2009 Colorado Regional Science Olympiad **Answer Key**

[Asterisks (*) indicate tie-breakers; also indicated on participant response sheet.]

Compare your student scores with those of students participating in the Northern and Southern Colorado Regionals listed at the end of this answer key.

STATION A

1. There would not be sufficient food in a habitat of ice and snow for numerous herbivores of this size to thrive.
2. Mammoths spent part of each year in the bitter cold. Small ears and tails helped prevent heat loss and frostbite.
3. huge size (or similar); large tusks; large trunk (1 or 2 correct = ½ pt)
4. grazing, foraging or eating
5. sparring for a mate; or fighting for dominance
6. *The mammoth bone was preserved in ice (actual remains) so it was not exposed to decay and mineral-bearing water. The bones are much too young for them to have “turned to stone.”
7. Long hair (guard hair) protects the undercoating from harsh weather conditions; the smaller hair is denser and lies closest to the body to minimize heat loss.

STATION B

1. a. Ginko
   b. Metasequoia
   c. Fern
   d. Glossopteris
2. d or Metasequoia
3. c or Ferns
4. b or Metasequoia
5. b or Metasequoia
6. a or Ginkgo
7. *d or Glossopteris

STATION C

1. d
2. g
3. e
4. f
5. b
6. c
7. a
8. b

STATION D

1. Porifera
2. porous bodies
3. true
4. true
5. *spicules
6. spongin
7. flagella

STATION E

1. *None of them, all fossil specimens at this station are articulate.
2. pedicle
3. a
4. a. pedicle
   b. brachial

STATION F

1. Dunkleosteus
2. Placodermi
3. Devonian
4. head and armored plates (Any description of these items is acceptable.)
5. These fish did not have teeth. (What appear to be teeth is actually a protrusion of the fish's jaw.)
6. Osteichthyans
7. Chondrichthyans
8. *The skeletons of Chondrichthyans are composed of cartilage and those of the Osteichthyans are composed of bone.

STATION G

1. a. Crinoid or Calyx
   b. Sea urchin
   c. Brittle star
   d. Sand dollar or Encope
   e. Pentremite or Blastoid
   f. Crinoid or Crinoid stem
2. a or f or Crinoids
3. deeper water
4. c or Brittle stars
5. b or Sea urchins
6. d or Sand dollar
7. Either order: (e or Pentremites or Blastoids) and (a or f or Crinoids)
8. Must be in this order: (e or Pentremites or Blastoids); (a or crinoids)

STATION H

1. a. Rhombopora
   b. Archimedes
2. moss animals or sea mat
3. colonial
4. screw
5. *Brachipods

STATION I

1. Hard animal parts do not require rapid burial to fossilize, nor are they likely to be consumed by scavengers or predators.
2. Mosasaur
3. Any one of these terms: grasses, shrubs, foliage, plants or vegetation
4. e
5. d
6. d and e or coprolites
7. rapid burial; arid (hot and dry) environment
8. an indication of the size of the creature; whether it was a carnivore or herbivore, i.e. what it ate

STATION J

1. Ichthyosaur
2. vertebrae (spine = ½)
3. Mesozoic
4. convergent
5. its sharp, inward pointing teeth
6. Mosasaur
7. Dimetrodon
8. Possibilities: control body temperature; attract a mate; appear larger to frighten off predators.

STATION K

1. a. Baculite
   b. Ammonite
   c. Gryphaea
   d. Conus
   e. Belemite
   f. Turritella
2. c or Gryphaea
3. guard
4. b
5. a. propulsion through the water
   b. sutures or suture patterns
6. It permitted the creature to control its buoyancy, or ability to move up and down within the water column.
7. *d or conus

STATION L

1. a. Halysites
   b. Septastraea
   c. Hexagonaria
   d. Horn coral, Rugose, Heliophyllum
2. c or Hexagonaria
3. d or Horn coral or Heliophyllum
4. a or Halysites 5. b or Septastraea

STATION M

1. a. left pleural lobe

   b. axial lobe

   c. right pleural lobe

   d. cephalon

   e. thorax

   f. pytgidium

2. d or parasitic

3. *exoskeleton

4. Barnacle

5. feeding, i.e. direct plankton and detritus into their shells for consumption

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Compare your student's performance with that of the Top combined N and S Regional Colorado student scores on this fossil test out of a possible 110 points. Approximately 60 students participated in each division.

B-Division: 70.5 / 61.0 / 60.5 / 59.5

C-Division: 80.0 / 74.0 / 68.0 / 67.0