the distance traveled and the time spent driving?



42. Jose is riding his bike at constant speed. As he rides down his street he is moving from east to west. At the end of the block, he turns right and starts moving from south to north, but he's still traveling at the same speed. Has his velocity changed? Although Jose's speed hasn't changed, his velocity has changed because he is moving in a different direction. How could you use vector arrows to represent Jose's velocity and how it changes?

43. Brianna's dog is racing down the sidewalk toward the east. The dog travels 36 meters in 18 seconds before it stops running. The velocity of the dog is? 2 m

44. If a car travels at an average speed of 60 km/h for 5 hours, then the distance it travels is? 300 km

45. If you walk 6 km at an average speed of 3 km/h, how much time does it take? 2 h

46. Two cars accelerate at a rate of 3 meters per second squared (m/s2). The mass of each car, in kilograms (kg), is shown in the chart below. How many more newtons (N) of force (kg X m/s2) are needed to accelerate the car with the larger mass?

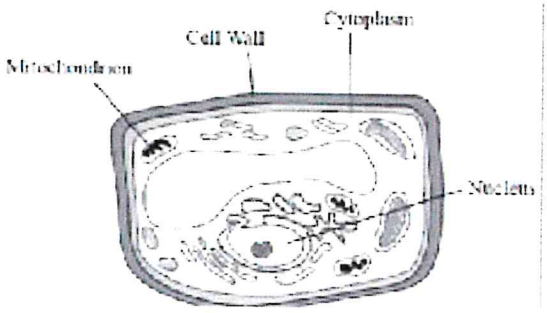
Car	Mass (in kg)
A	1250
B	2000

Cell Structure

47. Plants and animals have similar structures to help them survive. How is the skeletal system comparable to the stem of a plant?

A. The skeletal system absorbs energy from the sun.
B. The skeletal system supports the body and the stem supports the plant.
C. Both the skeletal system and the stem transport nutrients throughout the body.
D. The stem helps the plant to make food and the skeletal system helps the body to make food.

48. Plant cells differ from animal cells; the diagram below identifies four different structures in a plant cell. Compared to the structures in an animal cell, which of the following structures is found only in a plant cell?



A. Mitochondrion
B. Cytoplasm
C. Cell Wall
D. Nucleus

49. The cell theory applies to all organisms, including the five displayed below. Which of the following statements describes how these organisms are an example of the cell theory?

A. The organisms have cells that lack a nucleus.
B. The organisms are made of one or more cells.
C. The cells of the organisms undergo photosynthesis.
D. The cells of the organisms are identical to each other.

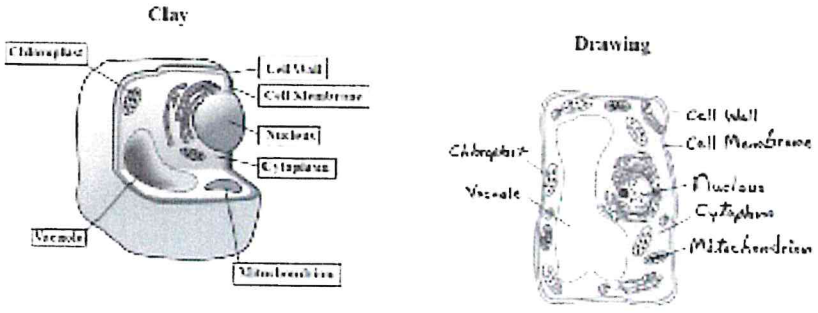
50. The human body has three different kinds of muscle cells. Striated (skeletal) muscle cells move such structures as the arms and legs. Cardiac muscle cells move blood into and out of the heart. Smooth muscle cells move food through the digestive system. While each of the muscle cells performs a different job, they function in a similar way. What makes muscle cells different from other cells in the body?

A. Muscle cells can hold more blood than other cells.
B. Muscle cells can divide and reproduce at a faster rate than other cells.
C. Muscle cells can work together to contract and relax while other cells cannot.
D. Muscle cells can move freely to different parts of the body while other cells cannot.

51. Some diseases in humans are caused by genetic mutations. The mutated genes can then be passed from parent to child. Where does the replication of these mutated genes occur in the human cell?

A. Nucleus
B. Ribosome
C. Cell membrane
D. Endoplasmic reticulum

52. There are two types of models that can be used to show details of the structures of cells. They are shown below. Which of the following is a limitation of the drawing but not the clay model?



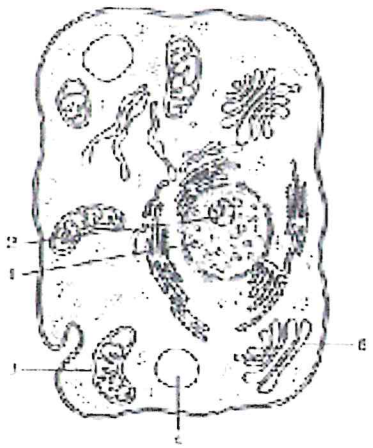
A. It does not represent the main parts of a cell.
B. It does not contain the correct number of nuclei.
C. It cannot represent a living cell, since a true cell is three-dimensional.

D. It cannot represent a living cell, since the cytoplasm should be in constant motion.

53. When a cell structure is worn out or defective, which organelle is responsible for breaking down the material?
    A. Lysosome
    B. Cytoplasm
    C. Ribosome
    D. Nucleus
54. What two organelles function as storage units; one for chemicals and the other for such things as food, water, and waste?

    A. Cytoplasm and vacuoles
    B. Vacuoles and cytoplasm
    C. Ribosomes and lysosomes
    D. Lysosomes and vacuoles

Use the diagram and its numbered structures to answer questions 54-58:



55. If this were a gland cell, which organelle would you expect to see in very large numbers?

56. Which organelle contains chromatin?

57. Is this a plant or animal cell?

58. Explain why plant cells are the ultimate energy transformers
59. Is this a prokaryotic or eukaryotic cell?

Cell Division

ROBERT L. MERRITT MIDDLE SCHOOL

8TH Grade Learn-At-Home Packet

Science

Week 4

60. During this part of the cell cycle the cell is growing, doing its normal function, and duplicating its DNA.

A. Interphase
B. Prophase
C. Metaphase
D. Anaphase
E. Telophase

61. Which of the following happens when a cell divides?

A. Increase in the cell's volume.
B. It becomes harder for the cell to get rid of wastes.
C. Each daughter cell gets its own copy of the parent cell's DNA.
D. It becomes harder for the cell to get enough oxygen and nutrients.

62. One difference between cell division in plant cells and in animal cells is that plant cells have?

A. Centrioles
B. Centromeres
C. Cell plate
D. Chromatin

63. In eukaryotic cells, the timing of the cell cycle is regulated by?

A. Centrioles
B. Cyclin
C. Spindle fibers
D. Nuclear envelope

64. When during the cell cycle are chromosomes visible?

A. Only in interphase.
B. Only when replicating.
C. Only during cell division.
D. Only during G1.

65. When cells are grown in a lab, which factor can halt normal cell division?

A. Contact with other cells
B. Growth factors
C. A cut in the skin
D. Injection of cyclin

Mitosis and Meiosis

66. Which of the following characteristics of mitosis is not correct?

A. Mitosis occurs in somatic cells.
B. 2N —> 2N
C. 2N —> N
D. Mitosis is important for growth and repair of multicellular organisms.
E. Mitosis occurs when unicellular organisms reproduce asexually.

67. Where are centrosomes (microtubule-organizing-centers) located in an animal cell?

A. Mitochondria
B. Golgi
C. Chromatids
D. Centromeres
E. Centrioles

68. Which of the following sequences shows the correct life cycle for humans?

A. Diploid egg + diploid sperm --> haploid zygote --> mitosis --> haploid adult --> meiosis --> diploid gametes
B. Diploid egg + diploid sperm --> haploid zygote --> meiosis --> haploid adult --> mitosis --> diploid gametes
C. Haploid egg + haploid sperm --> diploid zygote --> mitosis --> diploid adult --> meiosis --> haploid gametes
D. Haploid egg + haploid sperm --> diploid zygote --> meiosis --> diploid adult --> mitosis --> haploid gametes

69. Which of the following statements is NOT correct when cells undergo meiosis?

A. Meiosis ensures that the chromosome number remains constant generation after generation.
B. Meiosis ensures that each generation has a different genetic makeup than the previous one.
C. Meiosis ensures that each newly formed daughter cell receives the same number and kinds of chromosomes.
D. Meiosis results in four daughter cells.
E. Meiosis occurs in the production of egg and sperm cells in animals.

70. During which phase of meiosis will the sister chromatids line up at the equator?

A. Prophase I
B. Prophase II
C. Metaphase I
D. Metaphase II
E. Anaphase II

71. During which phase of meiosis will the spindle disappear as the nuclear envelopes form? The plasma membrane furrows to give two complete cells, each of which has the haploid, or N, number of chromosomes. Each chromosome has one chromatid.

A. Prophase I
B. Prophase II
C. Anaphase II

D. Telophase I
E. Telophase II

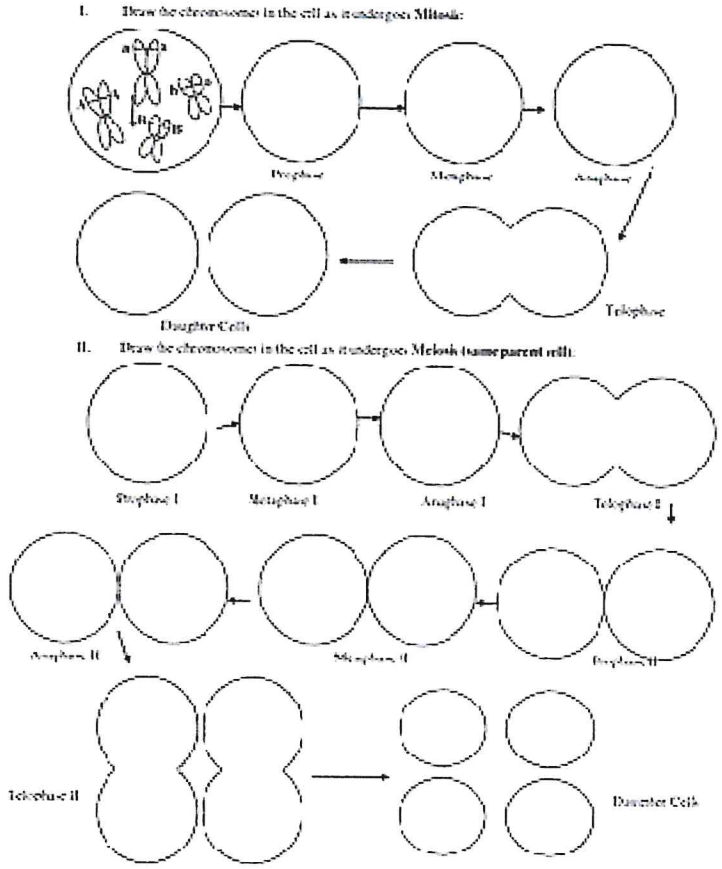
72. Which cell during oogenesis must be fertilized by a sperm if it is to become a mature egg?

A. Primary oocyte
B. Secondary oocyte
C. Ootid
D. Primary spermatocyte
E. Secondary spermatocyte

73. Which of the following cells represents a way to discard unnecessary chromosomes while retaining much of the cytoplasm in the egg?

A. Primary oocyte
B. Secondary oocyte
C. Ootid
D. Egg
E. Polar body

74. Which of the following comparisons of mitosis versus meiosis is not correct for animal cells?



A. Occurs in somatic cells<---->occurs in the gonads
B. Two daughter cells<---->four daughter cells
C. Diploid daughter cells<---->haploid daughter cells
D. One cell division<---->two cell divisions
E. Homologous chromosomes pair up<---->homologous chromosomes do not pair up

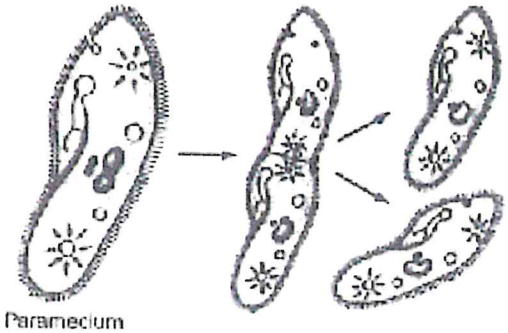
75. Fill in the circles below with a sketch of what takes place during each phase of mitosis and meiosis.

Sexual and Asexual Reproduction

76. Sexual reproduction for some fish occurs when the female fish lays eggs and the male fish locates the eggs and fertilizes them. What is an advantage in fertilizing eggs outside the female's body?

A. Fewer eggs and sperm are needed
B. Many sperm can fertilize the same egg
C. Many of the eggs can be fertilized at the same time
D. The fertilized eggs can produce offspring identical to one parent

77. The *Paramecium* shown below uses binary fission to reproduce. Which statement describes the results of this process?


Paramecium

A. One daughter cell will live and the other will die
B. Both daughter cells are genetically different from one another
C. Both daughter cells are genetically the same as the parent cell
D. One daughter cell will have more genetic material than the other

78. An advantage of sexual reproduction over asexual reproduction is that sexual reproduction?

A. Takes less time
B. Requires more time
C. Provides genetic diversity
D. Produces identical offspring

Genetics

79. A population of mice, some with light-colored fur and some with dark-colored fur, is introduced into a field with dark soil. A few generations later, the majority of the mice have dark-colored fur. Which of the following best explains this change?

A. Light-colored mice can run faster.
B. Dark-colored mice have fewer offspring.
C. Light-colored mice have changed color over generations.
D. Dark-colored mice are better able to hide from their predators.

80. The gene for curled ears (C) is dominant over the gene for straight ears (c). The picture below shows a cat with curled ears (Cc) and a cat with straight ears (cc). What percent of the offspring are expected to have curled ears as a result of a cross between the cats shown?

Curled Ears Straight Ears

A. 100
B. 75
C. 50
D. 25

81. Arianna is learning about the differences between inherited traits and learned behaviors in organisms. For example, she knows that being able to read is learned, while having straight or curly hair is inherited. How does a person inherit a trait such as hair texture?

A. Through the storage of excess fatty acids in tissues
B. Through DNA passed from parents to offspring
C. Through the breakdown of different proteins at birth
D. Through different viruses passed from parents to offspring

82. In pea plants, purple flower color is dominant to white flower color. Susan has pea plants in her garden. Most of them have purple flowers, while some have white flowers. If she crosses two pea plants that have white flowers, what color flowers will the resulting pea plants have?

A. 100% purple
B. 100% white
C. 50% purple and 50% white
D. 75% purple and 25% white

83. In humans, unattached earlobes are a dominant trait. attacked earlobes are recessive. if the kids of a family all have attached earlobes, what can you say about the parents' genetic makeup?

A. Both parents carry only dominant genes
B. Each parent carries at least one recessive gene

C. Both parents have spontaneously mutated for the trait
D. One parent carries 2 dominant genes and the other carries 2 recessive genes.

84. In a group of rainbow trout, some individuals have a greenish-brown body and others have a blue body. In this group, the gene for the body color trait has two alleles. The allele for a greenish-brown body (*B*) is dominant over the allele for a blue body (*b*). Complete the Punnett square below to show all possible genotypes of the offspring from a cross between two rainbow trout.

85. The pedigree table below shows the blood types of three generations of family members. Notice that some of the blood type phenotypes have been given to you. What is the genotype of the individuals 1 – 6? Give the probable genotype of all other family members.