STATION # 1 (4 Carnegie models)

1. Genus? Iguanodon
2. Genus? velociraptor
3. Genus? allosaurus
4. Genus? plateosaurus

5. Of the four samples, which Genus first appeared in the Geologic record?
   Plateosaurs

6. true or false - Sample 1 was a Herbivore true
7. true or false - Sample 2 was a Carnivore true

8. Dinosaurs are unique among all tetrapods in having a *perforate acetabulum*. What specific physiological characteristic resulted from this structure that is considered more "advanced" than other reptiles?

Erect stance/legs underneath body which allowed for more efficient locomotion

9. What is the most prominent visible difference between hips of the Ornithischia and Saurischia?
   the orientation of the *pubis bone.*

10. What type of dinosaur was "SUE" ? T-rex

STATION #2 (pelecypoda and clam specimen)

11. Phylum? MOLLUSCA

12. Class? BIVALVIA

13. Specimen A is an example of a/an:

    a. cast b. internal mold

    c. external mold d. unaltered

14. How did these specimens obtain nourishment?
    Filtering food particles from water

15. What type of symmetry is observed here? Bilateral

16. What did these specimens use to burrow into the sand or mud on the ocean floor? Muscular foot

17. By what feature is the ORDER of specimen B classified?
    By their hinges

STATION #3 pecten photo and recent shell

18. These specimens belong to what GENUS? PECTEN

19. Name the feature shown by the arrow: "wing" or "ear"

20. Is this GENUS sessile or mobile? mobile

21. What is the common name of these fossils? Scallops

22. What was the habitat of this GENUS? benthic/marine

STATION #4 ginko and dawn redwood photos

Specimen A

Specimen B

23. Identify the GENUS of Specimen A. Ginkgo

24. What is the origin of specimen A's name?
Chinese words *yin* for silver, and *hsing* for apricot,

25. Identify the GENUS of Specimen B. Metasequoia

26. What is the common name of Specimen B? dawn redwood

27. These specimens have remained relatively unchanged for millions and millions of years, thus they are commonly called what?
"living fossils"

28. Specimen B is the state fossil for which state? Oregon

STATION #5 orthoceras specimen)

29. What is the CLASS of this specimen? Cephalopoda

30. What is the GENUS of this specimen? Orthoceras

31. What is the matrix of this specimen? Clay/shale

32. What is the name of the partitions that divide the shell into chambers? Septa

33. What is the meaning of its Species name? "straight horn"

34. What are the two main functions of the siphuncle? Buoyancy (or vertical position in the water column) and Movement (horizontal movement)

STATION #6 (graptolite photo A, petosky stone B)

Specimen A

35. What is the ORDER of Specimen A ? Graptolidea

36. For what purpose do geologists use specimen A?
In dating rocks (or index fossil)

37. What was the habitat of specimen A? marine/pelagic

38. What is the GENUS of specimen B? Hexogonaria

39. In what state of the USA is specimen B commonly found?
Michigan

40. What is the Phylum of specimen B? cnidaria

41. What does the common name of specimen B mean?
The translation of the name "Pe-tos-e-gay" or Petrosky is "rising sun," "rays of dawn," or "sunbeams of promise.

42. What do the two specimens have in common?
Colonial organisms/both marine would be a correct answer as well.

STATION #7 (2 bony fish slab)

43. During which geologic Era did the first bony fish appear?
Paleozoic

44. Specimen A is a Jiang hanichthys from Hubai, China appeared about 100 million years ago. Into what Period does this place the specimen? Cretaceous

45. Specimen B's fossils are about 50 million years old. What EPOCH does this represent? EOCENE

46. These specimens would be classified as: D
a. agnathan
b. chondrichtyan
c. placoderm
d. Osteichthyan

47. These fossils would be classified as: D
a. internal molds
b. external molds
c. casts
d. actual remains

48. The rock in which specimen A is found is classified as:
a. sedimentary b. igneous c. metamorphic A

STATION #8 (Caesar Creek slab with multiple fossils)

Identify each of the labeled fossils on this slab collected from the spillway at Caesar Creek Park.

49. Specimen A - What Phylum? brachiopoda

50. Specimen B - What Phylum? bryozoan

51. Specimen C - What Class? Articulata (brachiopod)

52. What appendage do many species of the Phylum represented by Specimen A posses that attach to this organism? pedicle

53. What are the two most common matrixes of this fossil sample: shale and limestone

54. What geologic period does this slab represent? Ordovician

55. Mazon Creek in Illinois is a famous fossil locality. In what geologic PERIOD do fossils from this site represent? Pennsylvanian

56. Why are the Mazon Creek fossils so important? These fossils frequently have both hard and softer parts preserved. In addition many soft-bodied organisms that do not usually fossilize are preserved at this site.

57. Mazon Creek is known as a Lagerstätten. What does this mean? Lagerstätten are depostis that exhibit extraordinary fossil richness and completeness. The word literally translates as “lode places.”. Perhaps a better (but looser) translation would be “mother lodes.” These are the deposits that paleontologists search many lifetimes to find.

STATION #9 Trace Fossils (worm tracks)

58. What was the most likely method of preservation of the fossils in these samples? D

A. replacement
B. carbonization
C. permineralization
D. mold and cast formation

59. The study of trace fossils is also known as what? Ichnology

60. The fundamental unit of taxonomy is the? Species

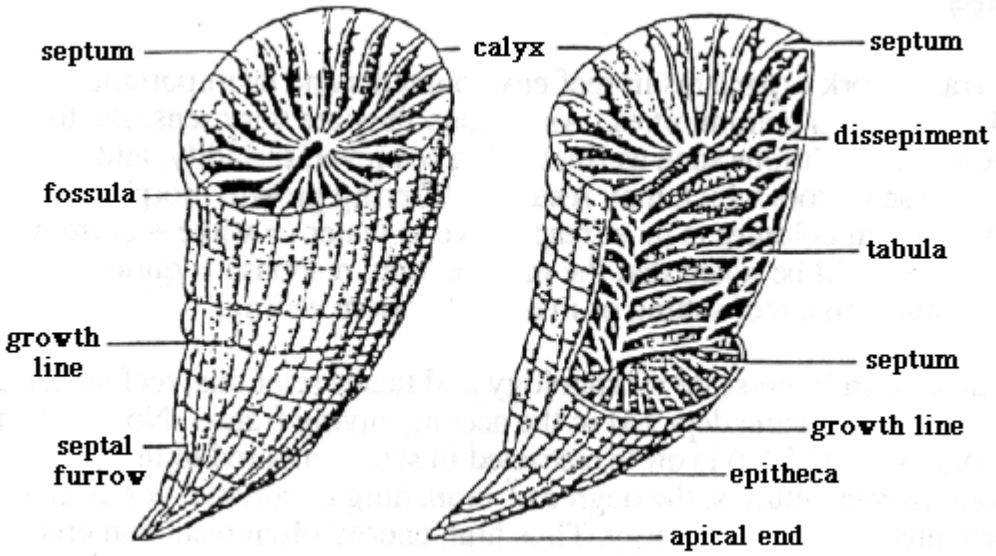
61. _____ can be defined as a change in gene pool frequencies through time.

EVOLUTION

62. The oldest rocks are on the bottom and the youngest rocks are on the top is also known as what?

Law of Superposition.

STATION #10 MOROPHOLOGY



63. What is the name of this part/structure? Septum

64. What is the name of this part/structure? Growth line

65. What is the name of this part/structure? Tabula

66. When do species of this phylum first appear in the fossil record? Precambrian

67. What is the genus name of the arthropod replica on this table? Eurypterid

68. What is the PHYLUM of this fossil? Arthropoda

69. Although this animal lived in an ancient sea, it is most closely related to modern_____ scorpions (arachnids)

STATION #11 (trilobite)

70. Which combination of characteristics would give a species the **best** chance of leaving a fossil? C

Characteristic	
I large numbers	IV hard parts
II lived on land	V lived in a marine environment
III moved freely	VI remained stationary

A. I, II and III B. II, IV and VI C. I, IV and V D. II, III and IV

71. True or False – The Class of this sample is the earliest of all known Arthropods. True

72. Name the process that allowed these organisms to grow or get larger.
Molting

73. True or False – All organisms of this Class were marine, became extinct at the end of the Cambrian, and have great stratagraphic value. False (Permian)

74. The Burgess Shale is a famous locality in the Rocky Mountains for finding fossils from what geologic period?
Cambrian

75. Why is the Burgess Shale such an important find? Either answer:

Were buried in fine mud that preserved exceptionally fine details of the structure of their soft parts.

They represent an early snapshot of the complexity of evolving life systems. The Burgess Shale fossils as a group have already developed into a variety of sizes and shapes from the much simpler, pre-Cambrian life forms.

Many of them appear to be early ancestors of higher forms; from algae to the chordates (a major group of animals that includes human primates). Others appear unrelated to any living forms and their later disappearance presents an intriguing mystery.

STATION #12 Conularia (torma 19) (A), blastoid calyx (torma 3) (B), Cephalopod (torma 12)(C)

76. To what PHYLUM does this specimen A belong? Cnidaria

77. What is the symmetry of specimen A? 4-sided pyramidal

78. To what CLASS does specimen B belong? blastoidea

79. What is the symmetry of specimen B? 5-fold or pentameral

80. What is the name of the structure represented by Specimen B? Calyx

81. What is the geologic range of this Class (specimen B)? (Silurian –Permian)

82. What SUBCLASS does specimen C belong? Ammonoidea

83. What suture pattern does this sample represent? Ammonitic

84. True or False – All species SUBCLASS represented by specimen C are marine, carnivorous, and have external shells. False

STATION #13 (sponge, Torma sample # 6, sample A,)(bryozoans, torma sample 14, labeled B)

85. What is the Phylum of specimen A? Porifera

86. True or False – All members of the phylum represented by Specimen A have no internal organs, no circulatory or digestive systems, and all adult specimens are attached to the substrate and have no method of locomotion. TRUE

87. What phylum has a paleontological record that is not exceeded in length by any other animal? Porifera.

88. What phylum is represented by specimen B? Bryozoa

89. True or False – A digestive tract would have been present in specimen B. TRUE

90. Who's 1859 book is considered the foundation for the Theory of Evolution? Darwin

91. The process that operates to preserve the most beneficial spectrum of genetic variation in a group of organisms is more commonly known as what? Natural Selection

92. What scientist is credited with developing our current taxonomic hierarchry? Linneaus

Station 14 (lycopsida, torma sample 8 (A), shark tooth (sample 7 torma(b))

93. What is the Genus of specimen A? Lepidodendron

94. True or False – Specimen A was seed bearing. False

95. Why aren't the bones of animals represented by Specimen B preserved as commonly as those from the Class Osteichthyes?
They are cartilage.

96. Speaking of fish, what is the name of the famous Eocene Formation found in Wyoming that is know for its outstanding specimens?
Green River Formation

97. What Era is considered the age of marine invertebrates?
Paleozoic

98. True or False – Evidence of direct contact between Homo neanderthalensis and Ornithischian dinosaurs exists. False

99. True or False – Placoderms are primitive fish that first appeared in the Paleozoic, and are now extinct. True

100. Mammals first appear in the: D
a) Early Jurassic
b) Cretaceous
c) Early Cenozoic
d) Late Triassic

Station 15 – Coral (torma 20) (A), coprolite (torma 13) (B), atrypa (torma-5 (C)

101. What is the Phylum of sample A? Cnideria

102. What Order is Sample A? Tabulata

103. What type of fossil is Sample B? corprolite or trace fossil

104. What is the Genus of Sample C? Atrypa

105. True or False – It would be possible to find all three of these samples in the same formation. False

106. Could you ever find samples A and C in the same rock formation ? Yes

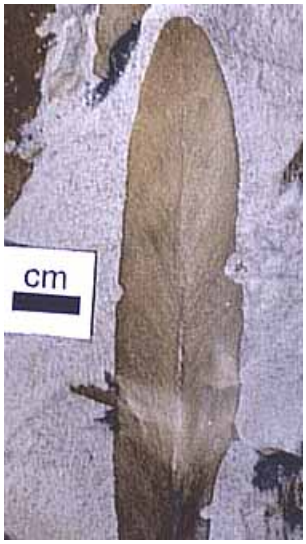
107. True or False – Sample C has a tooth and socket structure. true

108. Animals that do not have valves that are hinged by teeth and sockets, and usually have chitinophosphatic shells, are commonly called what? Inarticulate Brachipods

109. Many scientists feel the boundary between prehistoric and modern, although not precisely defined, is about _____ years ago. 10,000

STATION #16 (photos of plant fossils)

#111-115 Identify each of these by Genus



111. Specimen A

112. Specimen B

113 Specimen C

114. Specimen D

115. Specimen E

Specimen for Question #115

115. True or False: Herbaceous ferns were more abundant during the Pennsylvanian Period than the *seed ferns*. **False**

Station #16 photo

A Glossopteris www.ucmp.berkeley.edu/IB181/VPL/Cup/Cup2.html

B acer facstaff.gpc.edu/.../geology/geo102/cenozoic.htm

C Lepidodendron : www2.mcdaniel.edu/.../lepidendron.htm

D Annularia: www.emc.maricopa.edu/.../BioBookPaleo4.html

E Calamite www.geology.siu.edu/big/fossils.html

Fossil fern www.uni-muenster.de/.../Palbot/seite8.html

MENTOR INVITATIONAL 2009

FOSSILS “C” DIVISION

ONE FIELD GUIDE AND ONE 3-RING BINDER WITH ALL MATERIAL INSERTED INTO RINGS ARE PERMITTED

School _____ Team # _____

Names of participants
1. _____2, _____

Raw score _____/ possible Rank _____