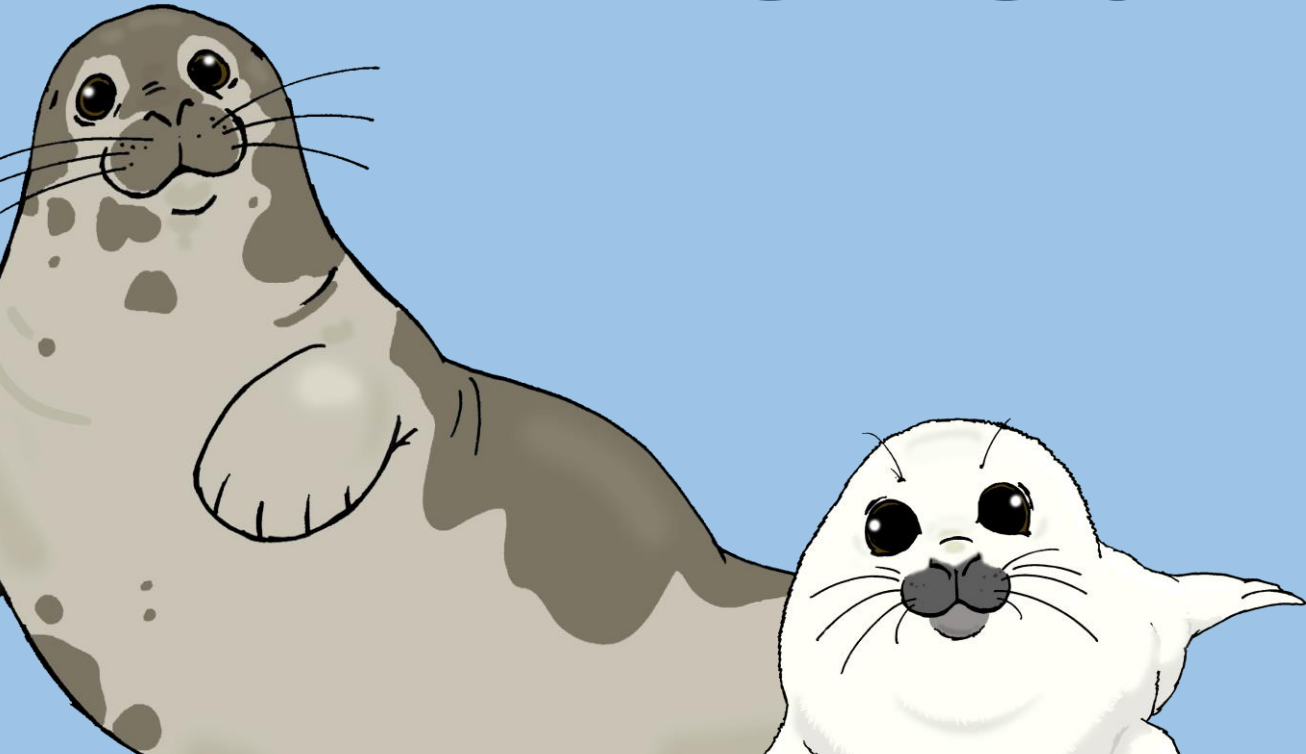




POLAR HABITATS: ARCTIC & ANTARCTIC



COPING WITH COLD

Conditions at the **North** and **South polar regions** are a tremendous challenge for the animal life found there. Maintaining **body temperature** when the air is way **below freezing**, moving over the snow and ice, and staying hidden, present constant difficulties in these frozen wildernesses.



emperor penguin

A WINTER COAT



Having **thick fur** to trap warm air close to the skin reduces heat loss. The **musk ox** has a heavy coat of fur that guards against the fury of the Arctic storms. Protective “**guard hairs**” and **insulating** hairs laid underneath form an effective barrier to losing precious energy.

Huddling with others also helps protect the younger oxen.

What is the best insulation to prevent cooling?

Design an investigation to show **heat loss over time** for **warm water***.
Record how **three different materials** compare against no insulation.

MATERIALS	TEMPERATURE (°C)		
	START TEMP	END TEMP	LOSS
No insulation			

* Do not use boiling water – just hot tap water

PENGUIN ADAPTATIONS

There are a variety of penguin species, who all share a **stout body shape**. A layer of **dense feathers** preserves body heat even in the chilly Antarctic waters.



macaroni penguin



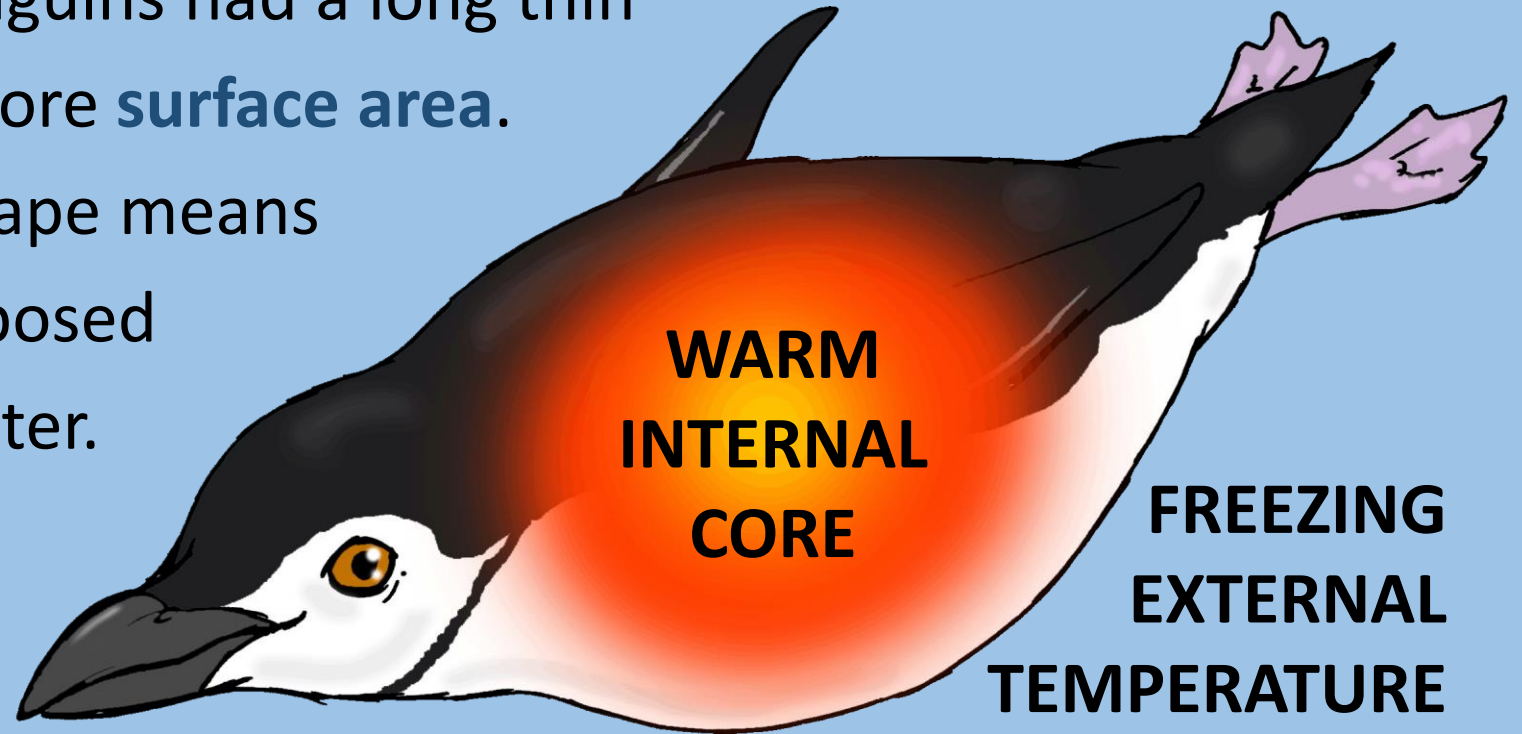
Adelie penguin

PENGUIN ADAPTATIONS

Having such a **compact body shape** also helps preserve warmth. If penguins had a long thin body, there would be more **surface area**.

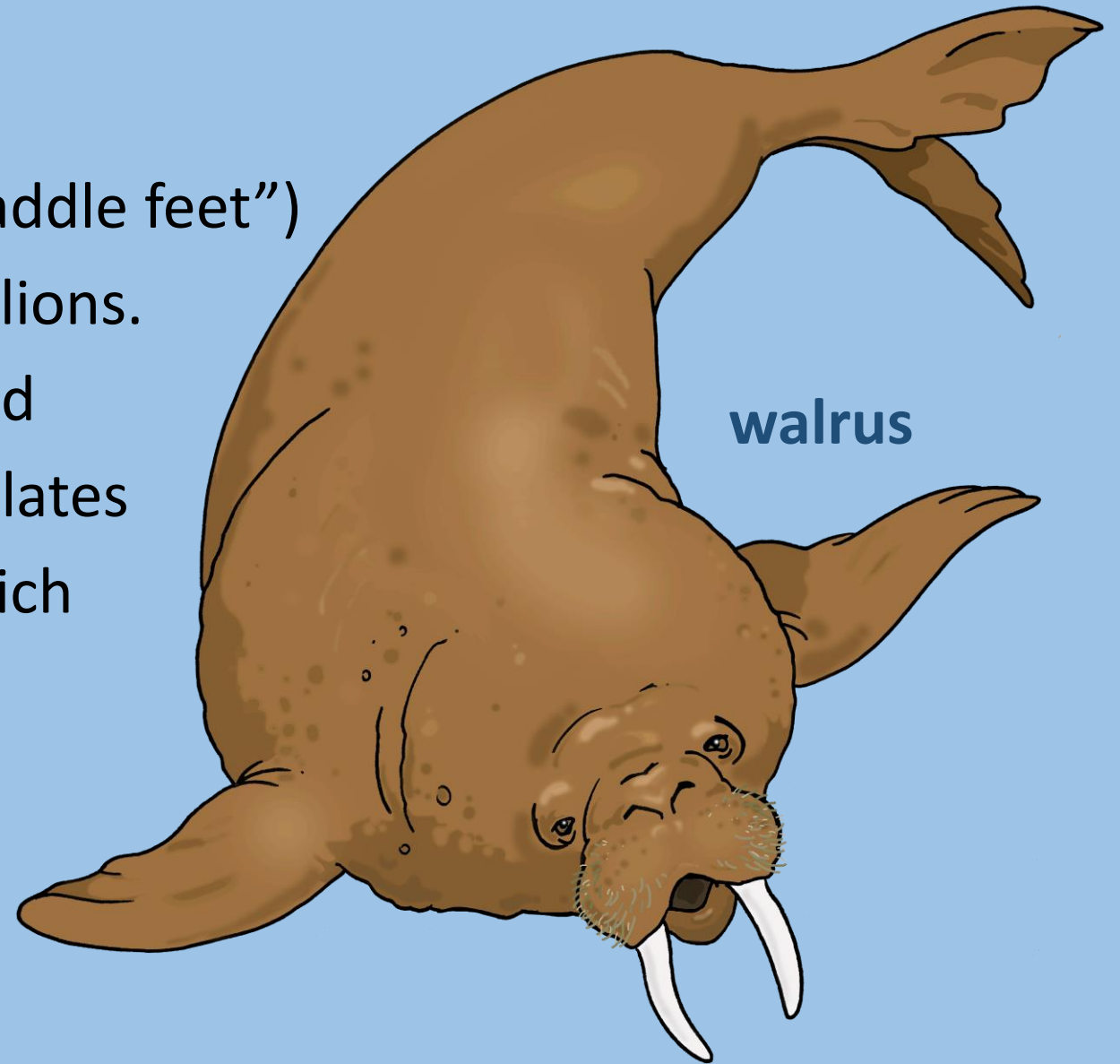
Their stout, compact shape means less of the surface is exposed to the freezing air or water.

chinstrap penguin



BLUBBER

The **pinniped** family (meaning “paddle feet”) includes the walrus, seals and sealions. They have a thick layer of fat called **blubber** under their skin that insulates them against the icy waters in which they spend most of their time.



RAISING YOUNG

Young harp seals are born on the ice and are extremely vulnerable to predators. Their snowy white fur **camouflages** them from equally well disguised polar bears. Hiding may not be enough, as polar bears can smell a seal from great distances and they can even break through thick ice to reach what would be a valuable meal.



harp seal (with pup)

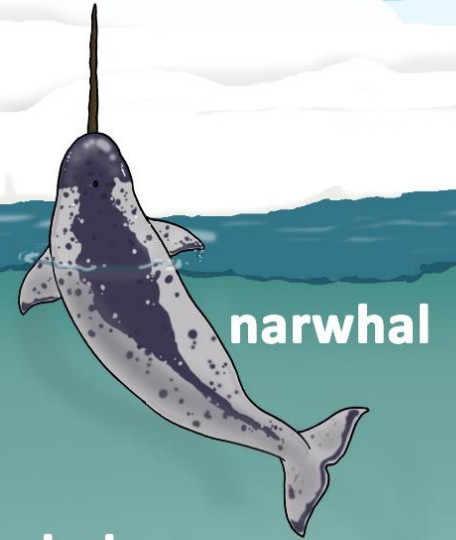
FOOD CHAINS & FOOD WEBS

ARCTIC CIRCLE OCEANS



polar bear

harp seal

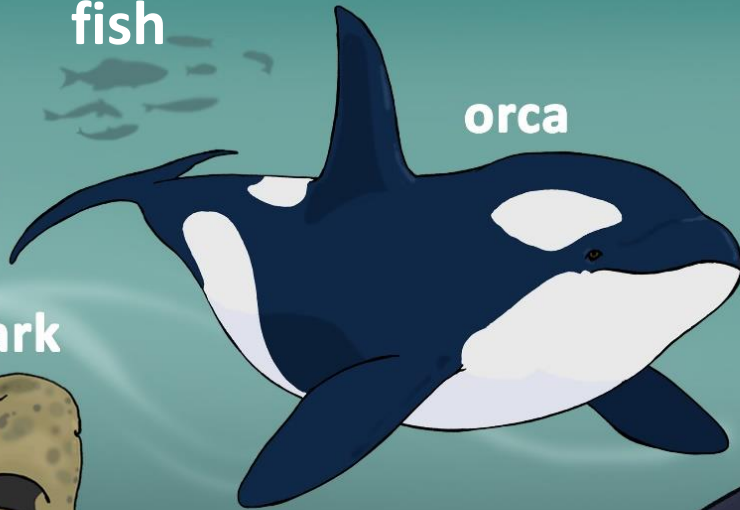


narwhal

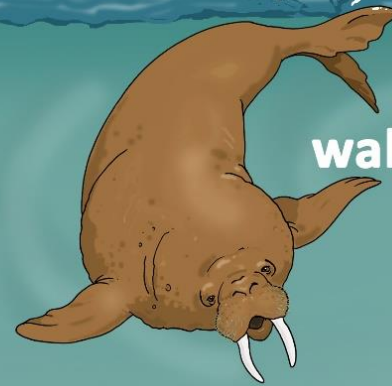


beluga

fish



orca



walrus

bowhead whale

Greenland shark



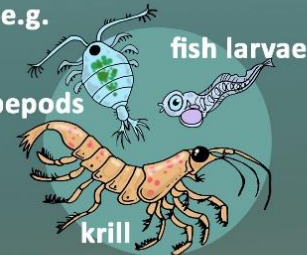
zooplankton

e.g.

fish larvae

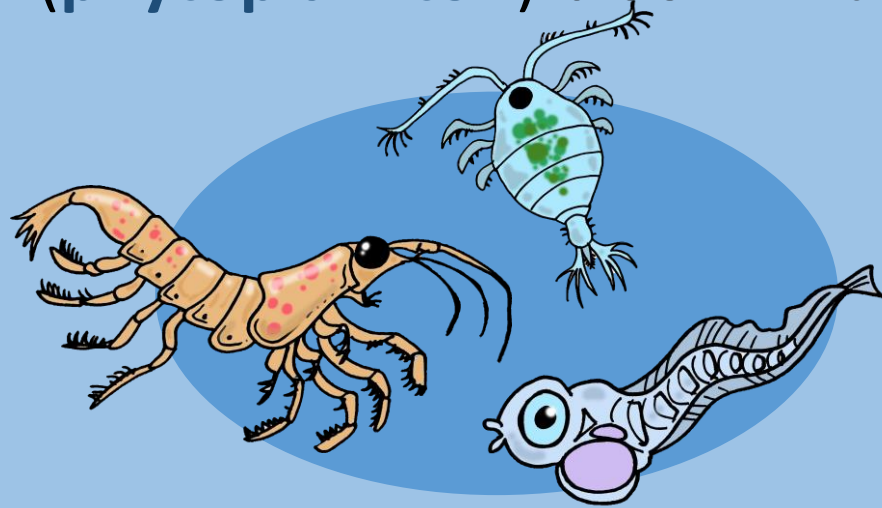
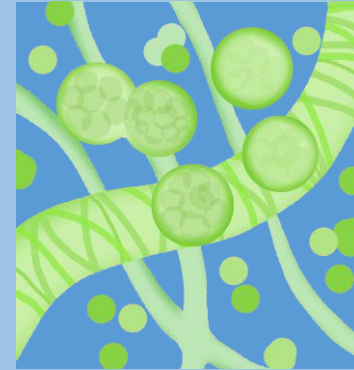
copepods

krill



FOOD CHAIN FOUNDATIONS

Because of **nutrients** carried by **ocean currents**, vast volumes of microscopic plant life (**phytoplankton**) bloom in these cold waters.



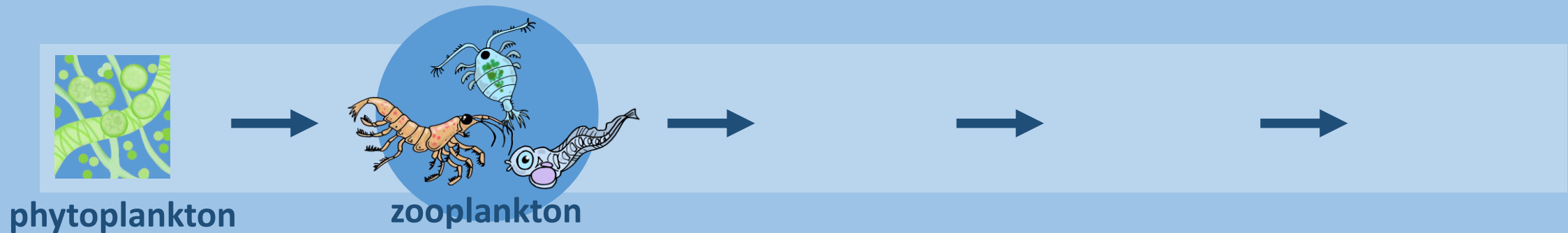
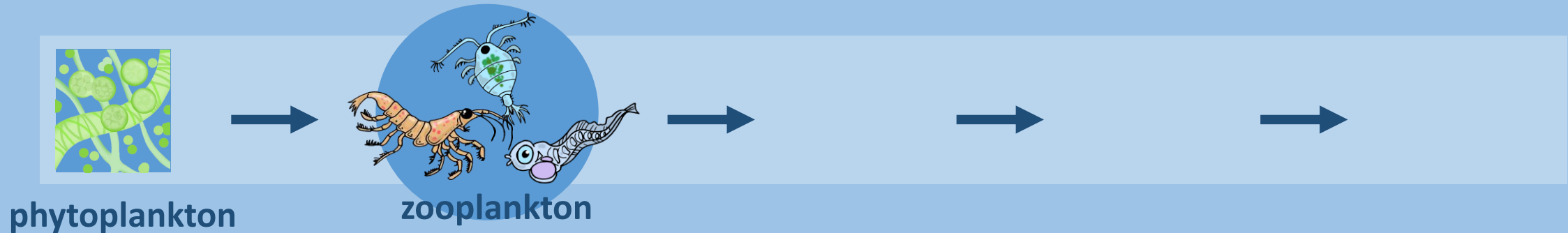
Zooplankton

e.g. krill, copepods and fish larvae

This provides food for a multitude of tiny animal life. The collective term for this living soup is **zooplankton**. In turn, the zooplankton provides the foundation of countless **food chains**

FOOD CHAINS What could come next?

Using organisms from the last image complete two food chains...

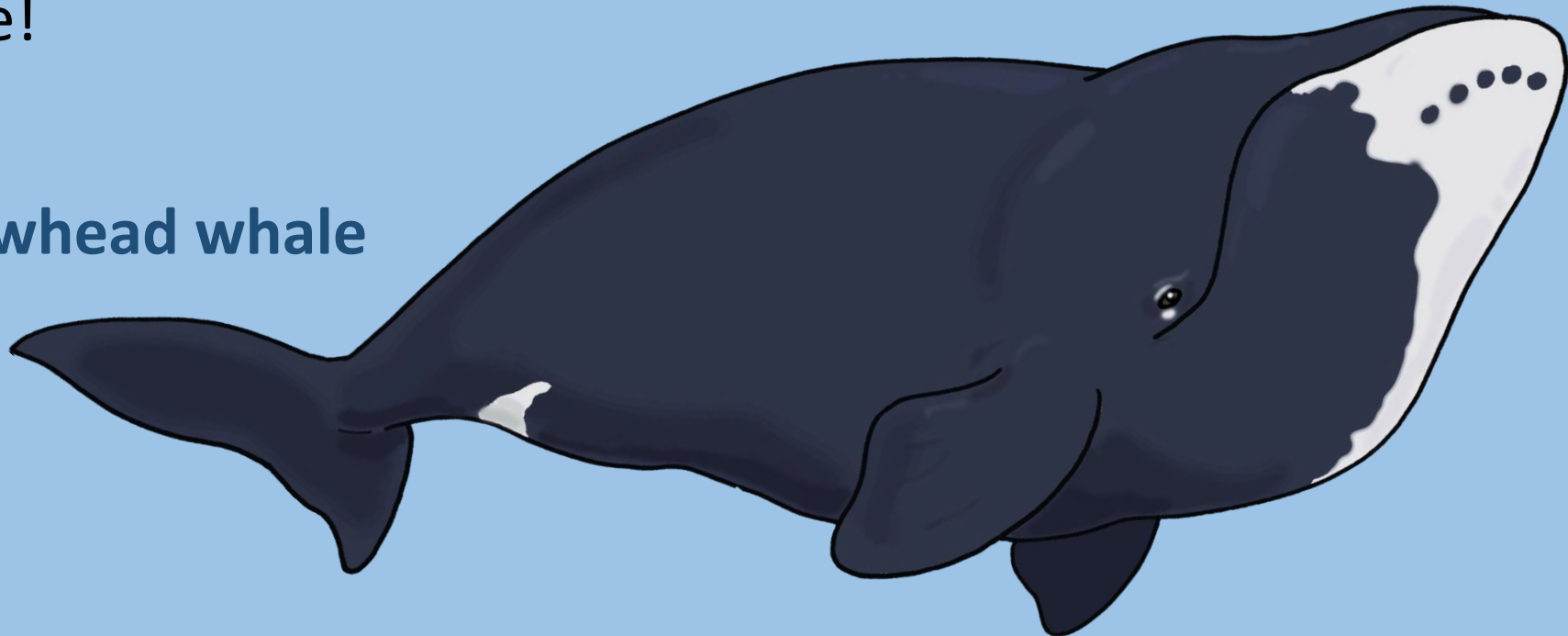


INCREDIBLE AGES

Living in chilly waters slows the body chemistry (**metabolism**) and results in some long-lived species.

Bowhead whales may reach an impressive **200 years old** and maybe even more!

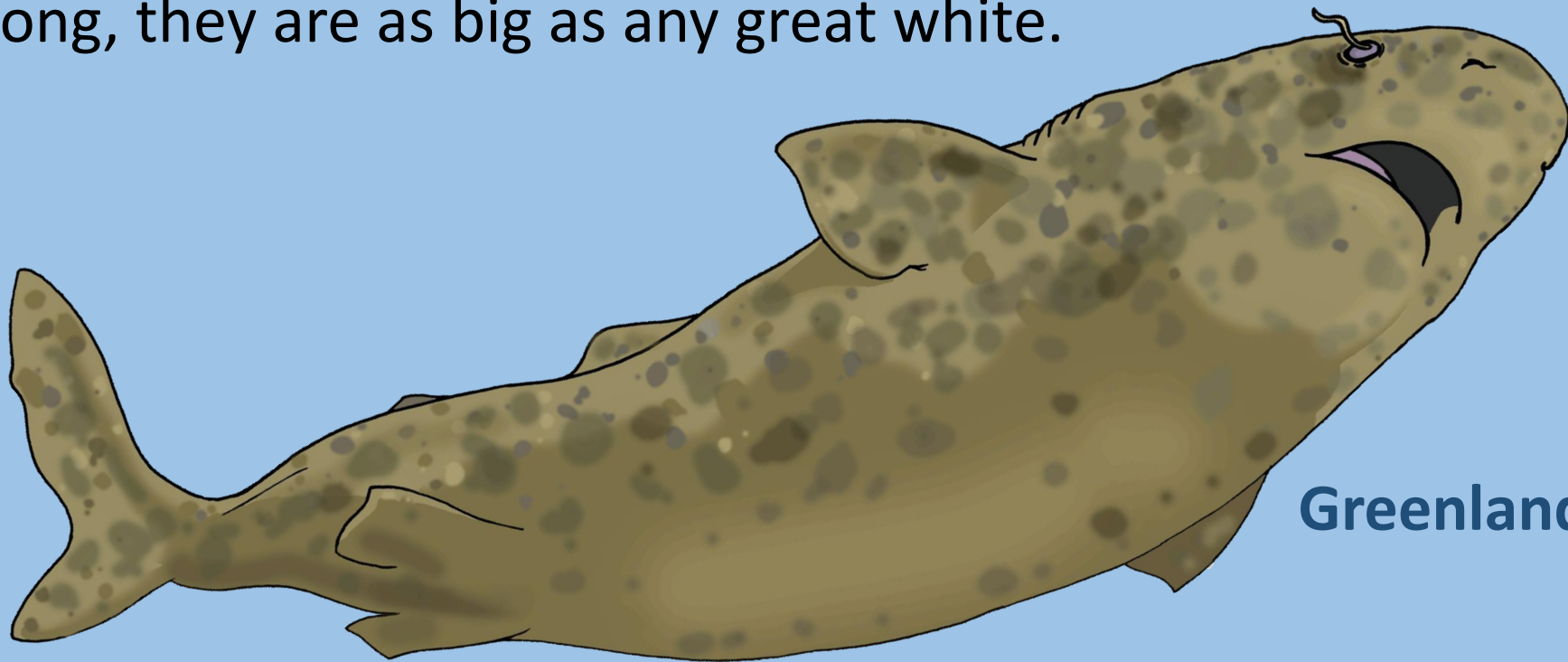
bowhead whale



INCREDIBLE AGES

The Greenland shark is the **oldest vertebrate** animal on Earth at somewhere between **250 and 500 years old**.

At 6m long, they are as big as any great white.

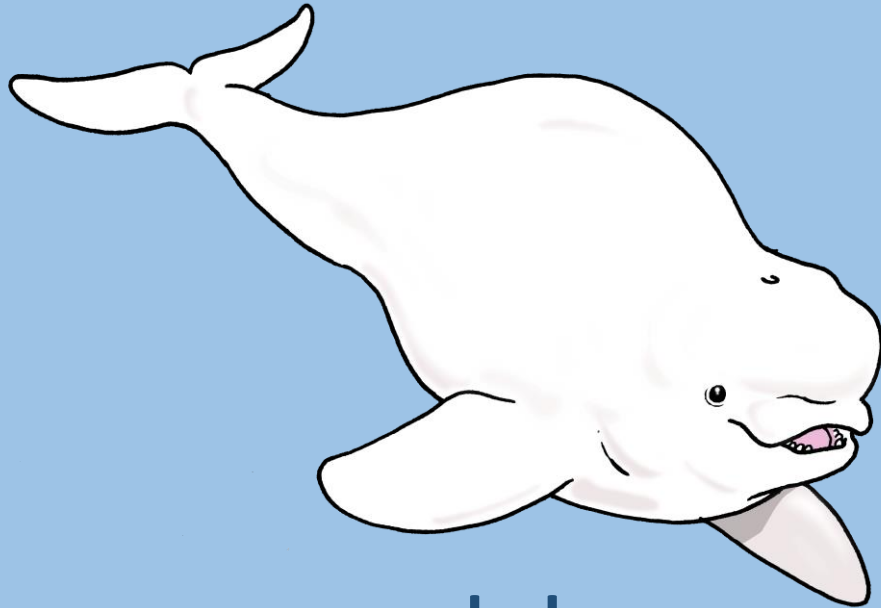


Greenland shark

WEARING WHITE

It makes sense in a world of white, to blend in and avoid being seen.

Beluga, share this tactic with the **polar bears** that hunt them.



beluga



polar bear

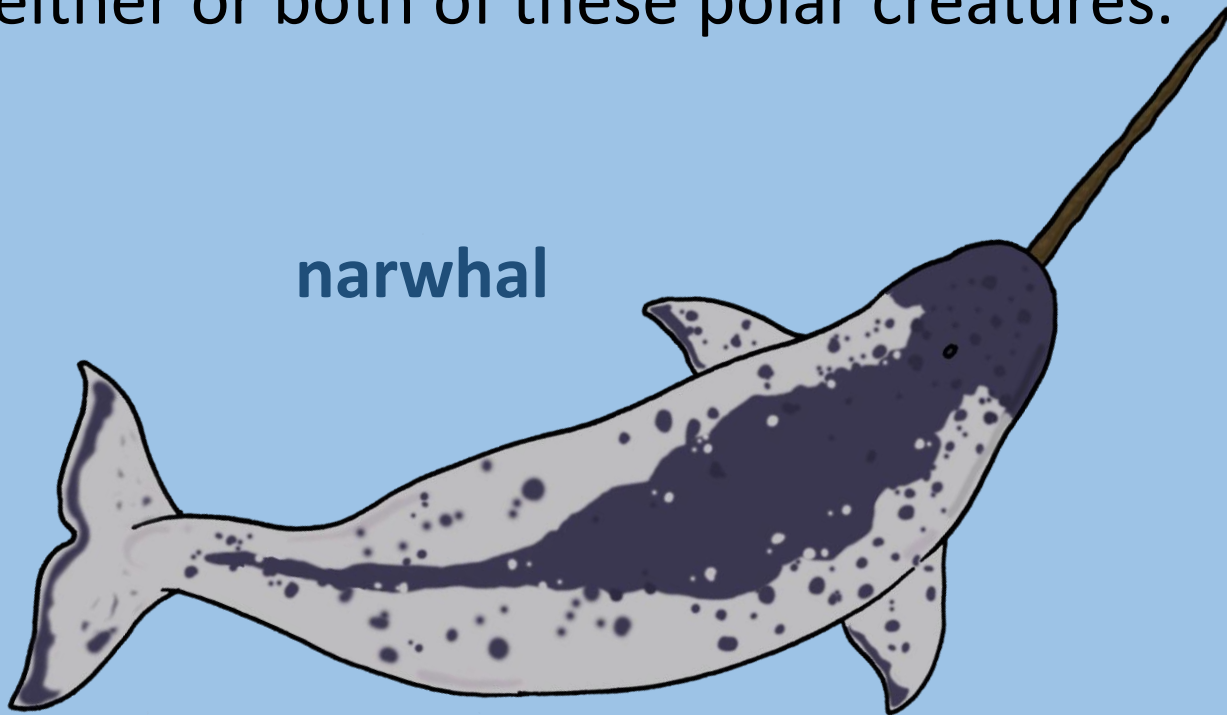
VO CAB Can you give a definition for these terms?

TERM	DEFINITION
insulation	
blubber	
metabolism	
zooplankton	
camouflage	

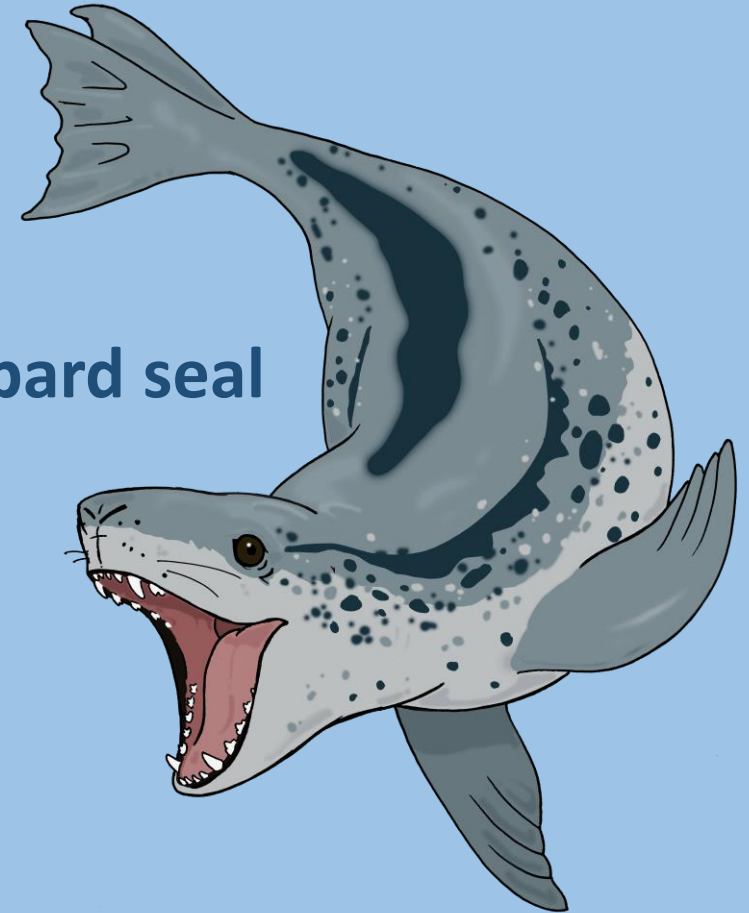
RESEARCH CHALLENGE

Create a **fact sheet** or **presentation** based on either or both of these polar creatures.

narwhal



leopard seal



Consider diet, adaptations, where they live, size and conservation issues.