



**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

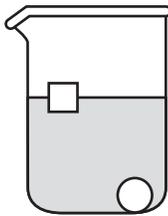
**Released Items  
2013**

**Grade 11  
Science**

# Science

- 1 A student drops two plastic beads with different densities into an alcohol solution. One bead has a density of  $0.87 \text{ g/cm}^3$ , and the other bead has a density of  $0.83 \text{ g/cm}^3$ . The picture below shows the positions of the beads in the solution.

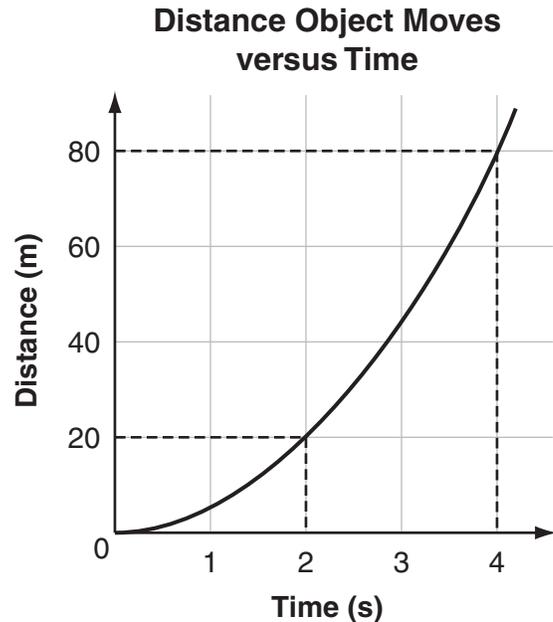
**Bead Positions  
in Solution**



Based on the positions of the beads, which range describes the density of the solution?

- A.  $0.64\text{--}0.66 \text{ g/cm}^3$
  - B.  $0.74\text{--}0.76 \text{ g/cm}^3$
  - C.  $0.84\text{--}0.86 \text{ g/cm}^3$
  - D.  $0.94\text{--}0.96 \text{ g/cm}^3$
- 2 Which data would **best** indicate that an exothermic reaction occurred in a solution?
- A. Gas bubbles formed.
  - B. Color changed from clear to blue.
  - C. Temperature decreased by  $5^\circ\text{C}$ .
  - D. Temperature increased by  $6^\circ\text{C}$ .

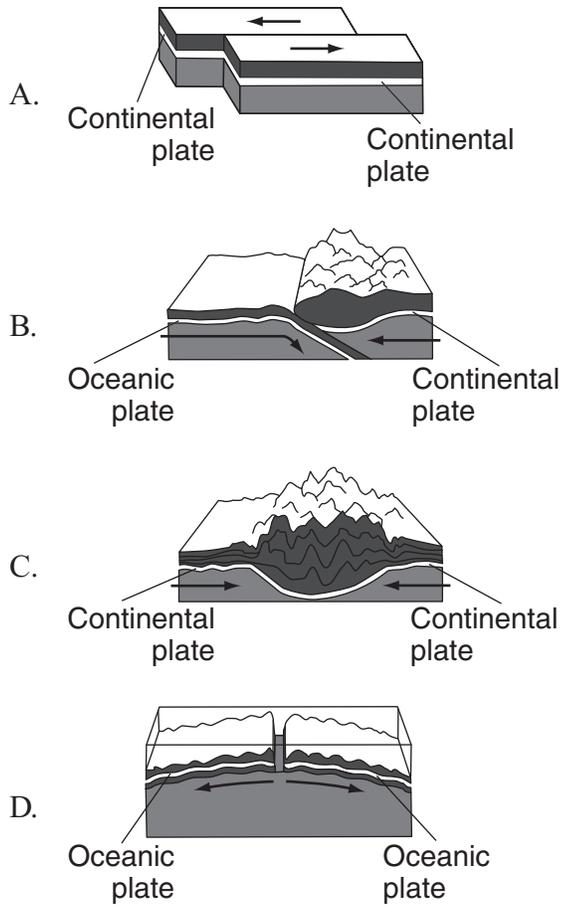
- 3 The graph below shows the distance an object moves over time.



Which statement **best** describes the motion of the object?

- A. The object is traveling at a constant speed.
- B. The object is traveling with no net force.
- C. The object is accelerating.
- D. The object is changing directions.

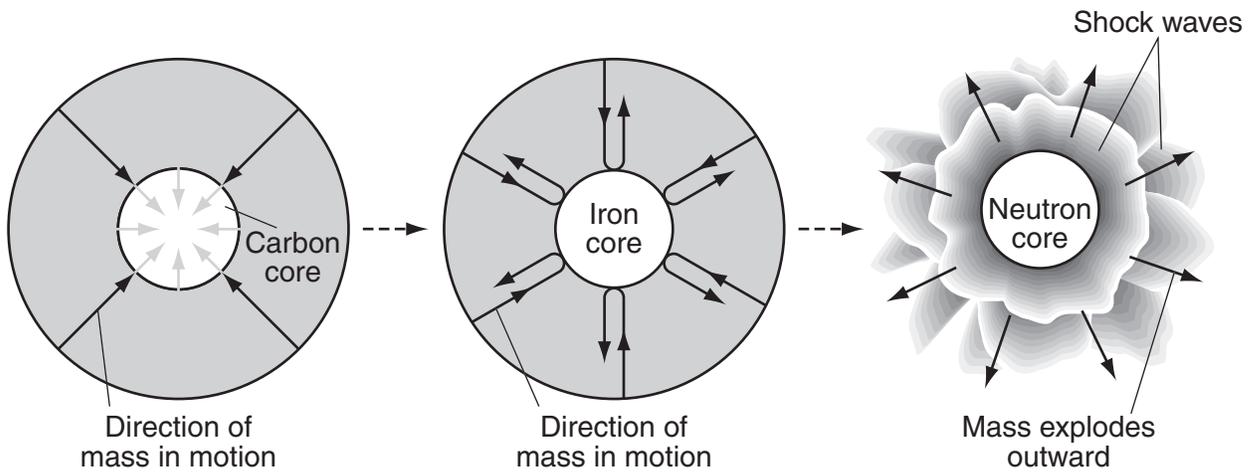
4 Which model represents volcanoes forming by subduction?



5 Why do many mountains have cores made of metamorphic rocks?

- A. Metamorphic rocks are the only rocks that form underground.
- B. Metamorphic rocks are the only rocks found in mountains.
- C. Metamorphic rocks are pushed down from Earth's surface when plates collide.
- D. Metamorphic rocks are formed by heat and pressure when mountains form.

6 The diagram below shows a star becoming a supernova.



Which statement **best** explains why the star explodes?

- A. The mass of the star increases.
- B. The mass strikes the hard core and moves outward.
- C. The star interacts with a large nearby star.
- D. The star changes direction as it moves.

*Please use the Plate Movements diagram on the reference sheet to answer the question.*

7 The table below lists some of Earth's specific plate boundary locations.

<b>Earth's Plate Boundaries</b>
South American Plate and African Plate
Nazca Plate and South American Plate
Caribbean Plate and North American Plate
African Plate and Eurasian Plate

- a. Select **two** plate boundaries listed in the table **and** describe in detail the expected motion of the plates in **each** location.
- b. For **each** boundary you selected in part (a), identify and describe **one** geologic feature that has formed there as a result of plate interactions.

Please use the genetic code on the reference sheet to answer the question.

- 8 Crohn's disease has been linked to a defect in a gene. The diagrams below compare part of the DNA encoding the normal gene with part of the DNA encoding the defective gene. In the defective gene, a cytosine (C) is inserted, as shown by the arrow below.

**Normal gene**

AGC|CCT|CCT|GCA|GGC|CCT|TGA|AAG|GAA

**Defective gene**

AGC|CCT|CCT|GCA|GGC|CCC|TTG|AAA|GGA



Based on the diagrams, what is the result of the mutation?

- A. The wrong amino acid is added at the start of the protein.
- B. A stop codon shortens the protein.
- C. The amino acid sequence is altered in the remainder of the protein.
- D. The protein is produced without any change in sequence.

- 9 The diagram below shows the partial DNA fingerprints of two parents and their three children.

F	M	Children		
1	2	3	4	5
—	—		—	—
—		—		—

Key	
F	represents the father
M	represents the mother

What is the **most likely** reason the mother's DNA differs from her children's DNA?

- A. The children received all of their chromosomes from their father.
- B. The children received chromosomes from a great grandparent.
- C. The children received half their chromosomes from each parent.
- D. The children received more chromosomes from their father than from their mother.

- 10 The pictures below show an ocotillo plant from southwestern North America and an alluaudia plant from Madagascar. These plants have no common ancestors. Their resemblance is caused by adaptations in response to similar environments.



Ocotillo plant



Alluaudia plant

Which process **most likely** caused these plants to produce similar structures?

- A. convergent evolution
- B. divergent evolution
- C. genetic mutation
- D. genetic recombination