



FOSSILS

# WHAT IS A FOSSIL?

- It's a rock. Sorry guys. Nothing cool. THE END.



Fossils are the preserved remains, or traces, of organisms (preserved usually in rock).

# What needs to be present for a fossil to form?

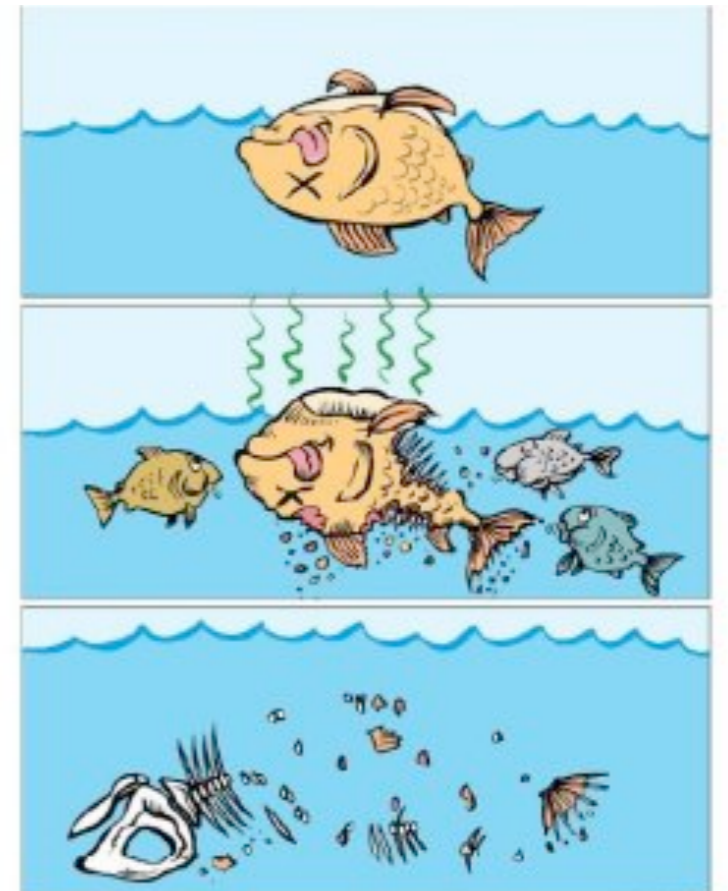
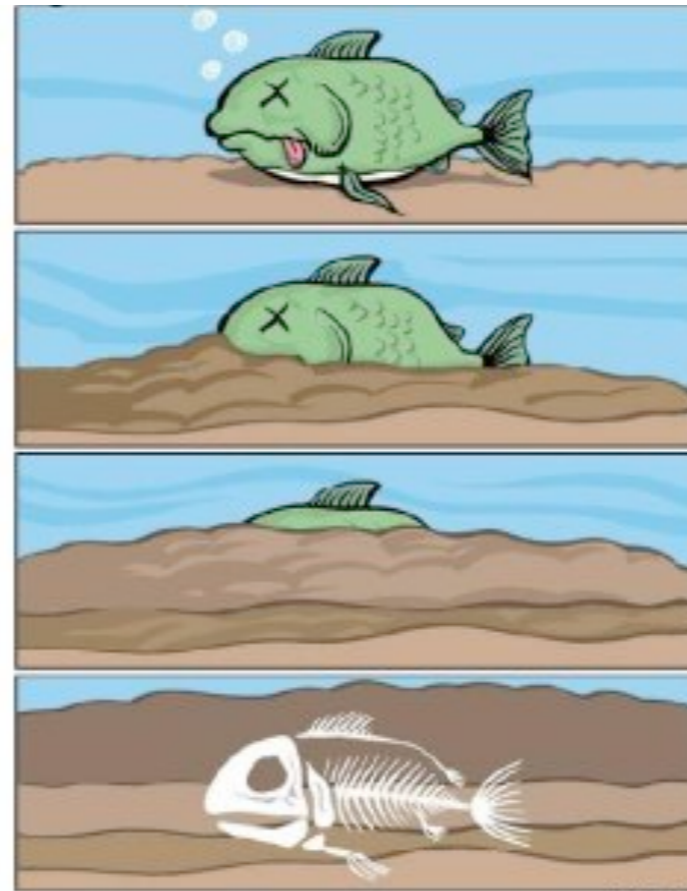
- Fossils form under very strict conditions
- Fossils form BEST:
  - With hard body parts (teeth, bones, shells)
  - When they die whole (not eaten)
  - When they are covered quickly after death
  - When there is little oxygen around them (Less decomposition)



# Aquatic vs. Terrestrial Fossils

1. Aquatic fossils can form by sediments covering an organism

a) (The “rain of sediments”).



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2. Terrestrial fossils form during landslides, after flood deposits, volcanic eruptions, freezing, and other catastrophic events.

# Fossil formation

## Examples

- Which of these would be the best location for a fossil to form?
  - Bottom of a swamp or in a fast-moving stream?
  - Windy desert or a grassland?
  - The bottom of the ocean or the middle of a rainforest?

# Fossil formation

## Examples

- ANSWERS
  - Bottom of a swamp. It's low-oxygen
  - Windy desert. It will have plenty of sand to cover the organism fast.
  - The bottom of the ocean. There is little oxygen and sediment continuously falling on the fossil.
- Fossils on land form during landslides, after flood deposits, volcanic eruptions and other catastrophic events.

# Fossil formation

## Examples

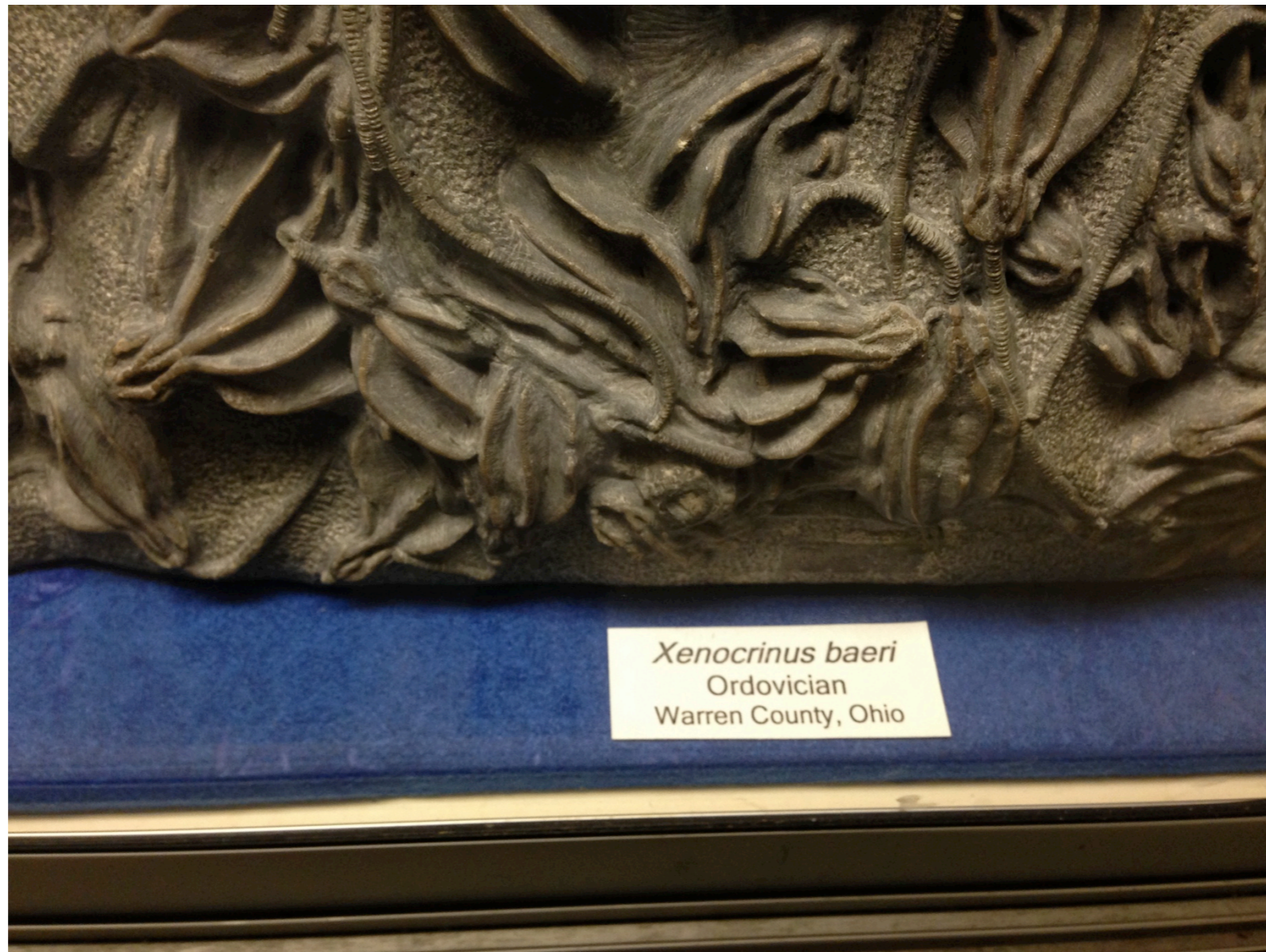
- Which organism is more likely to be fossilized?
  - A beetle or a slug?
  - A bird or a fish?
  - A tree or moss?
  - A jellyfish or a crab?

# Fossil formation

- ANSWERS
  - A beetle. It has hard parts
  - A fish. It's more likely to be covered in an environment without oxygen
  - A tree. It has hard parts
  - A crab. Again, it has hard parts.
- Most organisms don't become fossils.
- Aquatic organisms are more likely to fossilize than terrestrial organisms



# Fossil types



- So, what kinds of fossils do we have?

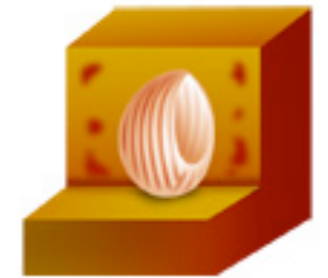
# Fossil Types: Casts and Molds

- A hard body part is trapped in sediment.
- The shaped outline is a mold
- If the body part dissolves, and then the open area fills with rock again, we get a cast
- These are COMMON

Cast Fossil



1. Shells occasionally fell on the sediment rock.



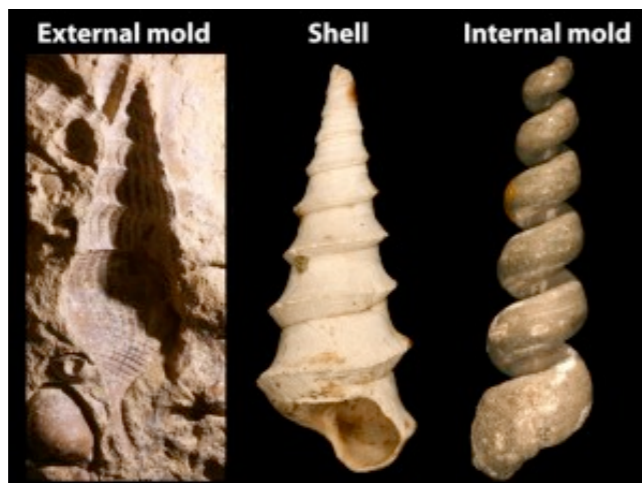
2. Shells were buried within short time.



3. Shells dissolved and became pith casts.



4. Shells were replaced by organic substances or the pith casts were filled up



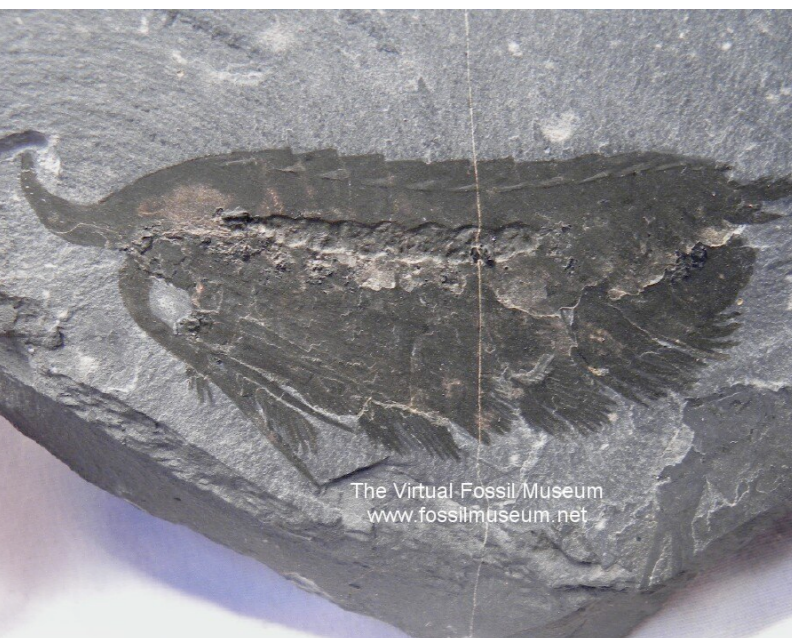
# Fossil types: Permineralization

- Occurs when the organism is quickly covered, and little decay occurs
- Water in seeps into the organism and leaves minerals, which crystallize into the shape of the organism
- Can leave detailed fossils, even with soft-bodied organisms.



# Fossil types: Carbon Films

- This happens with soft-bodied organisms (plant leaves, worms, graptolites, feathers, etc)
- Over time, heat and pressure cause the carbon to imprint on a rock layer, giving the “shadow” of the organism
- VERY DETAILED



# Fossil types: Amber

- Tree sap hardens, and becomes a fossil itself (amber)
- Sometimes, organisms are trapped in tree sap. Bugs, fungi, bacteria, and other organism remains
- The hardened sap preserves another organism
- 2 fossils in 1! Careful though: some people don't consider the amber a fossil because it is not technically a rock.



# Fossil types: Trace Fossils

- These are the leftover evidence of organisms that aren't actually PART of the organisms.
- Leaf imprints, foot prints, burrow holes, gastric stones, and coprolites...go ahead. Ask what it is!



# How Fossils help us Date rocks and events:

## Index Fossils

- Certain Fossils (index fossils, or guide fossils) can also tell us about **WHEN** a certain rock layer formed
- We know that certain organisms existed for only a short time.
- If we find that organism in a rock layer, we know the rock layer was formed in a certain time period.



# Index Fossils

- Good index fossils must be
  - Easily identified
  - Only existed for a short period of history
    - (either went extinct or changed features)
  - Found in a wide variety of areas



# Example Index Fossils

- Ammonites

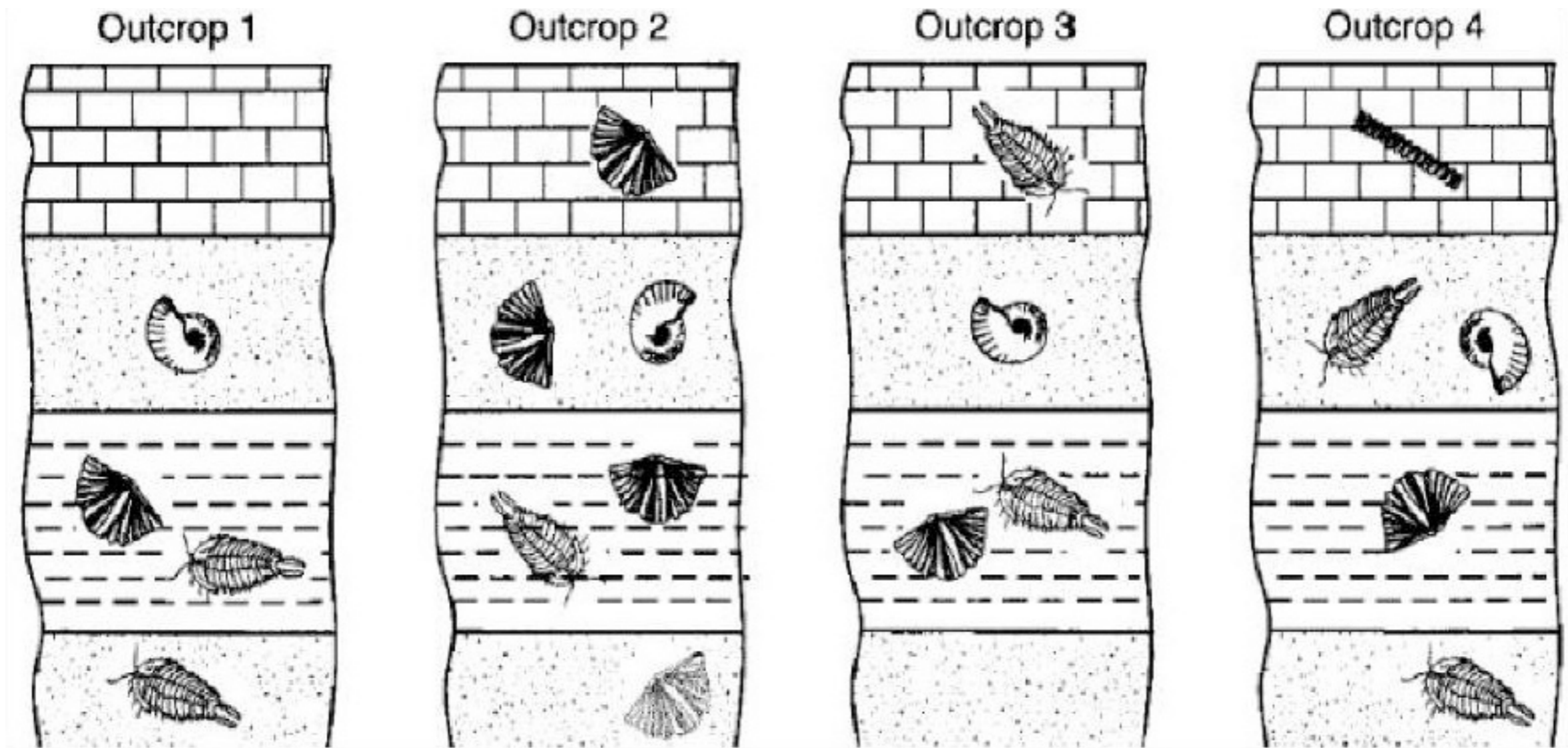


- Trilobites



# Index Fossils and Biostratigraphy

- Biostratigraphy: Using the fossil record to help us date the rock layers
  
- Also helps us determine which rock layers are the same age. If they have the same fossils, they are the same age, or near the same age.



These 4 rock sequences are separated by great distances. Which rock layers are the same age?

First off...which fossil type is an index fossil?

Secondly...which layers are the same age?

