

# *L.A. Underwater & Paleoart*

Envisioning prehistoric marine life through  
paleontology and art

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NHM Educator Workshop  
February 2023

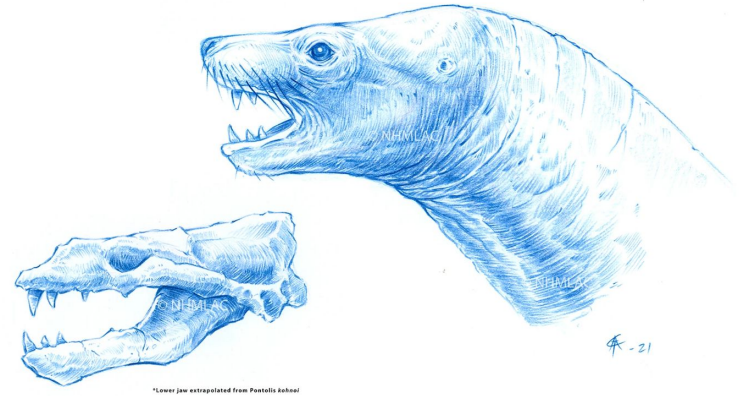
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# L.A. Underwater: The Prehistoric Sea Beneath Us

For 90 million years the metropolis we know today as Los Angeles was underwater and home to incredible sea life, including peculiar ancestors of modern day species. L.A. Underwater is an exhibition that features life-size projections of prehistoric animals, nearly 40 fossil specimens, an interactive map of fossil finds, and more!

The animals in this exhibition have a complex story behind them—one that combines paleontology and fine art, scientific modeling and creative expression. Let's explore how the fossils featured in *L.A. Underwater* inspired impressive works of **paleoart**.



\*Lower jaw extrapolated from Pontolis kohal



From top to bottom: Fossil skull of a newly described giant walrus, *Pontolis barroni*, which is on display in *L.A. Underwater*; facial anatomy sketches by Cullen Townsend; color study of *Pontolis barroni* by Cullen Townsend.

# What is Paleoart?

**Paleoart is the field of art concerning the reconstruction of prehistoric plants and animals.** It combines current scientific understanding with visual art in order to “bring to life” extinct organisms from their fossil remains.

Have you ever wondered how our vision of prehistoric life came to be? You may be surprised to learn how connected science and art are in terms of shaping our understanding of prehistoric life—so much so that there is an entire genre of art dedicated to creating a prehistoric world from fragments of fossil clues.

Paleoart is not just guesswork. Sometimes it involves complex 3-D modeling and ideas from many scientists. However, anyone can learn the basics and express their creativity through fossil-inspired art!

In this workbook we will take a look at two fossils featured in *L.A. Underwater* and explore the process of bringing these **extinct** animals “to life” through paleoart.

# Introduction

*L.A. Underwater* features one-of-a-kind fossils such as a prehistoric seal skeleton that was discovered along a family's rocky garden wall and the skull of an extinct giant walrus that lacked tusks!

While there are many fossilized curiosities to consider, we'll be focusing on two: the *Eupachydiscus* **ammonoid** shell (right) and the skull of the **Lincoln Heights whale**, *Mixocetus elysius* (below).



Ammonoids are extinct shelled **cephalopods**—prehistoric relatives of squid, octopuses, and nautilus.

The Lincoln Heights whale is an extinct **baleen** whale. Its modern relatives—like the minke, Bryde's and blue whales—still use baleen to filter feed tons of food from the ocean. Here the skull is shown on exhibit with its animated paleoart projection swimming in the background!

# Ammonite

## *Eupachydiscus*

This 143-pound fossil ammonite was collected from the Tuna Canyon Formation in the Santa Monica Mountains. It lived during the Late Cretaceous, 74 million years ago.

What exactly are ammonites? Belonging to a larger group called ammonoids, they were shelled cephalopods that appeared in the fossil record in the early Devonian (over 400 million years ago) and went extinct 66 million years ago during the Cretaceous-Paleogene extinction event—the same mass extinction that ended the ‘Age of Dinosaurs.’

The spiral chambered shell resembles that of an **extant** chambered nautilus. This is the part of the animal that preserved through **fossilization**.

**But how do we know what its soft body parts looked like if they were not preserved?**

We can study modern cephalopods—squid, octopuses, cuttlefish and nautilus—to gain clues!



Top: The fossilized shell on exhibit, which is 20 inches high and 18 inches wide; Bottom: A paleoart rendition of *Eupachydiscus* sp. by Cullen Townsend.

# Ammonoid vs. Chambered Nautilus

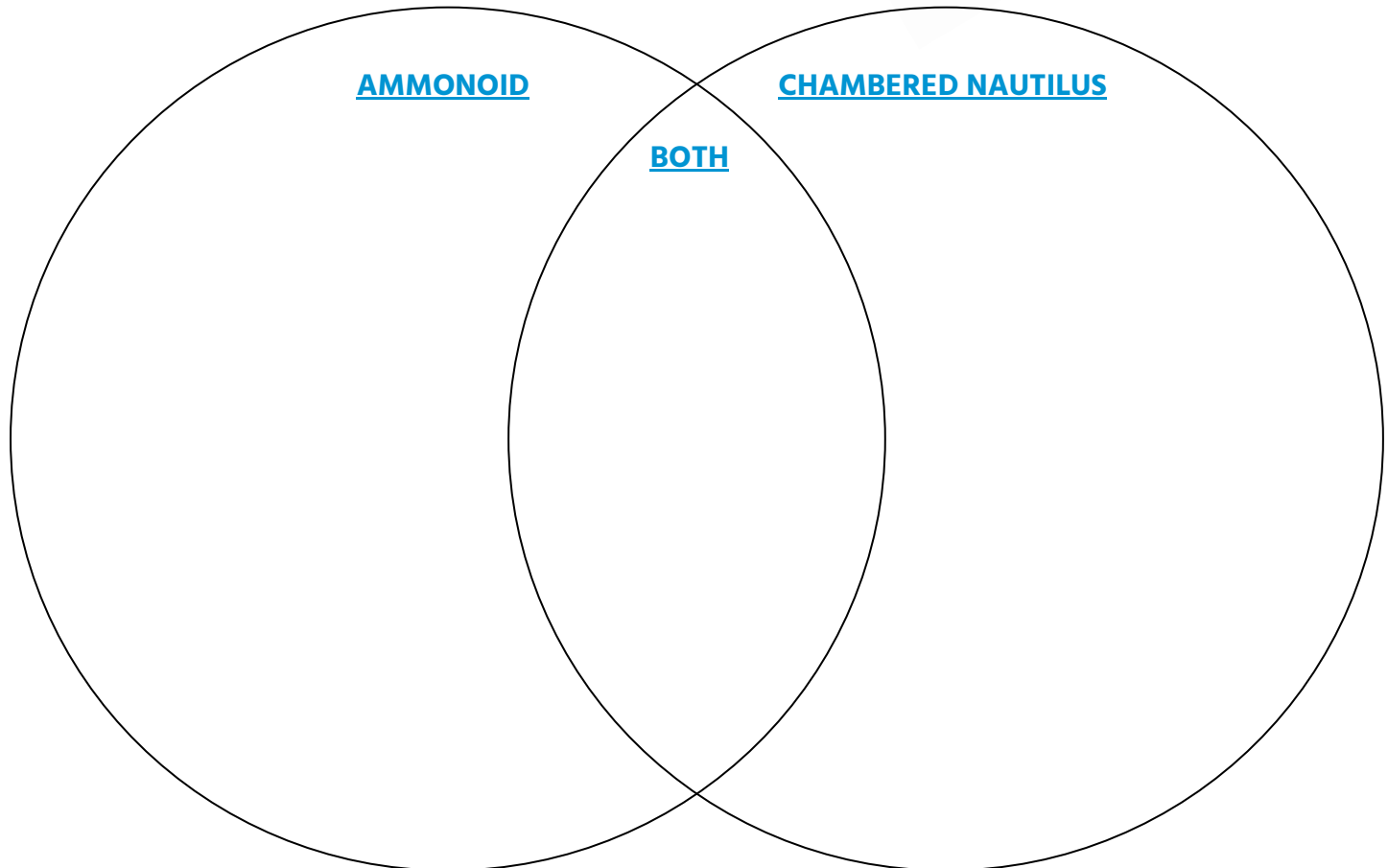
Extant cephalopods provide clues as to what an ammonoid's body may have looked like. Although squid are more closely related to ammonoids, the chambered nautilus give us some ideas about body plan and movement. **Use the venn diagram to compare and contrast the *Eupachydiscus* ammonoid with the chambered nautilus.**



**CHAMBERED NAUTILUS**

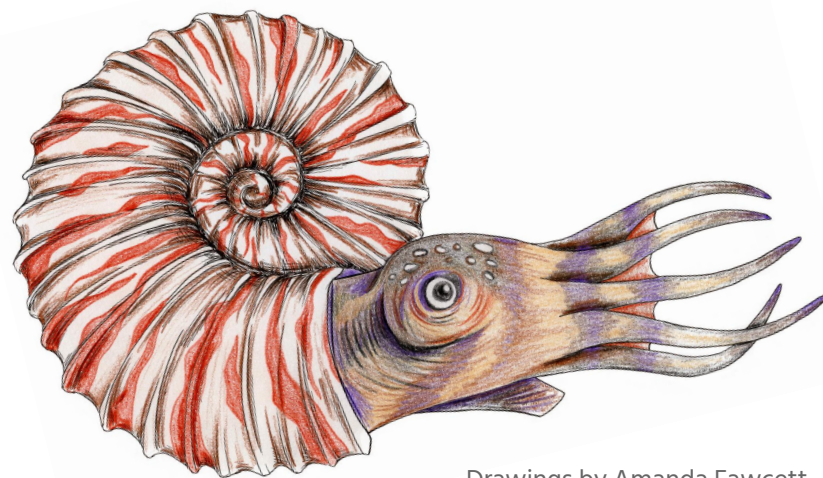
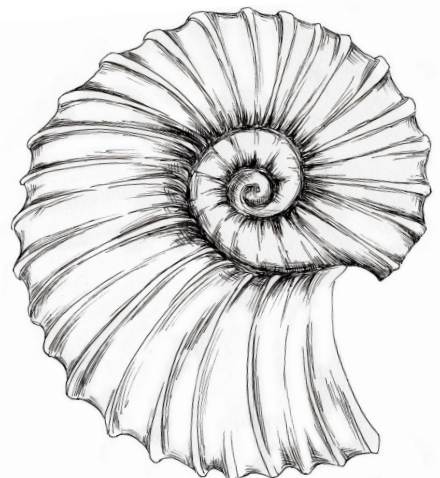
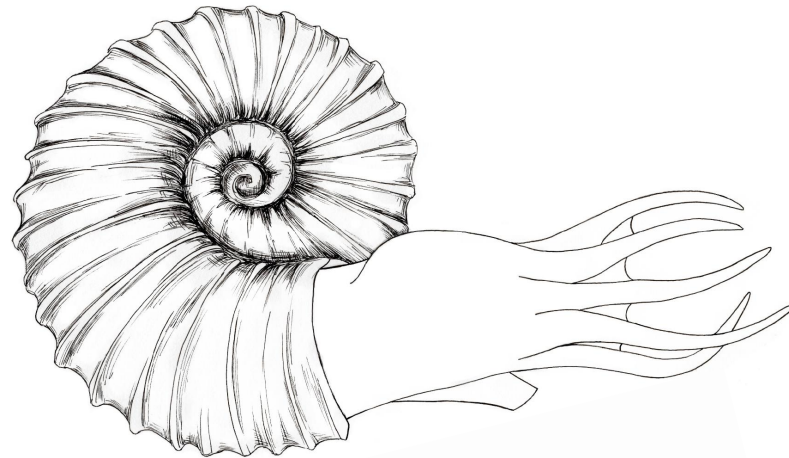


**AMMONOID**



# Creating Paleoart - Ammonoid

1. Study your fossil specimen, the *Eupachydiscus* ammonoid.
2. Make a sketch of the fossil.
3. Add body parts that were not preserved through fossilization, gaining clues from studying extant relatives.
4. Add color and details!

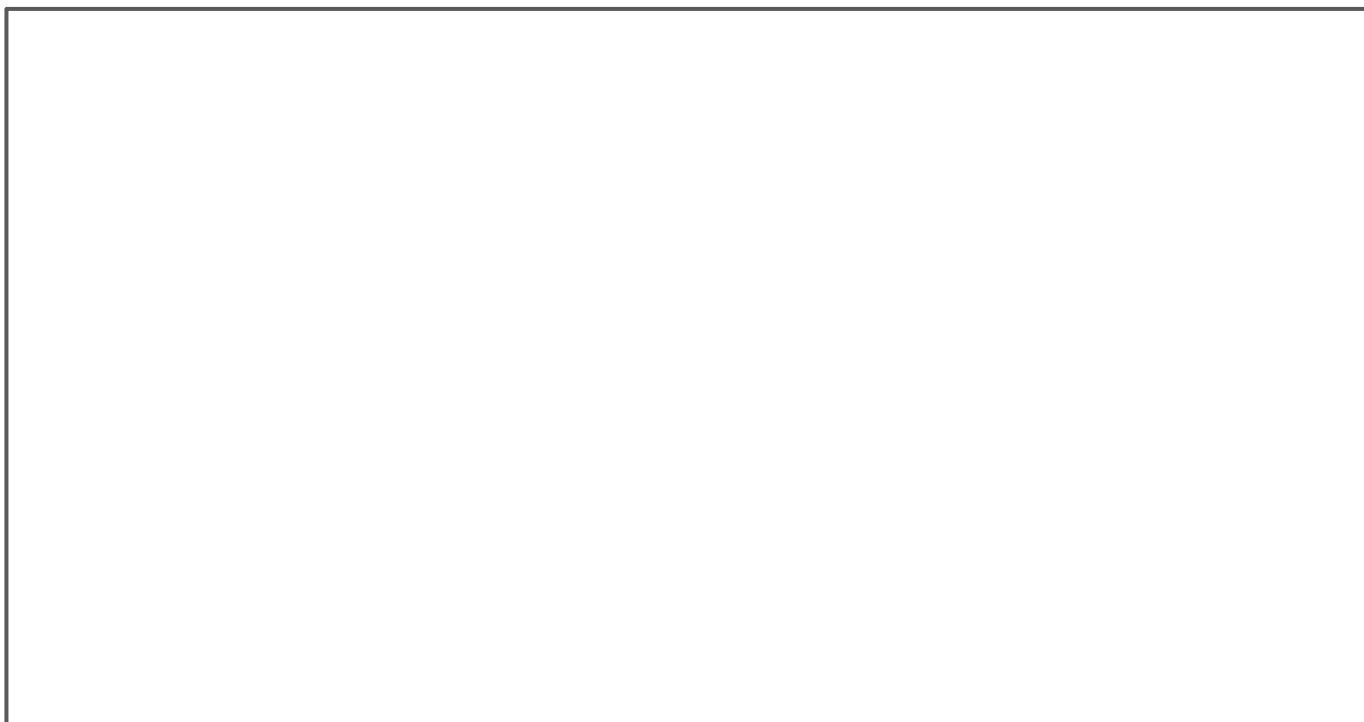


Drawings by Amanda Fawcett



# Try It Yourself!

1. Study your fossil specimen, the *Eupachydiscus* ammonoid (right).
2. Make a sketch of the fossil in the space below. **TIP: be sure to leave space for adding other features to your drawing.**



3. Add body parts that were not preserved through fossilization. **TIP: study extant relatives (right) to gain clues about how the body looked!**
4. Add color and details. Get creative!



Extant relatives, from top to bottom: chambered nautilus, common cuttlefish, bigfin reef squid.

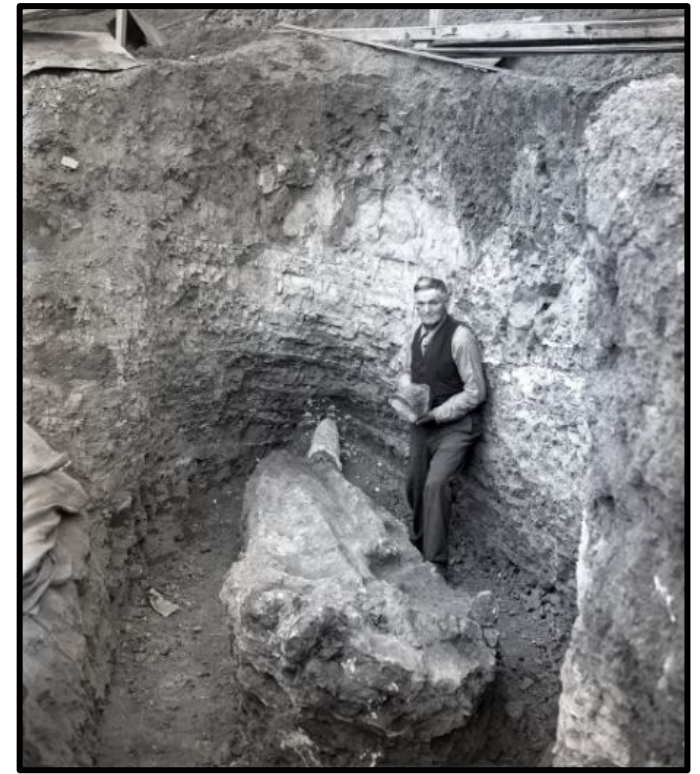
# Lincoln Heights Whale

## *Mixocetus elysius*

The fossil skull of *Mixocetus elysius* was discovered in 1931 by plumber F.W. Maley—not a scientist, but a community member and museum visitor! You can see the fossil on display in *L.A. Underwater* along with a paleoart projection of what the whale may have looked like.



The Lincoln Heights whale skull in the *L.A. Underwater* exhibition at NHM.



Plumber F.W. Maley stands next to the fossil whale skull he discovered, 1931.

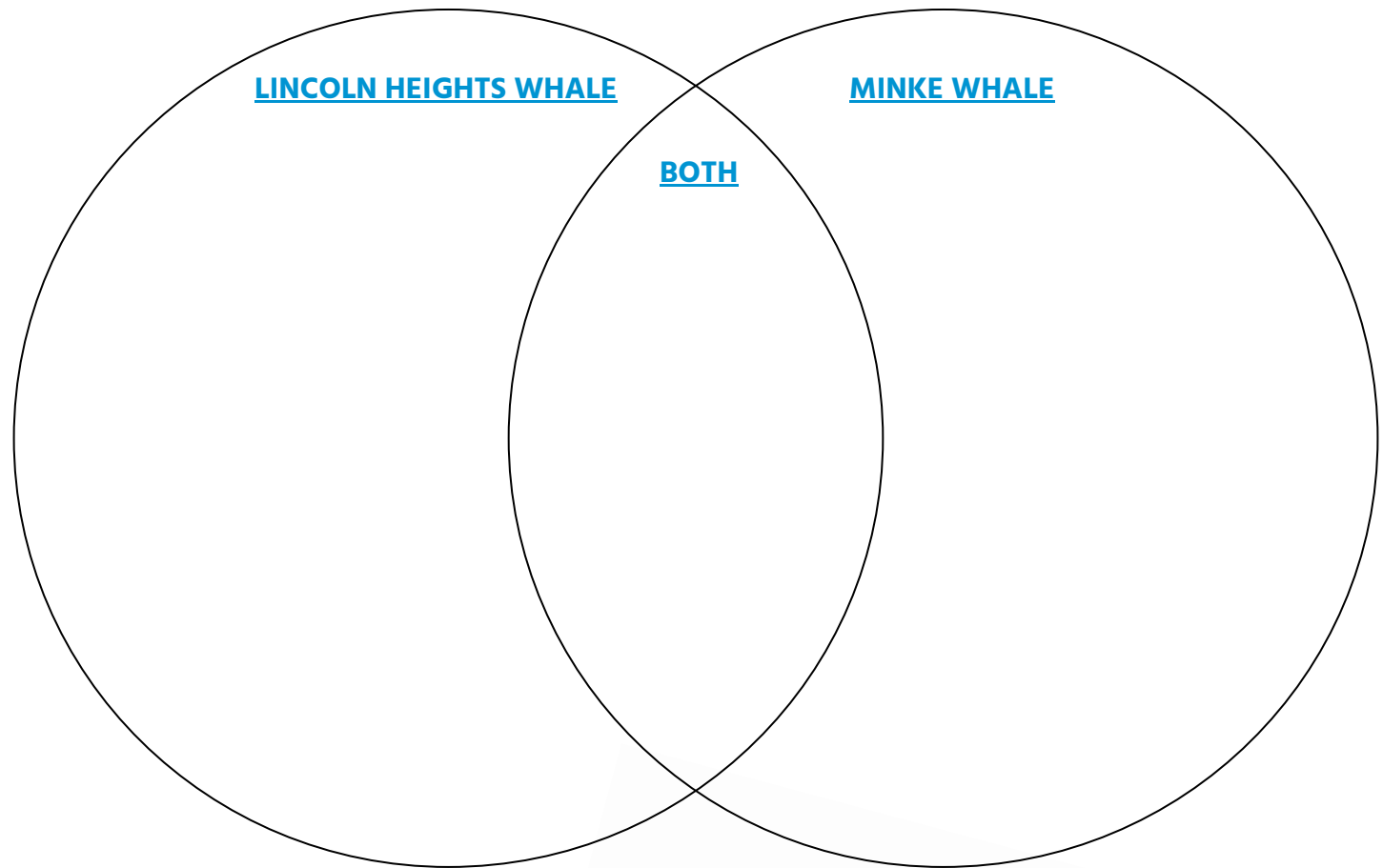
At 28 feet (8.6 m) long, *Mixocetus elysius* was one of the largest **baleen** whales in the world 10 million years ago. Today, most baleen whales are much bigger. This fact teaches us that baleen was an important adaptation that allowed whales to filter tons of food out of the water and evolve into giants of the sea!

The Lincoln Heights whale fossil is the only found specimen of its kind. **How do we know what a species looked like based on fossil remains from one individual?**

In addition to studying the fossils, we can use clues from similar **extant** species to reconstruct the past. In the next slide, compare and contrast the Lincoln Heights Whale skull with the skull of a minke whale, one of the smallest living baleen whales.

# Lincoln Heights Whale vs. Minke Whale

Since the Lincoln Heights whale fossil is the only found specimen of its kind, we study extant baleen whales to better understand the species. **Use the Venn diagram to note your observations of the Lincoln Heights whale skull alongside the skull of an extant minke whale.**



**LINCOLN  
HEIGHTS WHALE**



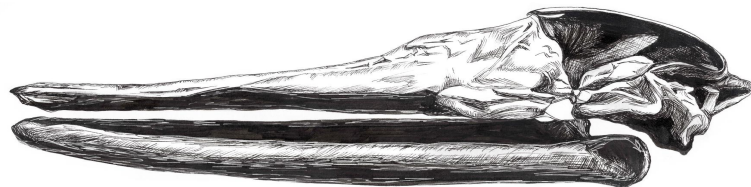
**MINKE WHALE**

# Creating Paleoart - Lincoln Heights Whale

1. Study your fossil specimen, the skull of *Mixocetus elysius*.
2. Make a sketch of the fossil skull. **TIP: Use a pencil so that you can erase later!**
3. Make an outline around the skull. Once you're happy with your outline, you can erase the skull sketch.
4. Add onto the skull outline with an outline of the rest of the body. **TIP: Since we only have the skull for reference, look at pictures of related extant baleen whales for inspiration.**
5. Add coloration and details!

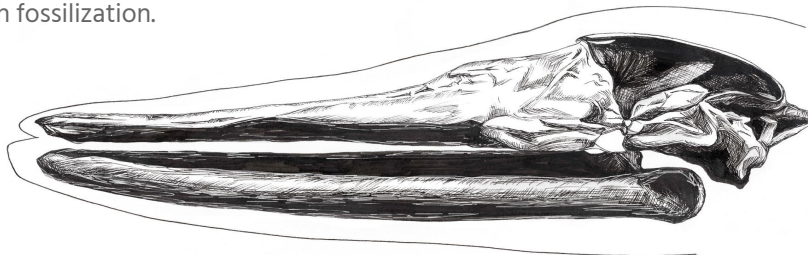


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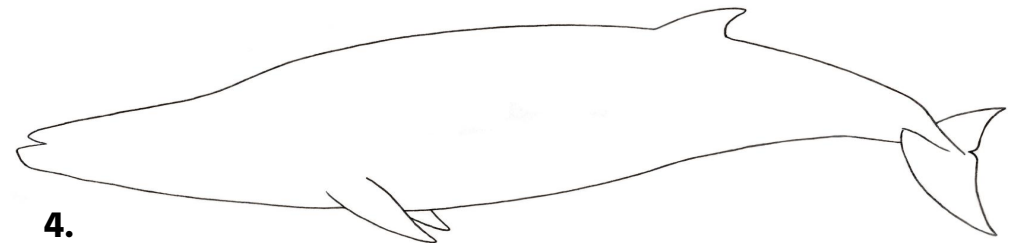


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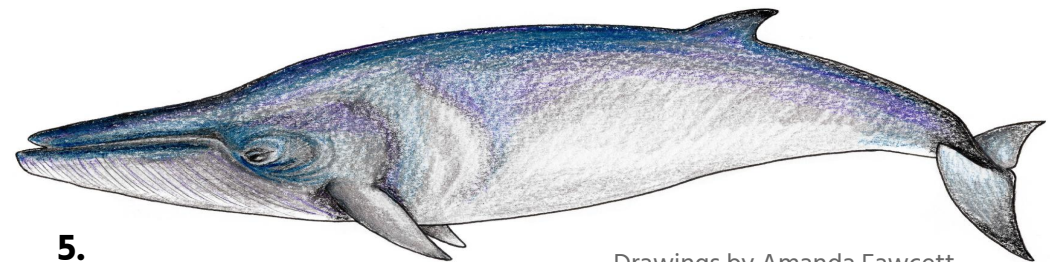
When making your outline, be sure to leave space for soft tissue like muscle and fat, and any structures that might not have been preserved through fossilization.



3.



4.



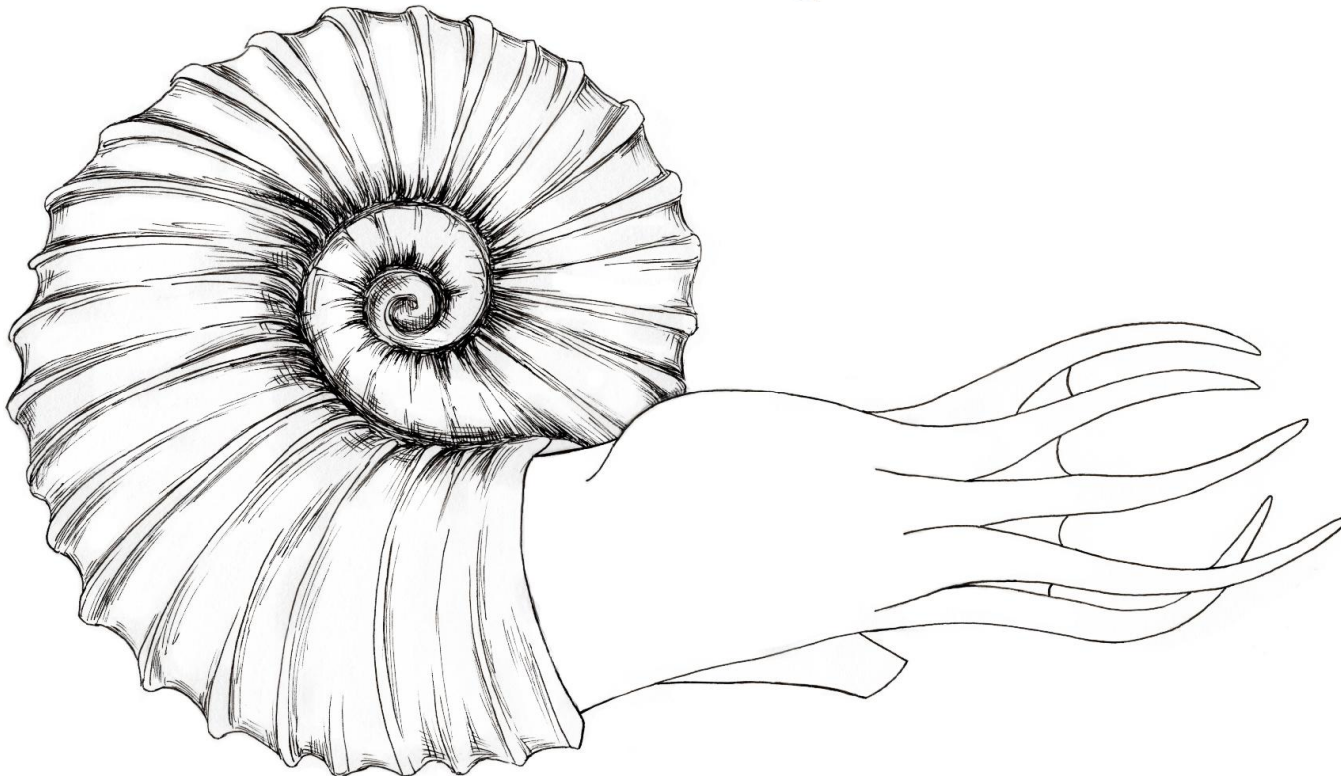
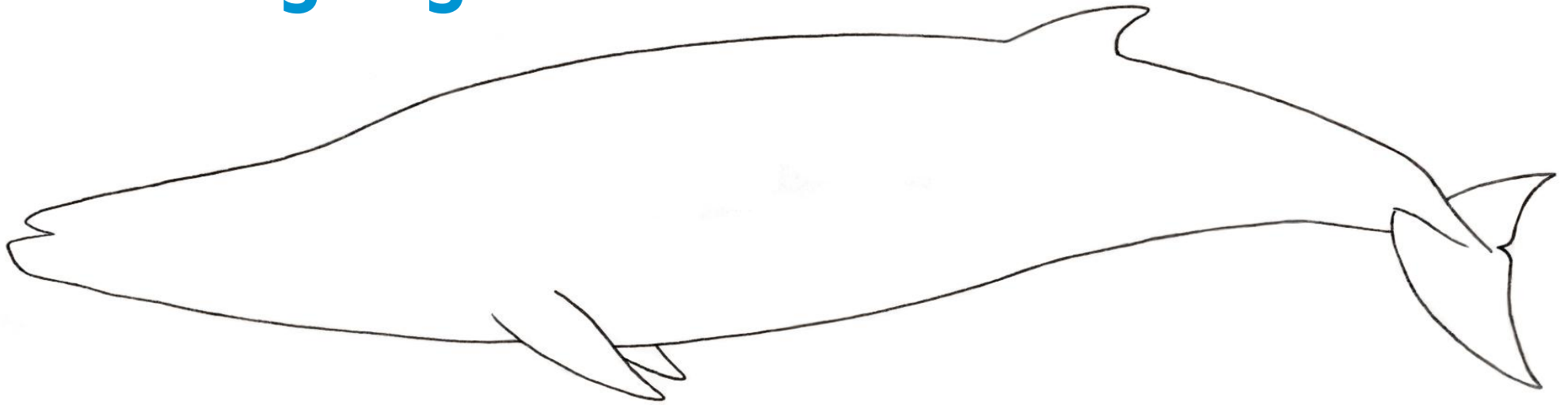
5.

Drawings by Amanda Fawcett

The common minke whale is one of the smallest baleen whales living today. It helps us to understand what the Lincoln Heights whale might have looked like.



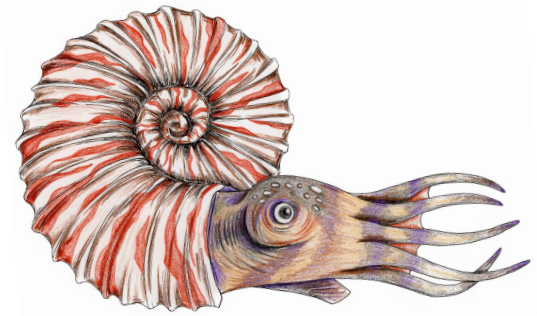
# Coloring Page



Use your imagination and the scientific understanding you gained from this workbook to create your own versions of these prehistoric ocean dwellers.

**What did you consider when choosing how to design these animals?**

# Glossary



**Ammonite:** A shelled marine mollusc from the class Cephalopoda that went extinct 66 million years ago.

**Ammonoids:** The larger group of shelled cephalopods which ammonites are part of.

**Baleen:** A system of plates and bristles inside the mouths of certain whales that allows them to filter feed from the ocean. Baleen contains keratin, which makes up human fingernails.

**Cephalopod:** Any marine mollusc belonging to the class Cephalopoda (including squid, octopuses, cuttlefish and nautilus).

**Extant:** Referring to species that are still living today.

**Extinct:** Referring to species that have died out and no longer exist.

**Fossilization:** The preservation of once-living organisms.

**Paleoart:** The field of art concerning the reconstruction of prehistoric plants and animals. Artists often work alongside paleontologists to create the most accurate representations.

# Dive Deeper!

- Come explore the exhibit, [\*Los Angeles Underwater: The Prehistoric Sea Beneath Us\*](#), in person to see the fossils in this workbook and so much more!
- Visit our [Los Angeles Fossil Map](#) to see fossils found around Los Angeles!
- Discover more stories about Ancient L.A. [here!](#)
- Have you found a fossil? [Click here](#) to learn more about how to record your discovery!

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