



# BURKE WORK

WHAT WE DO  
BEHIND THE GLASS  
IN  
PALEONTOLOGY

CREATED BY MORGAN STEWART

This activity book was created to partially fulfill the requirements for the degree of Master of the Arts.

Thank you to my supervisory committee, Meena Selvakumar, Katie Anderson, Andy Clark, and Siri Linz.

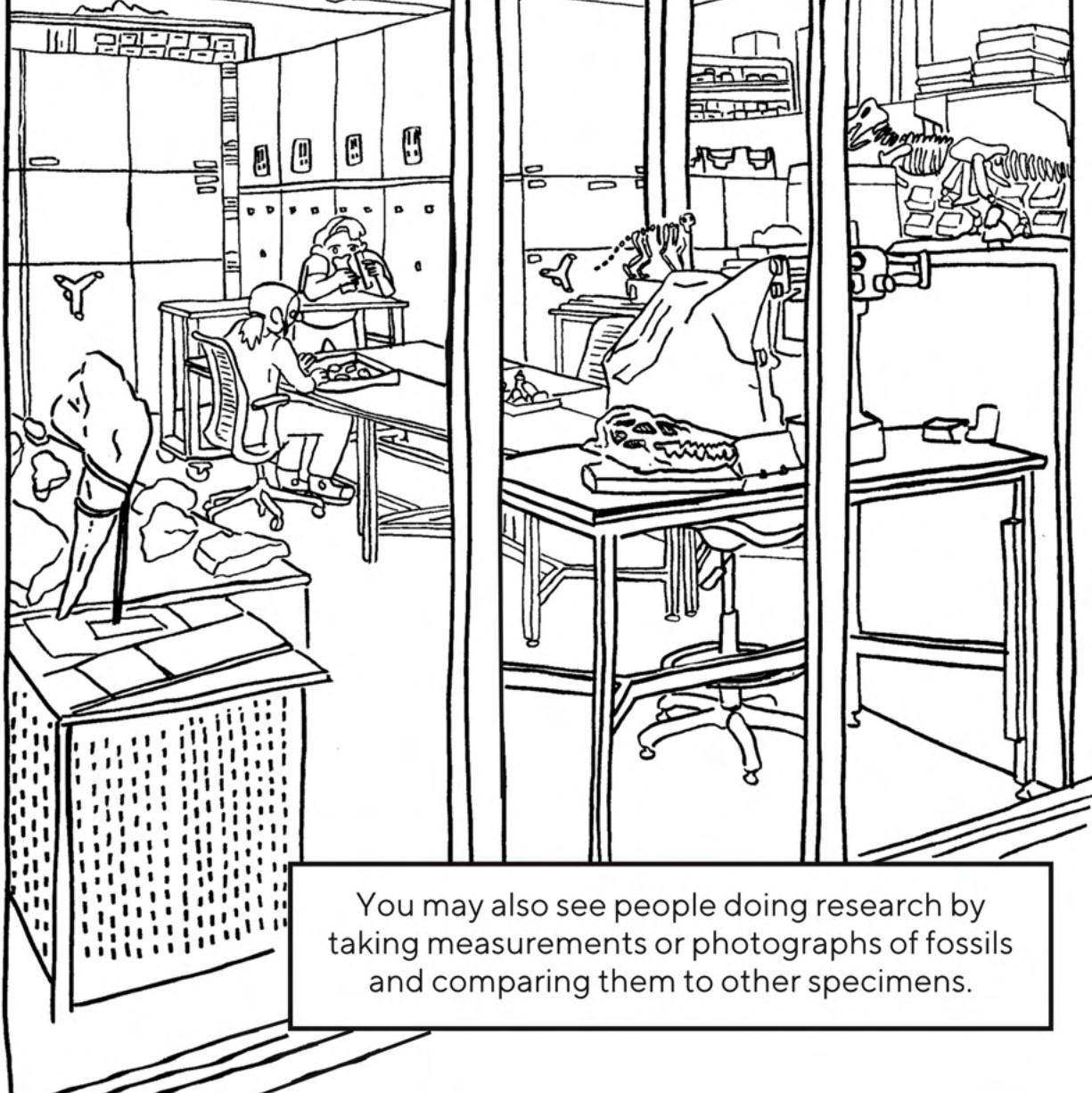
The research performed for this book was made possible through the contributions and help of Katie Anderson, Ron Eng, Kelsie Abrams, Jean Primozych, and Brody Hovatter.

Thank you also to Andy Clark, Caleb Stockham, Angela Reed, and Sarah Winkowski for their assistance in formatting and editing.

In the paleontology workroom, staff, students, and volunteers are often cataloging and organizing fossils that are coming into or are already part of the collection.

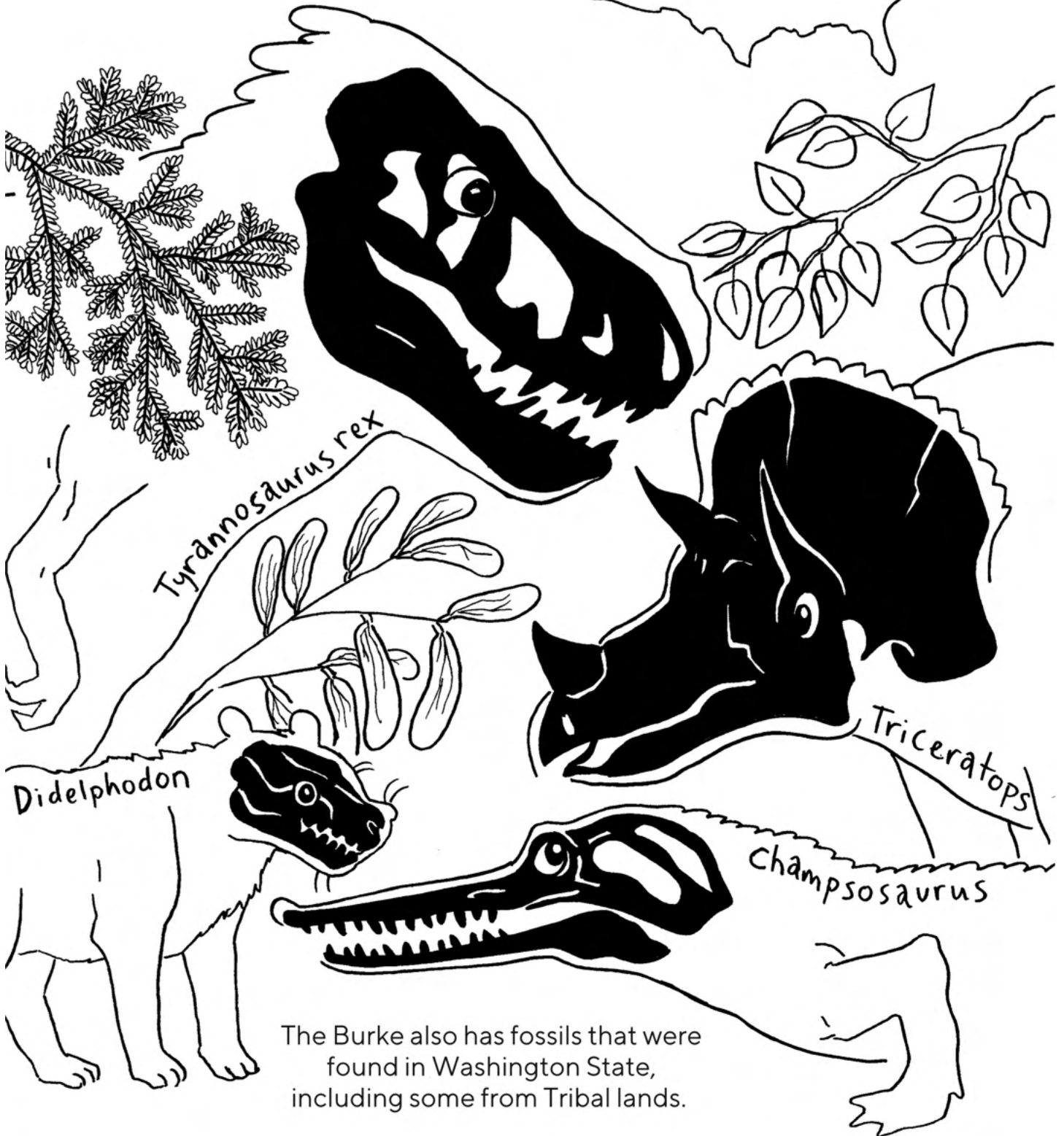
This makes sure that the fossils are kept in good condition, we know where they are, and the information about them is kept up to date.

You may also see people doing research by taking measurements or photographs of fossils and comparing them to other specimens.

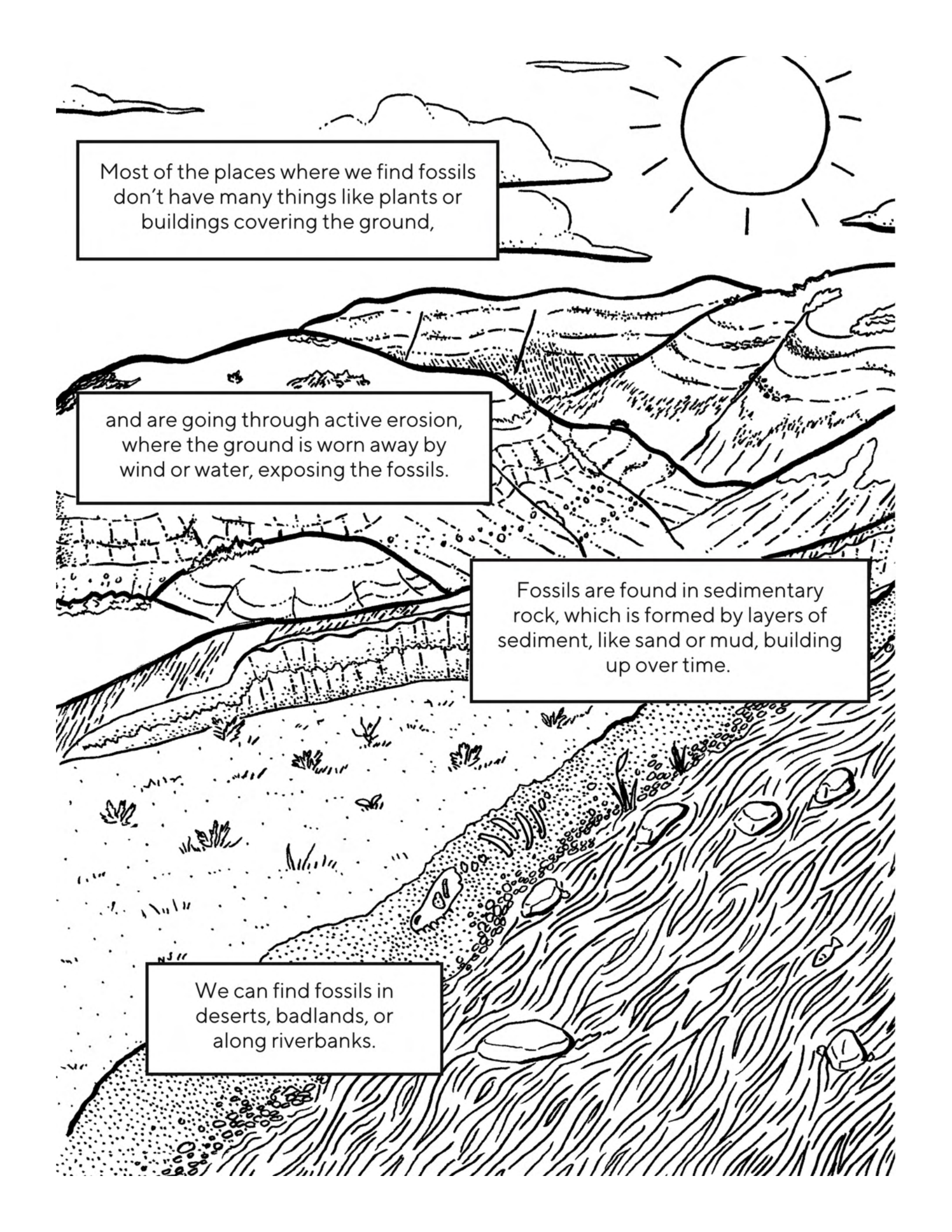


A lot of the fossils at the Burke were found in the Hell Creek Formation in Montana.

You can see them in the Fossils Uncovered paleontology gallery, like:



The Burke also has fossils that were found in Washington State, including some from Tribal lands.



Most of the places where we find fossils don't have many things like plants or buildings covering the ground,

and are going through active erosion, where the ground is worn away by wind or water, exposing the fossils.

Fossils are found in sedimentary rock, which is formed by layers of sediment, like sand or mud, building up over time.

We can find fossils in deserts, badlands, or along riverbanks.

It can be really difficult to find paleontological sites! We can't collect fossils on private property without permission and we need a permit to collect fossils from anywhere. Plus, dig sites can be miles away from the closest road, requiring a very hard hike to reach.

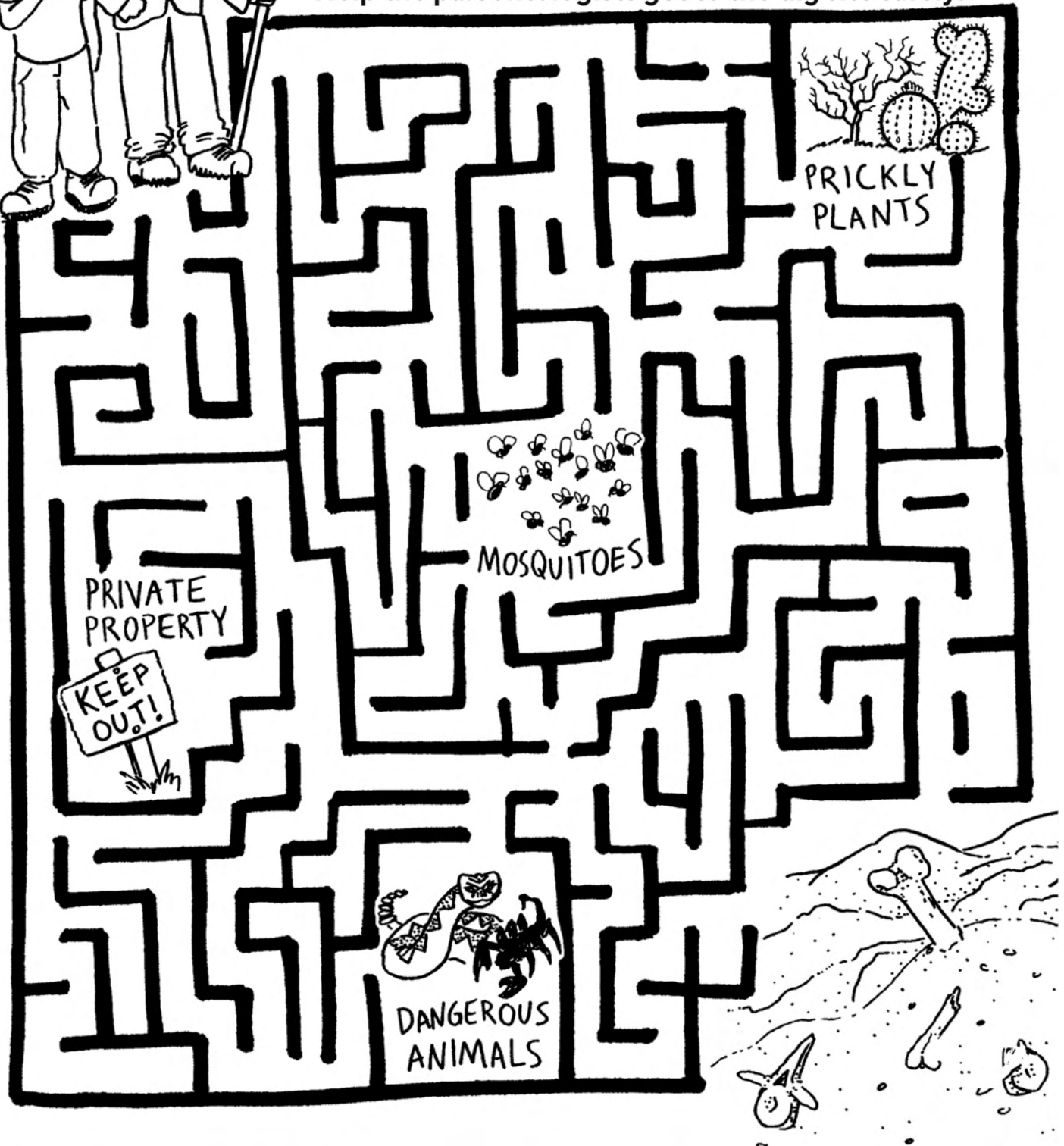
it can get really hot!

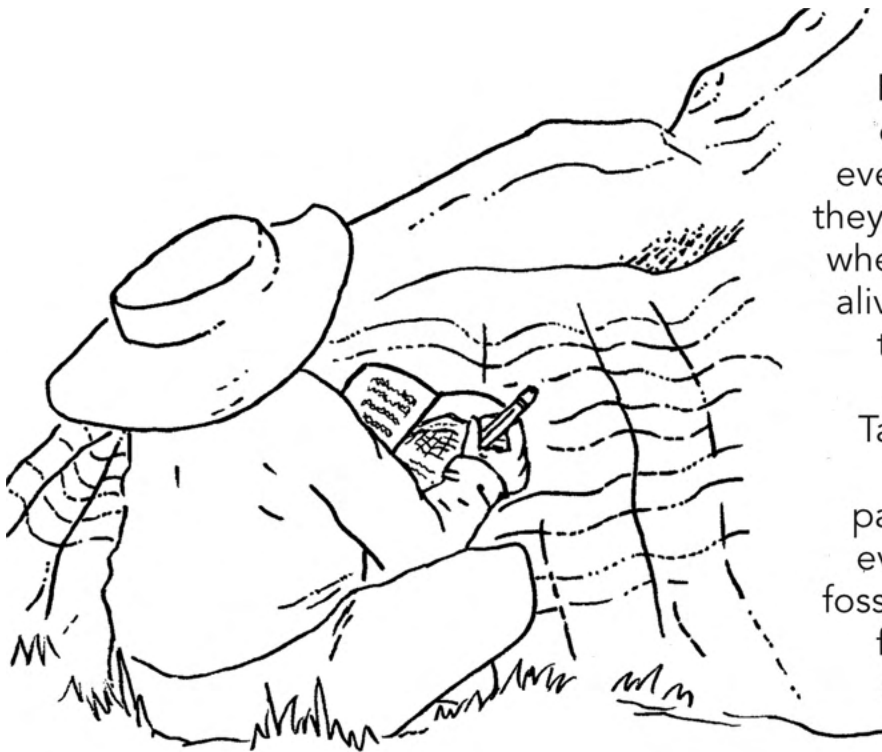


you need lots of water!



Help the paleontologists get to the dig site safely!





Paleontologists make very detailed field notes about everything they find and where they find it, so that they can study where the fossil was when it was alive and after it died and what that environment was like.

Taking very detailed notes is important because paleontologists want to learn everything possible from the fossil, like how it died and how it fossilized. A fossil can't be studied without this data!

Can you take very detailed notes so that someone else could find exactly where you are right now?

Describe the landmarks you see and draw a picture of what your surroundings look like!

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Paleontologists walk around, looking for fossils that have weathered out of the ground. This is called a survey. If fossils are visible, they are collected!

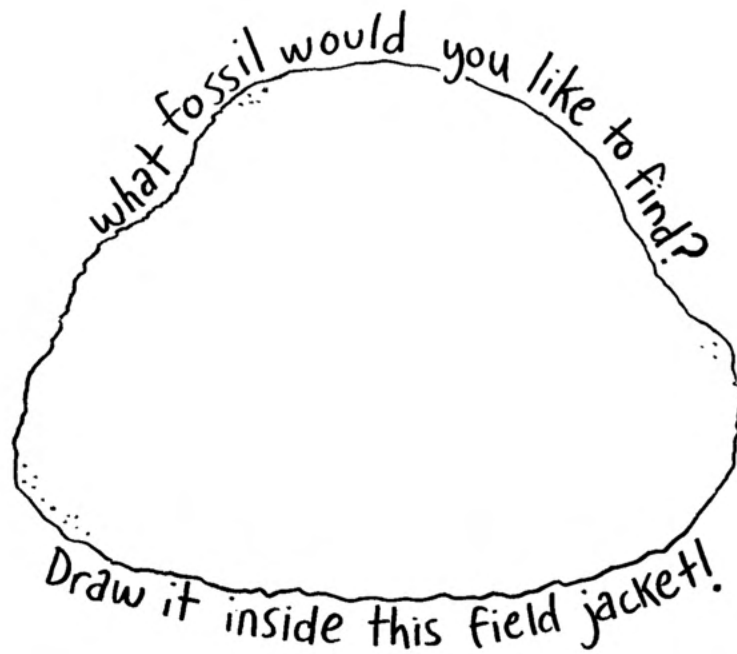
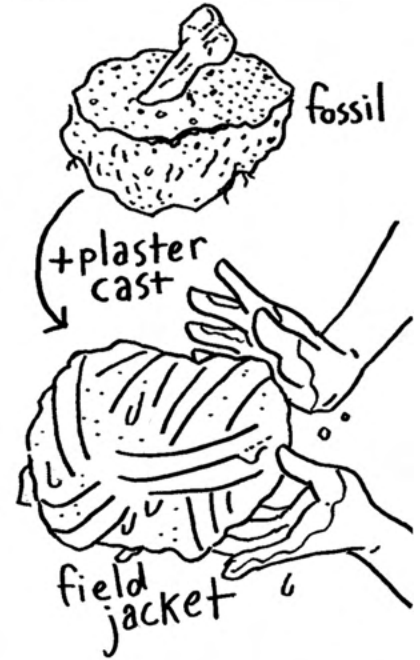


Paleontologists will also dig for fossils if part of the fossil is exposed or if there are probably more fossils in the area.



*Fossils are very delicate!*

Paleontologists leave the fossils in the rocks they are found in and wrap the entire thing in a plaster cast, called a field jacket, to make sure they stay safe during the trip to the museum.



**Now draw a truck to safely take the fossil back to the museum.**



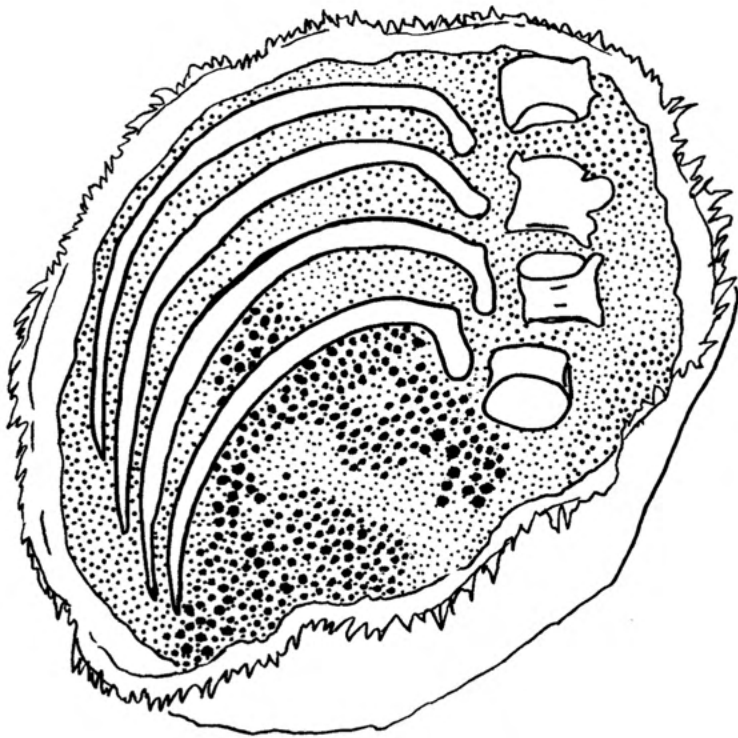
Fossils are embedded in rock called matrix.

Matrix can be

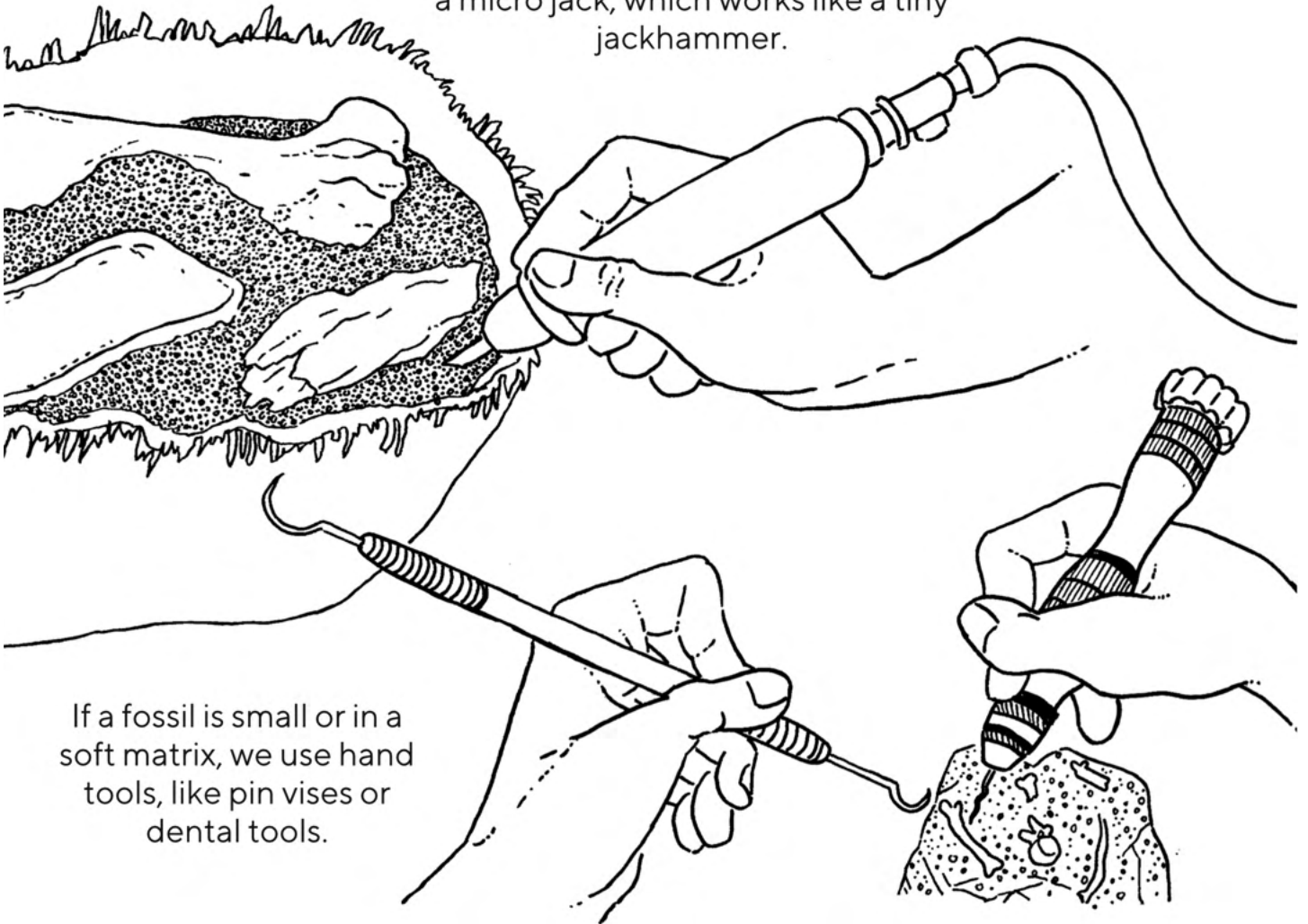
hard, soft, or  
in-between

and can be made of a lot of different size grains.

In the prep lab at the museum, we remove the matrix from the fossils.



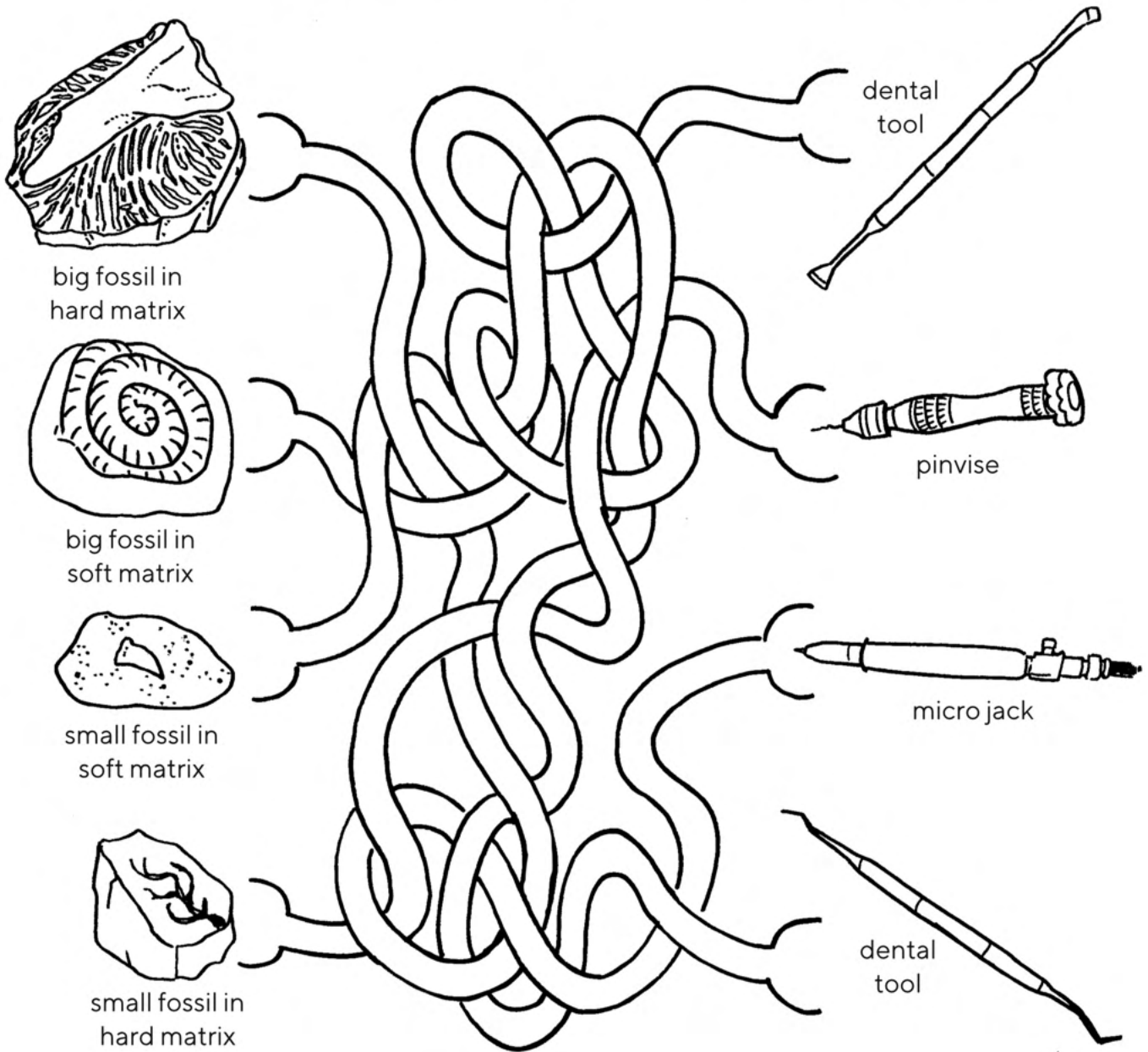
For a big fossil in hard matrix, we use a micro jack, which works like a tiny jackhammer.



If a fossil is small or in a soft matrix, we use hand tools, like pin vises or dental tools.

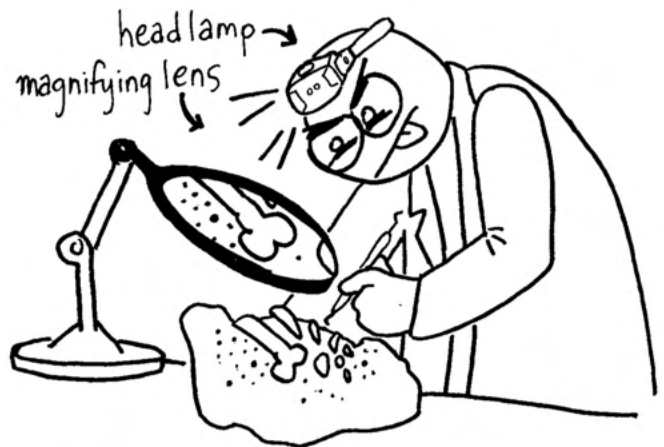
## Can you connect the best tools to the fossils?

We need to use the right tools to get the fossil out of the matrix!



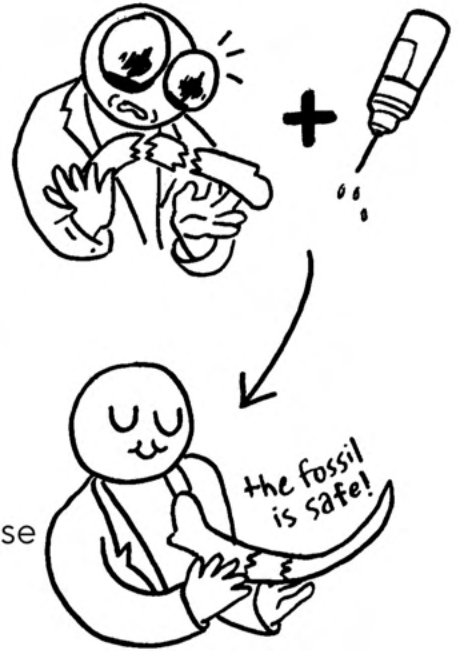
The matrix must be taken away very slowly, grain by grain, to make sure we cause as little harm as possible to the fossil.

We use magnification and lots of light to see the fossil clearly.



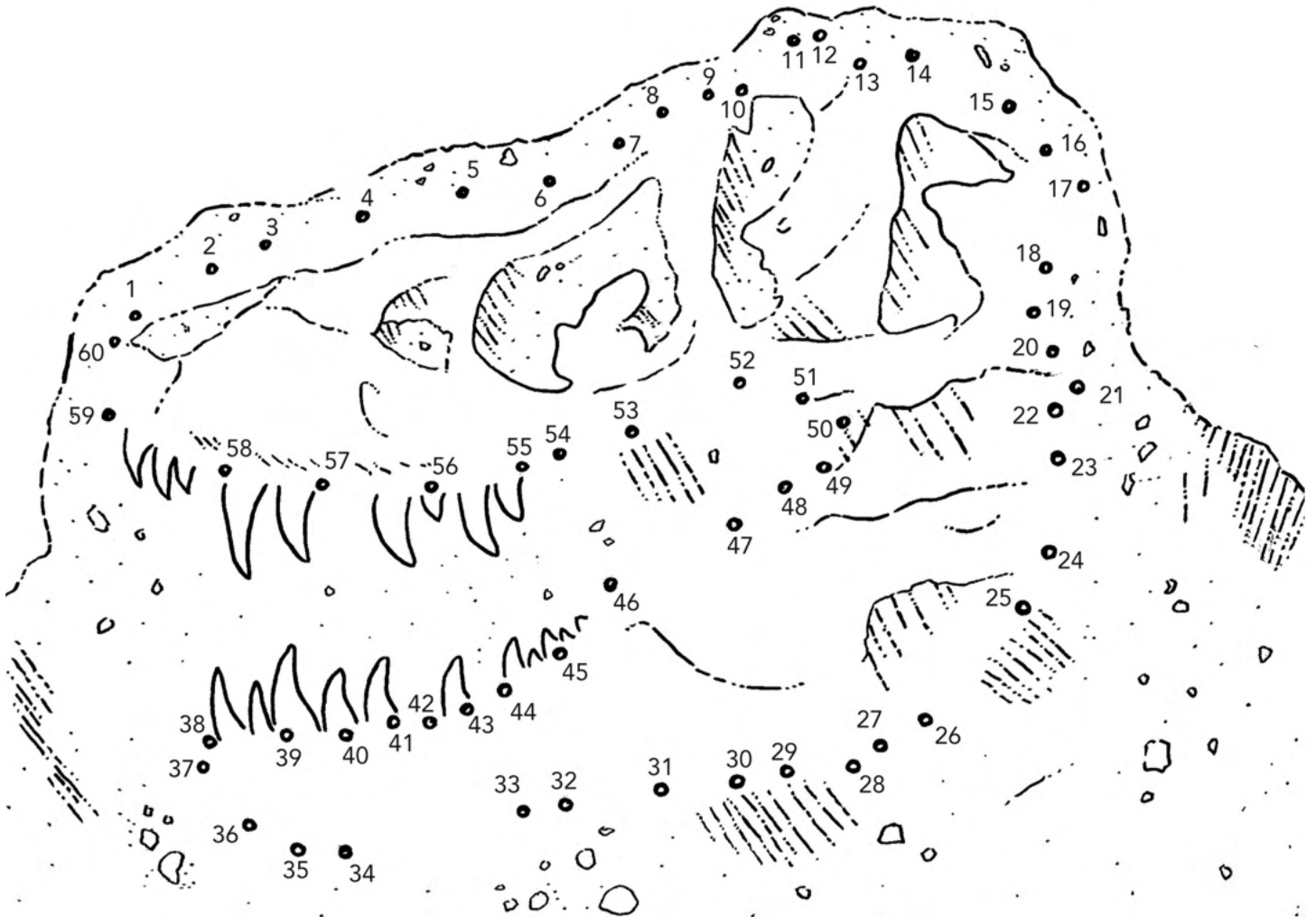


We use a glue called consolidant to make sure that fossils won't fall apart while we remove the matrix around them. The consolidant comes in different concentrations (strengths), which we use for different things.

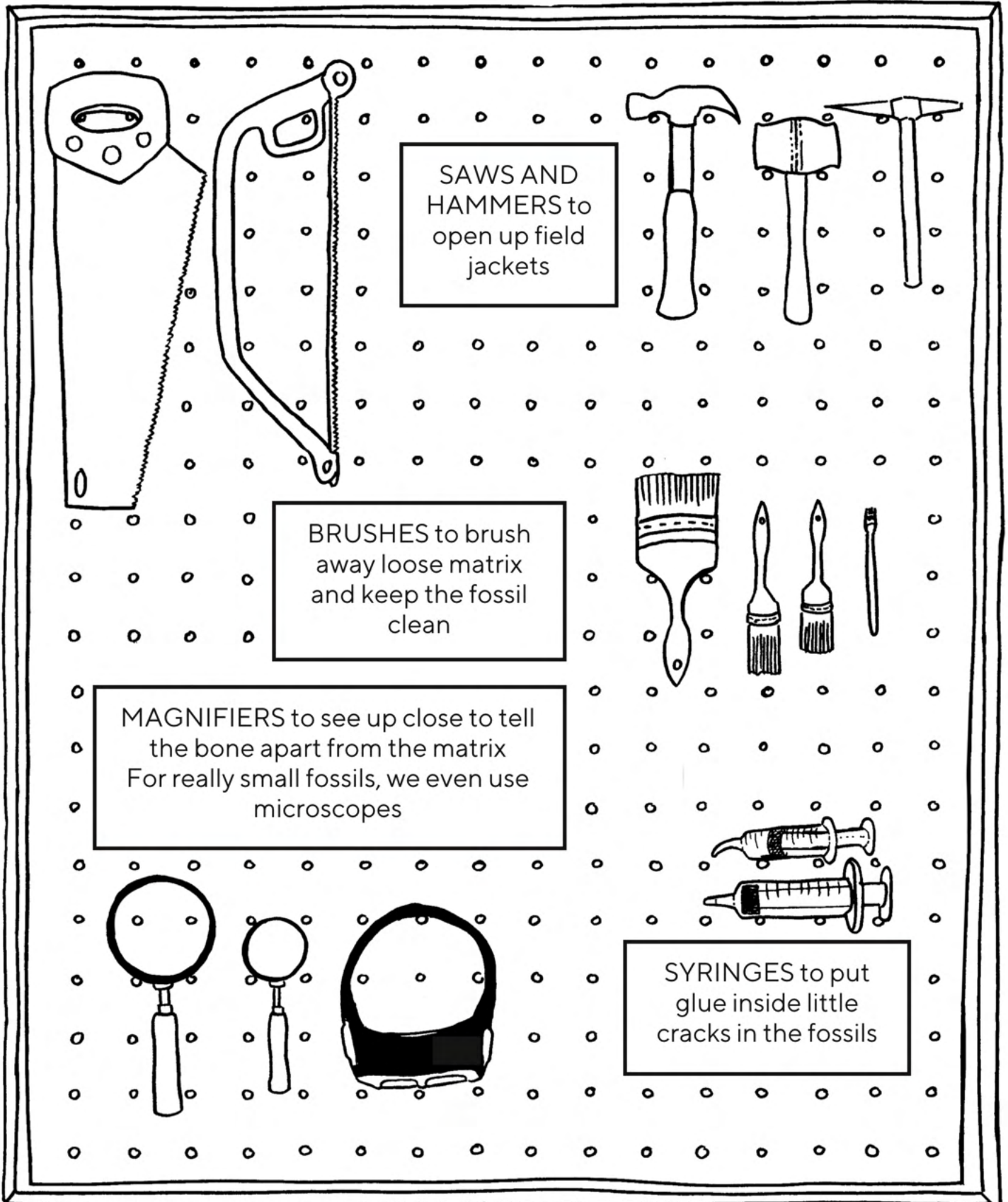


The adhesive is reversible, in case we make a mistake.

Can you help hold this fossil together?  
**Connect the dots to apply adhesive to the fossil's edges!**



The lab also uses lots of different types of tools!



The paleontology collection is organized into 3 sections.

Invertebrate Paleontology (IP)



animals without bones or spines

Vertebrate Paleontology (VP)



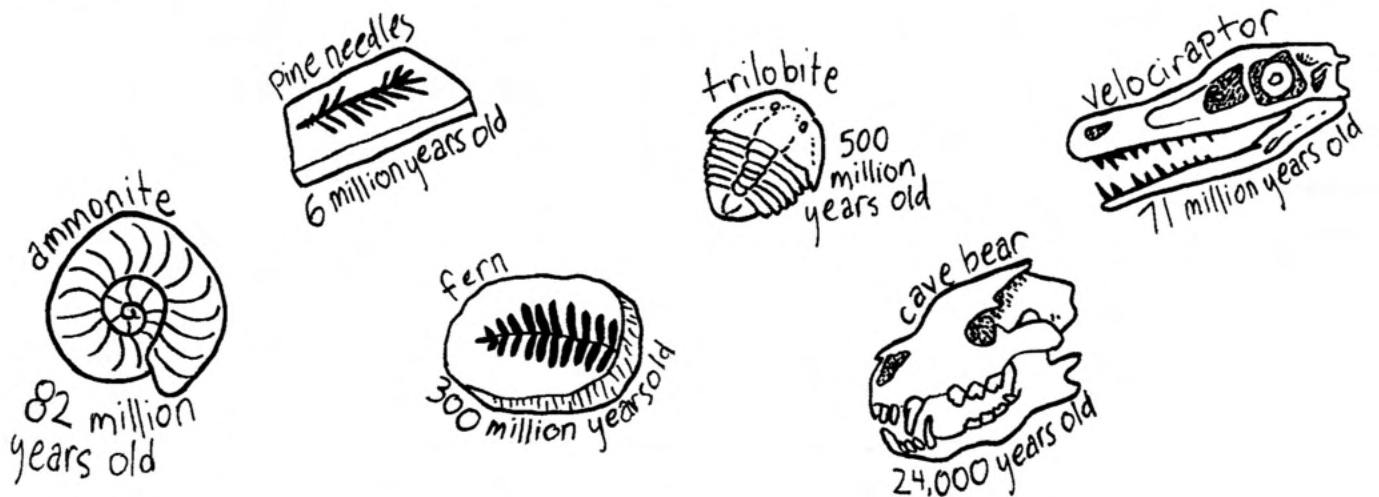
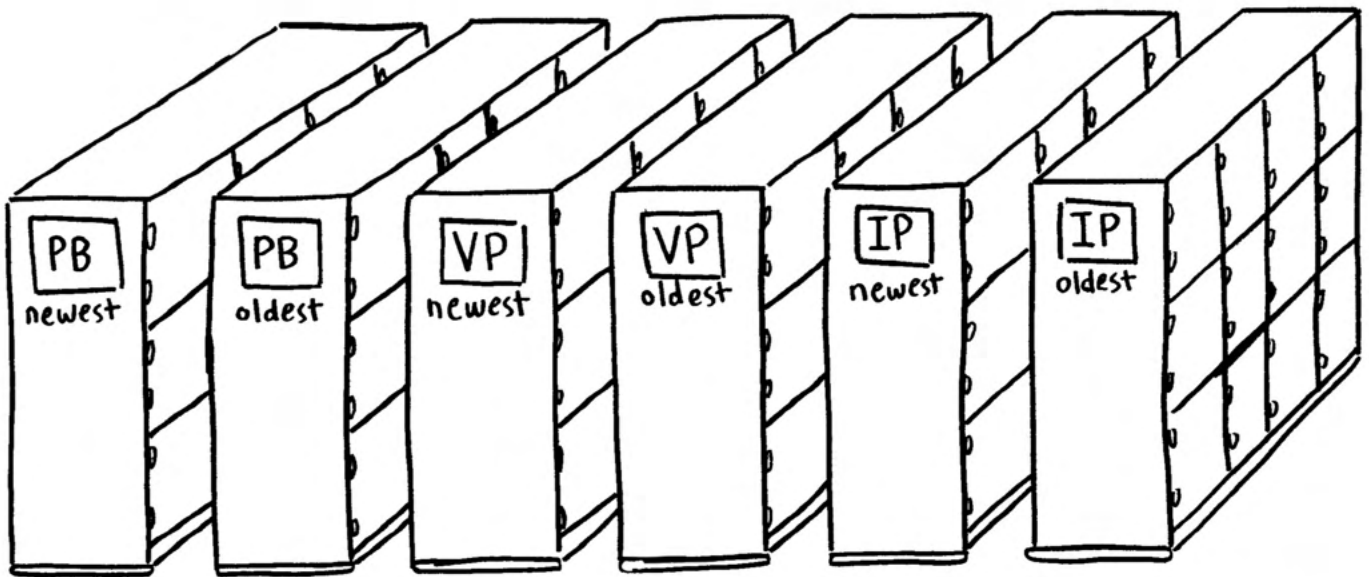
animals with bones and spines

Paleobotany (PB)

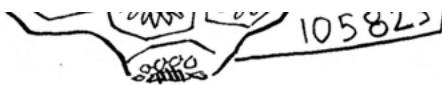


plants

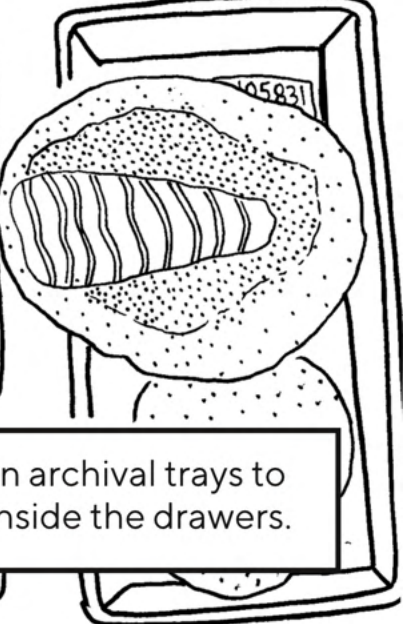
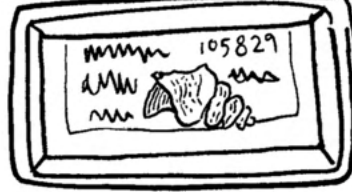
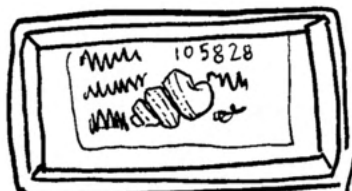
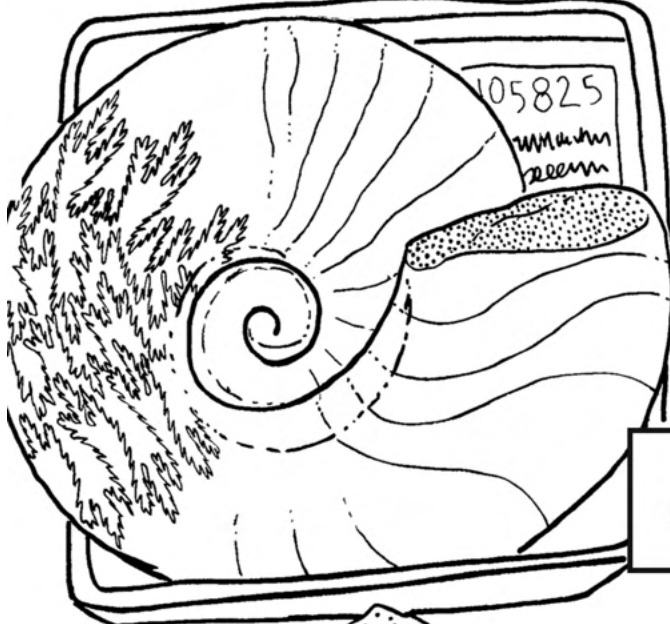
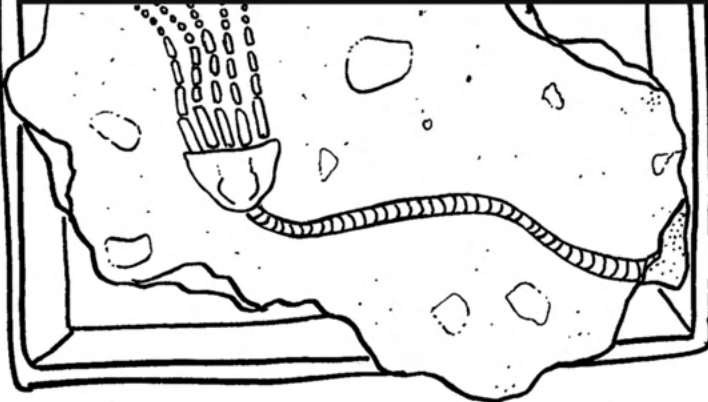
Fossils are organized in these sections by age and location, so dinosaurs and woolly mammoths are kept in different cabinets.



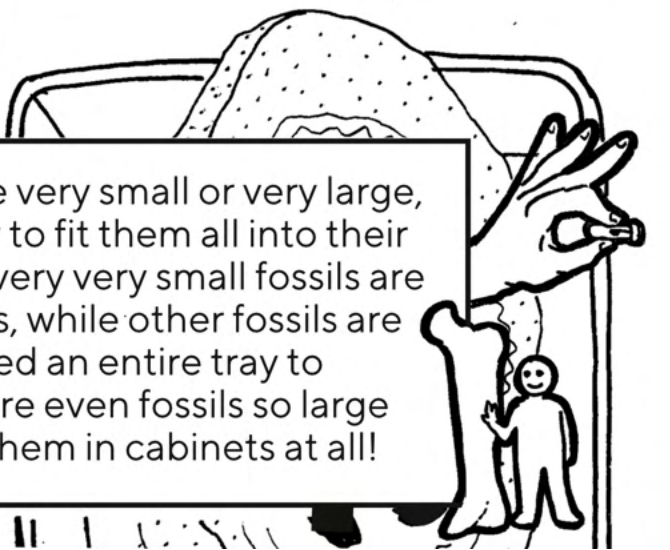
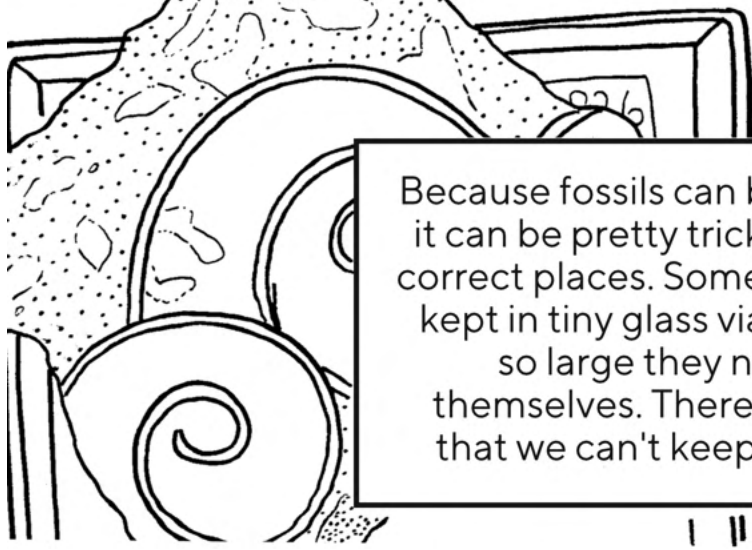
These fossils need to be put away!  
Can you draw lines connecting them to the right cabinets?



Each specimen has a unique number which helps the museum keep track of what kind of fossil it is, where it was found, and where it is stored. Fossils are organized in each of the collections in drawers inside the cabinets.

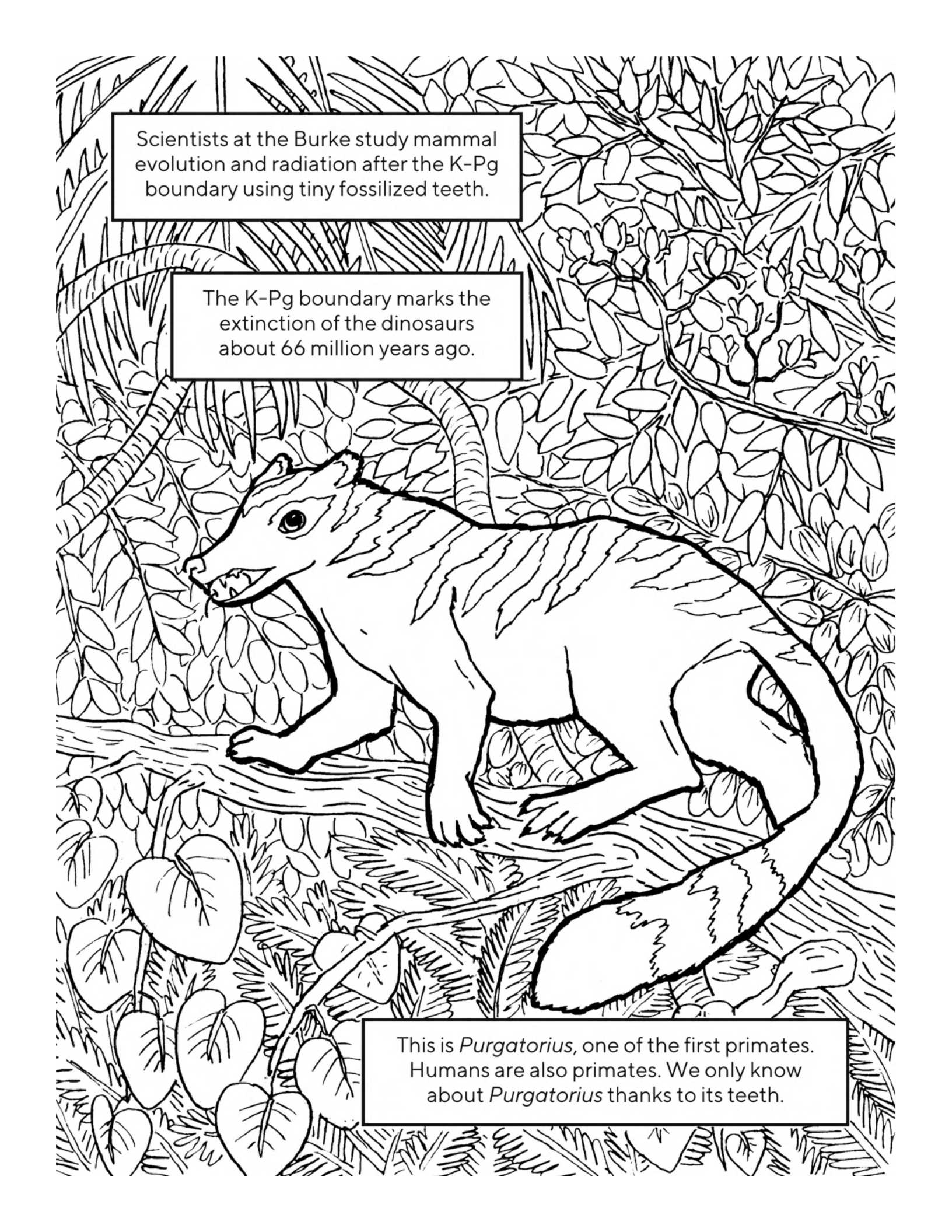


Fossils are kept in open archival trays to keep them separated inside the drawers.



Because fossils can be very small or very large, it can be pretty tricky to fit them all into their correct places. Some very very small fossils are kept in tiny glass vials, while other fossils are so large they need an entire tray to themselves. There are even fossils so large that we can't keep them in cabinets at all!



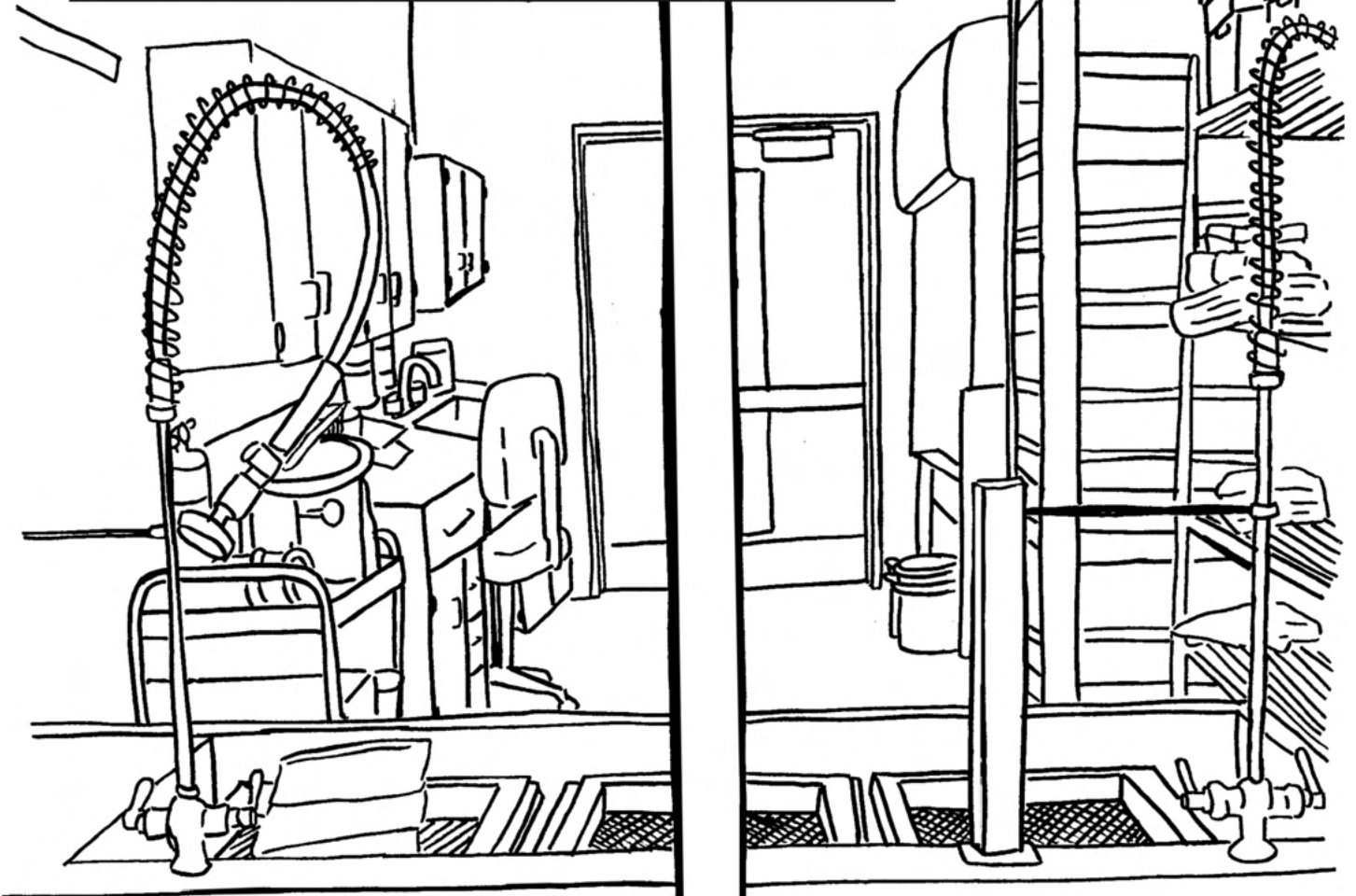


Scientists at the Burke study mammal evolution and radiation after the K-Pg boundary using tiny fossilized teeth.

The K-Pg boundary marks the extinction of the dinosaurs about 66 million years ago.

This is *Purgatorius*, one of the first primates. Humans are also primates. We only know about *Purgatorius* thanks to its teeth.

Research like the work done with *Purgatorius* relies on microfossils (tiny fossils which can be too small to see without magnification). They are collected in bulk sediment and then sieved.



A sieve is the screen we use to wash the smaller grains of sediment away, leaving behind fossils and rocks we can sort through with a microscope. This is the sieve room at the Burke!





Microfossils can be:



mammal  
teeth



crocodile  
teeth



fish  
vertebrae

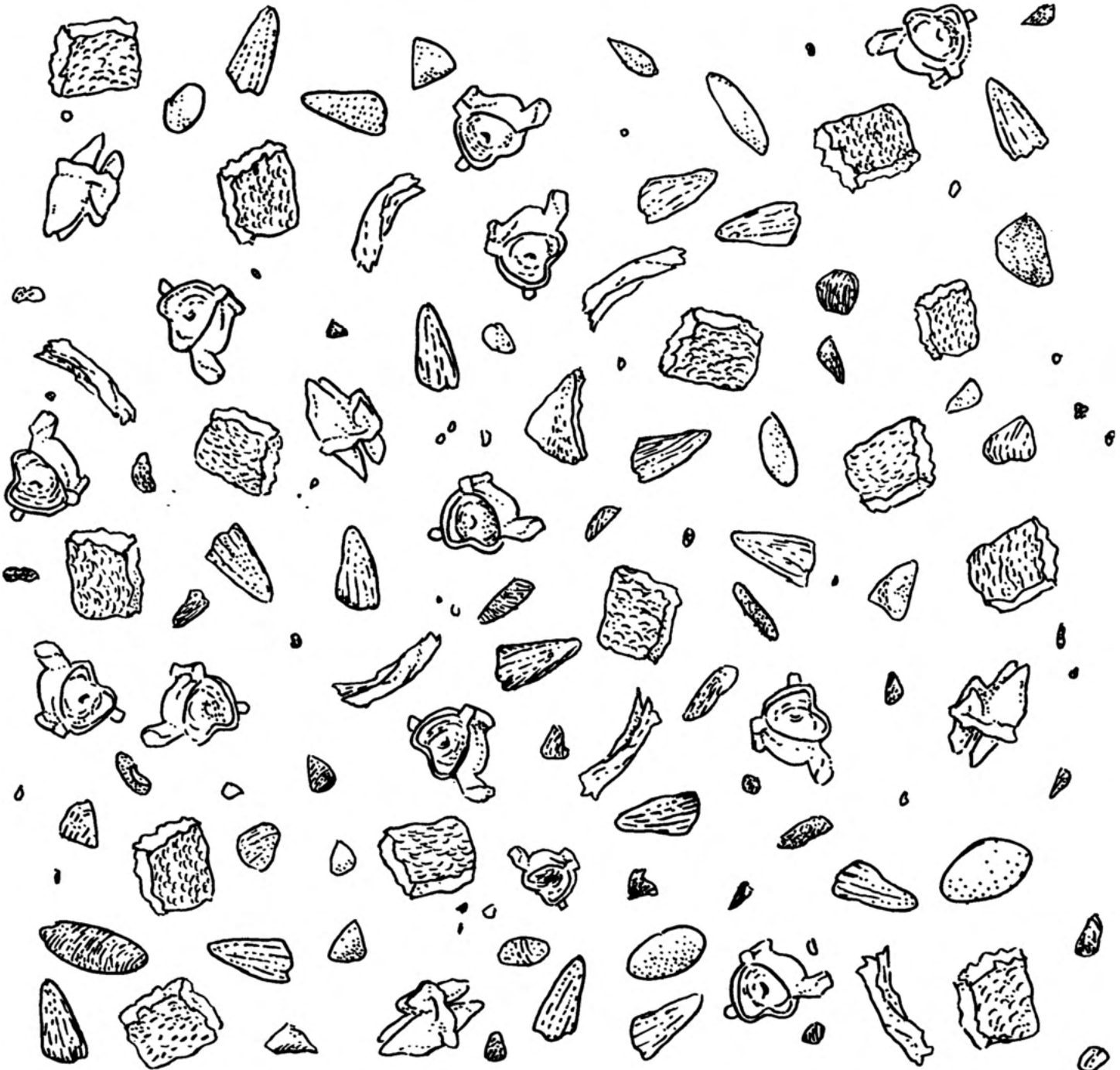


pieces of  
turtle shell



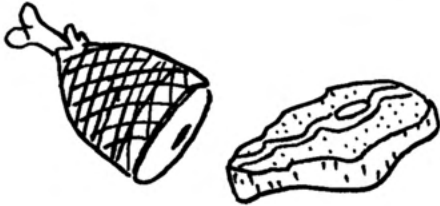
tiny bone  
fragments

**Can you circle the mammal teeth in this washed sample?  
Can you find the bone fragments?**



Fossils can be identified using comparisons to other fossils in museums.  
We also identify teeth using this technique.

By looking at the size and shape of teeth, we can learn how  
the mammal lived: how large it was and what it ate!



Animals that eat a lot of meat have sharp  
teeth for grasping and cutting, like a cat.

Animals that eat a lot of plants have blunt teeth that  
are good for crushing and grinding, like a cow.



We can also compare modern animals' teeth to  
fossils to get a better idea of what they ate.

What do these animals eat?  
**Will you give them some  
teeth?**

