Iowa End-of-Course Assessments

DRAFT

Physical Science

Specifications

A) Structure of atoms
B) Structure and properties of matter
C) Chemical reactions
D) Motions and forces
E) Conservation of energy and increase in disorder
F) Interactions of energy and matter

Sample Items

1. Which of the following regions of the electromagnetic spectrum has the shortest average wavelength?

    A. Visible
    B. Ultraviolet
    C. Infrared
    D. X-rays

2. Which of the following provides the best example of Newton's third law?

    A. A person's foot pushes against a sidewalk and the sidewalk provides support.
    B. A lamp becomes lit when its switch is turned to "on."
    C. A can of carbonated beverage explodes when left in the freezer.
    D. A piece of paper ignites into flames when touched by a match.

Physical Science

Sample Items cont.

Directions: Questions 3 through 5 are based on the following diagram, which shows a beaker containing water being heated over a Bunsen burner.

3. The circular arrows in the diagram represent the motion of the water contained in the beaker as it is heated. This motion is best described as:

   A. radiation.
   B. convection.
   C. conduction.
   D. Brownian motion.

4. As the temperature of the water increases, the motion of the water molecules:

   A. increases.
   B. decreases.
   C. stays the same.
   D. first decreases and then increases.

5. When the water undergoes a phase change from liquid phase to gas phase, which of the following best explains why the water molecules are released into the air?

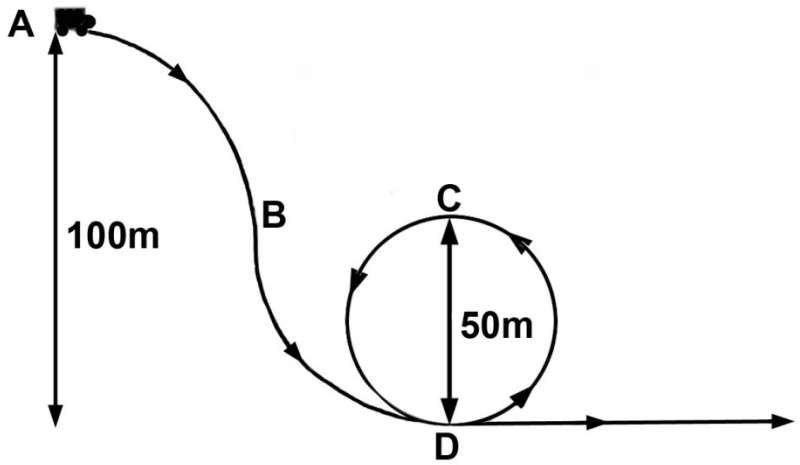
   A. The water molecules are repelled by the electrostatic forces from adjacent water molecules.
   B. The water molecules gain enough energy to overcome intermolecular attractions.
   C. The water molecules undergo a chemical reaction with other molecules in the air.
   D. The water molecules dissociate into atoms, which scatter as energy is released.

DRAFT

Physical Science

Sample Items cont.

Directions: Questions 6 through 8 are based on the following diagram in which a portion of the track for a roller coaster is shown. The roller coaster car starts from rest at the position labeled A.



6. At which two positions along the track will the kinetic energy of the roller coaster car be most similar?

   A. A and B
   B. A and C
   C. B and C
   D. B and D

7. At what position will the roller coaster car have the maximum kinetic energy?

   A. A
   B. B
   C. C
   D. D

8. The top of the loop is 50 m off the ground. The roller coaster car's potential energy at position C will be closest to which of the following?

   A. Half the potential energy at position A
   B. Twice the potential energy at position B
   C. Half the potential energy at position D
   D. Twice the potential energy at potential A

Physical Science

Sample Items cont.

9. A ball is placed at the top of an inclined plane and begins to roll down the plane. Which of the following best describes the ball's acceleration?

   A. The distance the ball travels during a fixed period of time
   B. The distance the ball travels and the direction in which the ball travels
   C. The time it takes for the ball to travel a specific distance
   D. The amount by which the velocity of the ball increases over a fixed period of time

10. A student dropped a 0.1-kg lead ball of the size of a large marble and a 0.1-kg tail feather of an ostrich at the same time from the same height. The ball reached the ground sooner than the feather. Which of the following factors was different between the ball and the feather?

    A. Mass
    B. Weight
    C. Gravity
    D. Surface area

11. An atom of $^{14}_{6}C$ contains how many neutrons in all?

    A. 6
    B. 8
    C. 12
    D. 14

12. In any combustion reaction, one of the reactants is which of the following gases?

    A. Cl_2
    B. CO_2
    C. H_2
    D. O_2