

**Part 1: Recognizing types of fossils and modes of fossil preservation**

Observe the fossil specimens and determine whether each one is a body fossil or a trace fossil. Also determine the type of fossil preservation:

- Unaltered (mummified, preserved in tar, preserved in amber, etc.)
  - Permineralization (minerals fill pore spaces)
  - Mineral recrystallization (mineralogy remains the same)
  - Mineral replacement (mineralogy changes)
  - Carbonization
  - Mold or cast (specify which one)
- A. A recent bivalve shell and a fossil bivalve shell. The recent shell is made of a material called aragonite, which is a variant of the mineral calcite (with the same chemical formula). Aragonite gives the shell its colorful, mother-of-pearl appearance. Aragonite often becomes unstable after the organism dies and will revert to calcite, which is more stable. Note that the fossil shell made of calcite has a chalky appearance.
1. What type of fossil is this? Circle one: body fossil trace fossil
  2. What is the type of preservation?
- B. Fossil brachiopods. Living brachiopods have shells made of calcite.
1. What type of fossils are these? Circle one: body fossil trace fossil
  2. What mineral are these shells made of?
  3. What is the type of preservation?
- C. A mudstone containing an impression of a trilobite and an impression of a brachiopod.
1. What type of fossils are these? Circle one: body fossil trace fossil
  2. What is the type of preservation?
- D. A coprolite (fossil dung) composed of quartz.
1. What type of fossil is this? Circle one: body fossil trace fossil
  2. What is the type of preservation?
- E. Fossil plant leaves in mudstone.
1. What type of fossil is this? Circle one: body fossil trace fossil
  2. What is the type of preservation?
- F. Borings made by clams in sandstone.
1. What type of fossil is this? Circle one: body fossil trace fossil
- G. An insect in amber.
1. What type of fossil is this? Circle one: body fossil trace fossil
  2. What is the type of preservation?
- H. A fossil gastropod. This is a replica (made of limestone) of an original calcite gastropod shell.
1. What type of fossil is this? Circle one: body fossil trace fossil
  2. What is the type of preservation?
- I. A fossil dinosaur bone.
1. What type of fossil is this? Circle one: body fossil trace fossil
  2. What is the type of preservation?
- J. Fossilized burrows in dolostone from southeastern Minnesota.
1. What type of fossil is this? Circle one: body fossil trace fossil

K. Fossilized wood.

1. What type of fossil is this?      Circle one: body fossil   trace fossil
2. What is the type of preservation?

L. Two replicas of skin from the Late Cretaceous dinosaur *Edmontosaurus*. Unique burial conditions permineralized this animal's soft tissues as well as its bones. The differences in skin texture may represent differences in body coloration.

1. What type of fossil is this?      Circle one: body fossil   trace fossil

Complete

**Part 2: Minnesota fossils**

Compared to other states, Minnesota has a very long history. The 3.85 billion-year-old rocks from Granite Falls are some of the oldest in the world. On the other hand, long periods of time are missing from the Minnesota rock record. Most of the fossiliferous rocks of Minnesota are in the southeastern part, from Taylor Falls south to the Twin Cities along the St. Croix River; from the Twin Cities south to Mankato and east to the Mississippi River. During the Cambrian, Ordovician, Devonian and Cretaceous periods, sea level was as much as 1000 feet higher than today, and much of Minnesota was covered by water that supported shallow ocean ecosystems.

All of the fossils in this exercise are from Minnesota, mostly from counties in the southeast. Follow the key in the first pages of “Minnesota Fossil Identification” on D2L to identify each specimen.

Sample	Identification
1	Phylum
2	Phylum
3	Phylum Class Order
4	Phylum Class
5	Phylum Class
6	Phylum Class
7	Phylum Class
8	Phylum Class Group
9	Phylum Class Group

10	Phylum Class Order	See 10A in the front of the room to observe the suture pattern
11	Phylum	
12	Phylum Class	
13	Phylum Class	
14	Phylum Class Order	This species can reach one foot in diameter and 14 feet long. See #630 in the SLC hallway display for another example.
15	Domain Group	This rock is almost two billion years old!
16	Domain Kingdom Group	
17	Phylum Class	This specimen is #620 in the SLC hallway display. This species from Granger, Minnesota is one of the largest in the world.
18	Phylum Subphylum Common name	See #618 in the SLC hallway display for another example.
19	Phylum Subphylum Common name	

Complete

## Taxonomic groups for Part 2:

### ❖ Domain Bacteria groups:

- Stromatolite

### ❖ Domain Eukarya

#### ● Kingdom Protista groups:

- Foraminifera
- Radiolaria
- Diatoms
- Coccoliths
- Dinoflagellates

#### ● Kingdom Plantae groups:

- Receptaculitids

#### ● Kingdom Animalia

- Phylum Porifera
- Phylum Cnidaria
  - Class Anthozoa
    - Tabulate corals

- Rugose corals

- Scleractinian corals

#### ○ Phylum Brachiopoda

- Inarticulate

- Articulate

#### ○ Phylum Bryozoa

#### ○ Phylum Mollusca

- Class Gastropoda

- Class Bivalvia

- Class Cephalopoda

- Order Nautiloidea

- Order Ammonoidea

- Order Coeloidea - belemnites

#### ○ Phylum Arthropoda

- Class Trilobita

- Class Chelicerata – Eurypterids

- Class Crustacea

#### ○ Phylum Echinodermata

- Class Blastoidea

- Class Crinoidea

- Class Echinoidea

#### ○ Phylum Hemichordata

- Graptolites

#### ○ Phylum Chordata

- Subphylum Vertebrata

- Class Conodonts