

FOSSILS

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-ont- = study of being

Paleontology

Paleo- = Ancient

-ology = study of

WHY STUDY THIS?

- Evolution
 - Why are there differences between organisms and how do they become different?
 - *Fossils provide the only physical evidence for evolution
- Biostratigraphy
 - Geological Time
- Paleobiogeography
 - Where and why have organisms lived where they have over time?
- Paleoecology
 - Change of environment over time

A LITTLE REVIEW –GEOLOGY



- Geologic Timeline: Timeline of Earth based on geologic events and mass extinctions
- Index Fossil –fossil of an organisms that was widely abundant for a short period of time
- Three Rock Types:
 - Sedimentary
 - Igneous
 - Metamorphic
- Erosion and Weathering-break down on rock by surficial processes
- Photo: Cambrian /Ordovician Boundary Site Newfoundland

DISCOVERING FOSSILS

*NOTE THIS IS NOT LINEAR STEPS, THEY CAN COINCIDE

Step Back: What do we have?

- Hard V Soft Bodied
- K (large body, few offspring) V R (small body, many offspring)

Step 1: Death –want a high preservation possibility

- How it died: **natural**, scavenged, **disaster**
- Where is died: **depositional** V erosional environments

Decomposition / Savaging / Transport

- Dose the body move form where it died?
- Transport=abrasion and rounding
- Sedimentary compaction

DISCOVERING FOSSILS

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Burial Environment

- **Depositional** –Sediments → Compression
- Erosional –no fossils

Preservation

- Different modes of preservation –we will be learning about this soon

Erosion

- Differential erosion of fossils

MAKING AND DISCOVERING FOSSILS

*NOTE THIS IS NOT LINEAR STEPS, THEY CAN COINCIDE

Discovery / Collection / Recording

- This step has the biggest imposed bias
- Collection Technique: screen washing V surface collection V quarrying
- Record Keeping
- How to decrease bias
 - Good Record Keeping (field notes)
 - Through Curation

TWO TYPES OF FOSSILS

Body Fossils



Trace Fossils



BODY FOSSILS

- Unaltered Remains
 - Bog and Peat slow down decomposition
 - Permafrost Preservation
- Replacement –when original biological tissue is replaced by new minerals
- Permineralization –pore space in original tissues is replaced by new material
- Recrystallization –when original mineral recrystallized during preservation, original crystal structure is reformed
- Carbonization –original material is replaced by thin carbon film (common in plants)

TRACE FOSSILS

- External Mold –makes impression in sediment, and then the fossil dissolves away
- Internal Mold –gastropod filled I with sediment
- Crawling Traces
- Resting Traces
- Dwelling Traces
- Grazing Traces
- Feeding Traces

SHARKS AND FOSSILS

- What are sharks skeletons made of?
 - Cartilage
- What in our bodies are made of Cartilage?
 - Ears and Tip of Nose
- Do we see the ears and nose in human skull remains?
 - No
- What is something about a shark that can fossilize?
 - Teeth

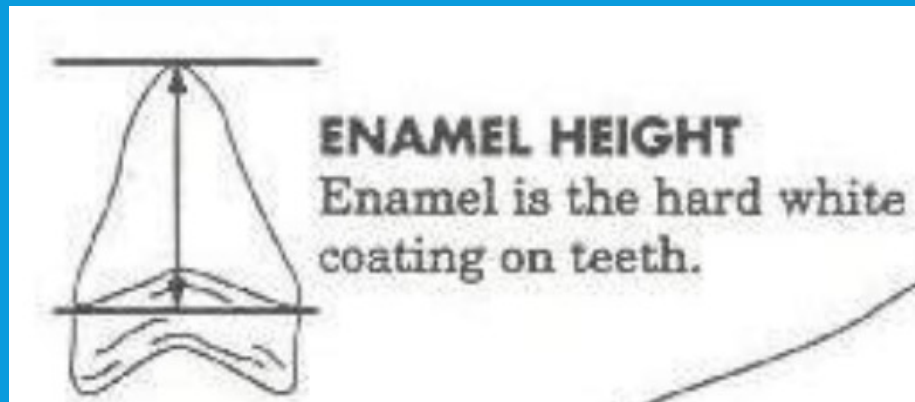
SHARK TEETH

- Sharks have multiple rows of teeth and will go through thousands in their lifetime.
- Shark teeth naturally fall out so teeth deposited into the environment not only when the shark dies, but throughout its life
- Sharks are well distributed all over the worlds oceans
- Most ocean floors are depositional environments
- When a tooth falls to the surface it is slowly buried by layers and layers of sediment
 - As the sediments piled on, water seeps through, and eventually the pore space in the teeth is replaced with minerals is the process called permineralization

WHAT CAN SHARK TEETH TELL US?

Estimating Size of Shark

The enamel height of the tooth in inches multiplied by 10 gives us an estimated length of the shark in feet



Diet

Based on the size and shape of the tooth we can determine the sharks diet



ESTIMATING SHARK SIZE

- To calculate the size of the tooth you take the enamel high in **inches** and multiply that by 10 to get the estimated length in feet.
- Sometimes we do not measure in inches, we measure in centimeters so we need to convert!
- **1in=2.54cm**
- **Example: If a sharks' tooth is 1.56cm estimate how long the shark's body is.**
- **Step 1: Convert from centimeters to inches**
- $$\frac{1.56cm}{1} * \frac{1in}{2.54cm} = \frac{1.56cm*in}{2.54cm} = \frac{1.56}{2.54} in = 0.61417in = 0.614in$$
- **Step 2: Multiple the height of the shark tooth in inches by 10.**
- $$0.614in * 10 \left(\frac{ft}{in} \right) = 6.14feet$$

TOOTH SHAPE

There are over 500 species of shark, and they all have unique teeth!



LETS TRY TO MATCH THE
TOOTH TO THE SHARK