FOSSILS

Who?? What?? When?? Where?? Why??

1. I am a type of fossil that can be used for correlating and dating geologic strata found in different parts of the world. I have the following characteristics:

- Short geologic range (time between appearance and extinction is short)
- Widespread geographic range (found in many places around the world)
- Found in various rock types
- Have hard parts that easily fossilize (calcareous, siliceous, phosphatic or organic)
- Am abundant/common
- Am easy to identify or recognize.

What am I?

2. I evolved from nautiloids in the mid-Paleozoic, reached my peak in the Mesozoic and became extinct at the end of the Cretaceous. My siphuncle is located near the outside (ventral side) of my shell. My Class name means "head foot". **What is my Class and Subclass?**

3. My shell is divided into chambers by partitions called septa. The area where a septum fuses to the inside of the shell creates a pattern which can be simple or complex. **What is the name of this pattern?**

4. During this Epoch, the earth experienced very cold temperatures. Ice repeatedly pushed out of the Artic Circle as continental glaciers which covered parts of Europe and North America. Mammals (such as the mammoth, rhinoceros, bison, reindeer and musk ox) evolved woolly coats to protect themselves from the cold temperatures. **What is the name of this Epoch?**

5. I lived during the Devonian and am the State Fossil for Pennsylvania. My head shield is almost completely covered by my glabella and my eyes. My eyes are called schizochroal eyes and were specially evolved to improve my vision. They have rounded lenses instead of hexagonal lenses. I am commonly found rolled up in a ball, with my tail (pygidium) tucked up underneath my head shield. **To what Phylum do I belong? What is my Genus?**

6. I am a German word meaning "place of storage". Sedimentary deposits that exhibit extraordinary fossil richness or completeness are given my name. **What is this German word?**

7. I am the process in which groups of organisms (species) die out. Because of me, over 99% of all species that have ever lived are no longer living. **What am I?**

8. I am called Sea Lily because of my resemblance to a plant. I have branching arms attached to a globular body (calyx) and a long, slender stem attached to the sea bottom by a root-like holdfast. I was a filter feeder. The gastropod Platyceras lived off my feces. Pieces of my stem are commonly found as fossils. I am the State Fossil of Missouri. **What am I?**

9**.** I am a chart that describes the timing and relationships between events that have occurred during the history of the Earth. I am separated into Eons, Eras, Periods and Epochs. Each of my Eras is separated from the next by a major event or change. I show date ranges in millions of years (m.y.a.). **What am I?**

10. I am a famous rock formation in the western Canadian Rockies. My fossils preserve many details of the soft parts of early Cambrian invertebrates. The organisms preserved in my layers were buried by an underwater avalanche of fine silt. **What is my name?**

11. I am the greatest of all the mass extinction events in geologic history. Ninety percent of marine life and about 75% of vertebrate life on land were wiped out. The trilobites, tabulate corals, rugose corals and blastoids became extinct. **What am I called?**

12. My name means "fish lizard". I am the Nevada State Fossil. I was a dolphin-like reptile up to 75 feet long! I had paddle-like flippers, massive ear bones and large eyes. My vertebrae are concave on both sides. I gave birth to live young. I first appeared during the Triassic Period, was at my peak in the Jurassic and became extinct in the Late Cretaceous. **During what Era did I live and what is my name?**

13. I am a type of sedimentary rock made up almost entirely of fossil debris with little or no matrix, loosely cemented together fossil fragments. I form in zones of high energy where finer material is carried away. What is my name?

14. My Rancho La Brea Tar Pits preserve the bones of animals from the Pleistocene that became stuck and then sank into tar that had seeped from the ground. Predator and prey animal remains are found, along with insects, plants and pollen. My fossils include *Smilodon* (the Saber-toothed Cat), the official fossil of this state. **Where am I?**

15. My Phylum is the most diverse and abundant of all animal phyla. Distinguishing features include an external skeleton made of chitin, a segmented body and jointed appendages. I lived during the Middle Cambrian. As you can see from the picture, my head and tail are relatively small compared to the rest of my body. **Who am I (Genus)? What are the names for my head, body and tail?**

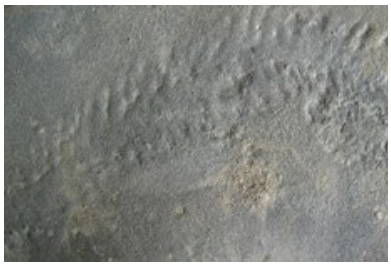
16. I am composed of tiny, flat clay particles deposited in horizontal layers. I am very fine-grained and I weather easily. I form in low-energy environments. **What rock am I**?

17. I am in Kingdom Protista, Phylum Protozoa, Order Foraminifera. I am circular in outline, made up internally of small chambers arranged in a spiral. My name means "little coin". I was abundant in the ancient shallow, warm seas of the Tethys Ocean. Limestone made up of my fossils was used to build the Egyptian pyramids. **Who am I?**

18. I am the second largest mass extinction event and I occurred about 65 m.y.a. The dinosaurs, pterosaurs, marine reptiles and ammonites are among the 85% of living things that became extinct at this time. Trace amounts of iridium are found in rock strata of this age. Theories about my cause include massive volcanic eruptions and giant meteorite impacts. **What am I called?**

19. I may occur in shallow to deep marine environments and may also form as a chemical precipitate or from the accumulation of calcareous microfossils. Remains of reef-building corals may form huge deposits. **What rock am I?**

20. I am a record of past biological activity; the photos above show three examples. I provide important information about lifestyles and habits of extinct creatures. I can include tracks, burrows, feeding marks, nests and eggs. My fossils are called ichnofossils. **What is the other name I am known by?**



21. My particles are commonly rounded grains of quartz. I form in moderately high-energy beach, river-delta and desert environments. My grains may be cemented together with calcite, quartz or iron-oxide. **What rock am I?**

22. I was a single-celled organism that floated in marine waters. I am shaped like grains of rice or wheat. My protective skeleton is called a "test". I am an excellent index fossil and am useful in biostratigraphy and for finding oil deposits. I am used to study past climates and ocean conditions. **Who am I?**

23. Some dinosaurs used me to aid in digestion, similar to birds today. These smooth stones would help to grind up vegetation in the gizzard. What am I?

24. I am a saucer-shaped fossil found in rocks of Silurian to Devonian age. My skeleton is a felt-like mass of spicules that form distinctive star- or flower-shaped features on my surface. I am in Phylum Porifera. My informal name is Calcispongia. **Who am I?**

25. I marked the beginning of the Mesozoic Era, the Age of the Dinosaurs. During my time, the present-day continents were massed together into on huge continent known as Pangaea. **What is the name of my time period?**

26. I flourished during the Mesozoic Era. A seed-bearing plant, I was dependent on wind to blow pollen to eggs which would then form seeds. My leaves are fan-shaped and may be notched or lobed. My informal name is Maidenhair tree. I am called a "living fossil" because living specimens were found in southeast China in 1956. **Who am I?**

27. Fossils are prehistoric remains or traces of life which have been preserved. Organisms do not all have an equal chance of being preserved. **What three things increase the odds of becoming a fossil?**

28. I lived during the Paleozoic Era. An articulate brachiopod, both my ventral (pedicle) valve and my dorsal (brachial) valve are sharply bent dorsally at the margins. My valves have fine radial ribs and thick, concentric, rounded ridges or wrinkles. I was adapted for living in the sediment, rather than above it like most articulate brachiopods. **Who am I?**

29. Discovery of my leaf fossils in rocks of similar age in countries thousands of miles apart lent support to Alfred Wegener's theory of Continental Drift. My leaves are lance- or tongue-shaped and they fell to the ground at the end of the summer. **What is my name?**

30. I reached my greatest diversity during the humid, tropical environment of the Carboniferous Period, and I make up a significant portion of the organic matter in coal deposits of that age. I am the largest horsetail tree and my trunk had distinct nodes or raised, rib-like rings, spaced regularly, with vertical ribs between them. Leaves or branches attached in whorls at these nodes. A pith cast of my stem is a common fossil. **What is the name of this fossil?**

31. Corals from this Order are only found in Paleozoic rocks and all are colonial. Their corallites are typically long, straight, slender tubes. The septa are inconspicuous or absent, but there are well-developed horizontal platforms (tabula). A common example of this type of coral is *Favosites*. **What is the name of this Order?**

32. I am the screw-like axis that held the edge of a lacy colony of Bryozoans. I am found in Mississippian-age rocks. **What is my name?**

33. I am the biggest trilobite in the picture to the left. As you can see, I am missing my cheek plates! This is not something to be worried about though. My exoskeleton would split apart in order to allow for something to happen. Because of this, various pieces of my exoskeleton have been fossilized and can be found in a wide range of sizes. **What is the process of splitting my exoskeleton called and why did it happen?**

34. This type of fossil preservation preserves plants or animals as a thin carbon film, usually in fine-grained sediments (shales). Fine details of the organisms may be preserved. Plant fossils in shale are generally preserved this way. Soft-bodied animals may also be preserved in this manner in black shale (an example is the Burgess Shale fossils). **What is this type of preservation** called?

35 My Genus name means "scale tree" and I am the fossilized bark of one of the dominant tree forms during the Carboniferous (Pennsylvanian) Period. I could grow up to 30 meters tall. Leaves grew directly from my stem, and when they fell off, a diamond-shaped leaf scar was left. Fossilized pieces of my roots show circular scars and are called *Stigmaria*. **What is my Genus name?**

36. I am from a group of ornithischian (bird-hipped) dinosaurs. My main characteristics were two rows of dorsal plates that ran along my back and caudal (tail) spikes that may have been used for defense. The dorsal plates had a large surface area and may have been used for regulating temperature. I am the Colorado State Fossil. **Who am I?**

37. I am the fossilized leaf whorls of an extinct horsetail. These horsetails (Sphenopsida) were arborescent (tree-like) and grew to a height of 10 meters (32 feet). They reached their greatest diversity during the Carboniferous Period and make up a large portion of the organic material in coal deposits of that age. **What is my name? What is the name of the fossil of the stem of the extinct horsetail (commonly found as a pith cast)?**

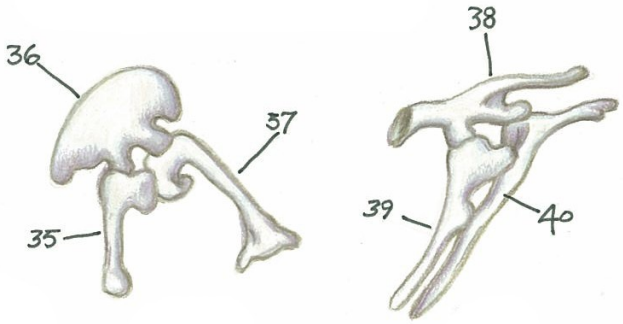
38. My colonies are made up of connected individuals called zooids. I am sometimes called "moss animals" and I may be encrusting, massive, branching or sheet-like. Though I may resemble corals, I am most closely related to brachiopods (both of us have a specialized organ called a lophophore that was used for food gathering). **What is my Phylum name?**

39. I was pelagic, drifting with the currents. My fossils commonly appear in black shales and resemble marks from a graphite pencil. The edges of my branches have a serrated appearance. Because I was planktonic, my fossils are found in rocks around the world. My different species make excellent index fossils. **What am I called? What is my Phylum?**

40. The large teeth pictured above come from two mammals that lived during the Quaternary Period. These mammals resembled modern elephants; DNA from a Siberian specimen of one of these creatures revealed that it was almost identical to that of living elephants. **What are the names (Genus) of these two mammals?**
Which tooth belongs to which mammal- the tooth on the left is from?
the tooth on the right is from?
How were they different from modern elephants? How were they different from each other?

41. My theca (calyx) resembles an acorn or flower bud. It shows 5-rayed symmetry, with 5 ambulacral grooves or rays and 5 holes near the top surrounding my mouth. My fossils are widespread in the Upper Mississippian-age rocks of the Midwestern U.S. and are often found preserved with rugose corals, bryozoans, brachiopods and crinoid debris. **What is my Phylum and Genus? What type of habitat did I live in and how did I feed?**

42. Dinosaurs are divided into two Orders based on their pelvic structure. The Saurischian dinosaurs are referred to as "lizard-hipped" because their hip/pelvic structure was similar to that of lizards. The Ornithiscian dinosaurs are called "bird-hipped" because their hip/pelvic structure is similar to that of birds. Which Order of dinosaurs are the ancestors of birds?



Answers:

1. Index fossil/guide fossil/zone fossil
2. Class Cephalopod Subclass Ammonoidea
3. Sutures
4. Pleistocene Ice Age
5. Arthropoda; *Phacops*
6. Lagerstatte (plural Lagerstatten). Two kinds are noted: Concentration Lagerstatten which are deposits with a particular concentration of disarticulated hard parts (such as a bone bed). Conservation Lagerstatten are known for exceptional preservation of fossilized organisms where soft parts are preserved as impressions or casts. The Burgess Shale in British Columbia and Solnhofen limestone in Bavaria, Germany are two examples.
7. Extinction
8. Crinoid
9. Geologic Time Scale
10. Burgess Shale
11. Perminan Extiction (end of Permian Period)
12. Mesozoic Era; *Ichthyosaur*
13. Coquina
14. California (Hancock Park in Los Angeles)
15. *Elrathia*; Cephalon, thorax, & pygidium
16. Shale
17. *Nummulites*
18. Cretaceous Extinction (end of Cretaceous Period)
19. Limestone
20. Trace Fossils
21. Sandstone
22. Fusulinid (*Triticites*)
23. Gastroliths
24. *Astaeospongia*
25. Triassic Period
26. *Ginkgo*
27. Hard parts, rapid burial by sediment, escape physical, chemical and biological destruction after burial.
28. *Leptaena*
29. *Glossopteris*
30. *Calamites*
31. Tabulata (tabulate corals)
32. *Archimedes*
33. Molting or shedding exoskeleton; this happened in order to allow the creature to grow.
34. Carbonization
35. *Lepidodendron*
36. *Stegosaurus*
37. *Annularia; Calamites*

38. Bryozoa
39. Graptolites; Hemichordata
40. *Mammuthus* and *Mammut* (known as Wooly Mammoth and Mastodon); left = *Mammuthus; right = Mammut*; Smaller ears, covered in thick hair (long hair and thick undercoat), long curved tusks (*Mammuthus*); *Mammuthus* was larger than *Mammut* (16 1/2' to 9 ¾'; 8.8 tons to 5.5 tons; larger/longer tusks); teeth were very different because of different diet- *Mammuthus* was grass eater living along the edges of the ice-age glaciers and *Mammut* lived in dense conifer forests, eating spruce and other low-fiber vegetation.
41. Blastoidea; *Pentremites*; Shallow marine with fairly well-agitated water which was needed to bring food to this stationary filter feeder.
42. Saurischian (lizard-hipped) dinosaurs