new bedford
whaling museum
ART. HISTORY. SCIENCE. CULTURE.

ADAPTATIONS:

Creature Features

This lesson includes three sections:

1

INVESTIGATE (15 min.)
Click through the following slide deck to learn more about unique adaptations of the animal kingdom, with a focus of those that live in the sea.

2

INQUIRE (15 min.)
Analyze videos found in the Creature Feature library to help inspire your scripting and production skills.

3

IMAGINE (30 min.)
Follow the steps in the Activity Guide to create a scripted storyboard for your very own Creature Feature video.

INVESTIGATE

What are adaptations?

Adaptations are evolved traits that help individual or species of plants and animals to not only survive, but reproduce. Adaptations take place over a long period of time to help organisms survive -- or adapt -- to changes in their environment.

Common animal adaptations are migration, hibernation, camouflage, flight, living together, hair/fur, artificial bigness, and resource conservation.

What kinds of adaptations are there?

In general, adaptations are categorized as behavioral, structural/physical, or physiological. Behavioral adaptations can happen more quickly (relatively speaking) since they depend on an animal's interactions with its environment. Behavioral adaptations speak to the things animals DO to survive, many of which are inherent or innate. Structural or physical adaptations speak to the traits that they HAVE, which can be physiological, and require genetic changes that might take generations to develop. These adaptations are passed along to next generations due to natural selection.

BEHAVIORAL: speaks to the things animals DO to survive

STRUCTURAL: speaks to the traits animals HAVE that help them survive

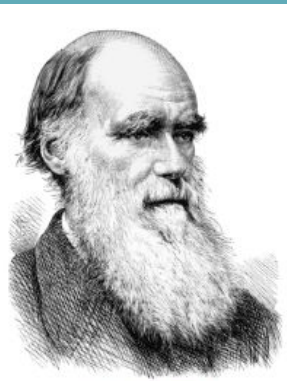
PHYSIOLOGICAL: Speaks to an animal's INTERNAL function that help them survive

What is natural selection?

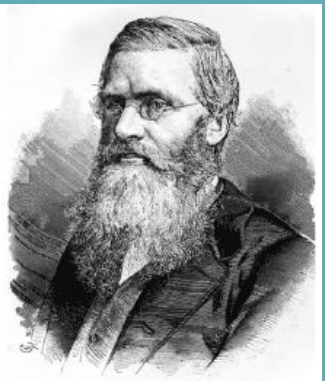
SPECIATION: The rise of a new or distinctly different species

In the mid-1800s, naturalists Charles Darwin and Alfred Russel Wallace introduced the theory of evolution by natural selection in their book, *On the Origin of Species*. Darwin and Wallace claimed that individuals within a species had variable traits, some of which were more suited to survival in a given environment, which meant that individual was more likely to reproduce and pass on such traits. Their research highlighted how such favorable adaptive traits were transmitted through generations, leading to **speciation** and evolution at large.

While Darwin and Wallace did not know about genetics, they did understand that traits were passed from parents to their offspring. They also found that diversity was sometimes due to variations that were seemingly random. Such changes, or mutations, could be harmful, neutral, or helpful when it came to survival.



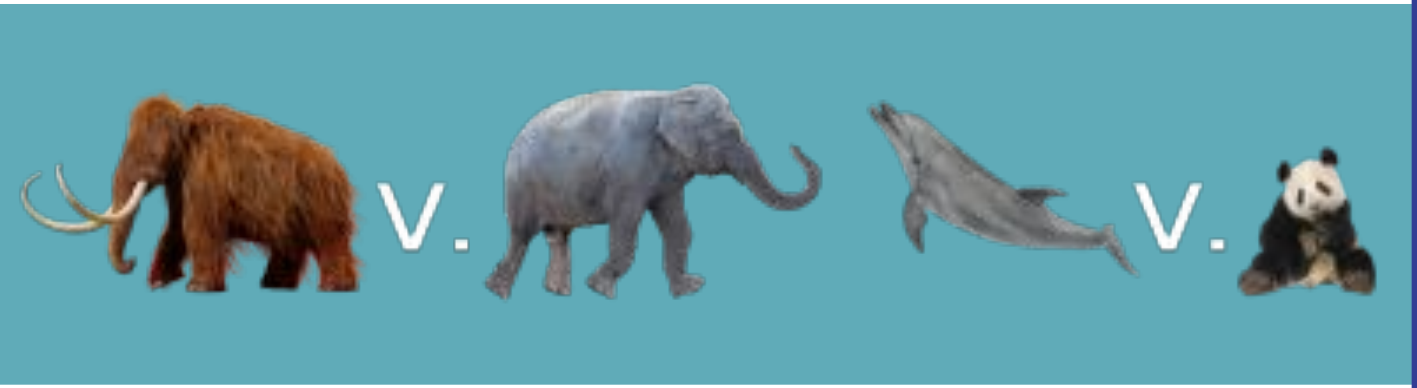
CHARLES DARWIN



ALFRED RUSSEL WALLACE

Divergent adaptations or adaptive divergence is when one or more species diverged from a common ancestor and yet are different species. These species' traits or **phenotypes** become more dissimilar over time. Such divergence happens from adaptations to different environments. Common examples are the woolly mammoth and the modern elephant or domestic dogs and wolves.

Convergent adaptations or adaptive convergence is when organisms evolve to have similar traits or **phenotypes** that help them to survive in like environments. Consider the swimming shape of sharks and dolphins or opposable thumbs of primates and panda bears.



Want to know more?

PHENOTYPE: Observable characteristics or traits

What is the theory of evolution?

Evolution refers to the process, development, and diversification of organisms over time. Adaptations play a key role in the theory of evolution.

For a long time, humans have tried to make sense of the world around them. Greek philosopher Anaximander of Miletus (500s B.C.E) shared an early theory of evolution based on observations that the first humans would not have been able to survive with a long infancy period, suggesting that humans, too, have adapted over time.

What careers study adaptations?

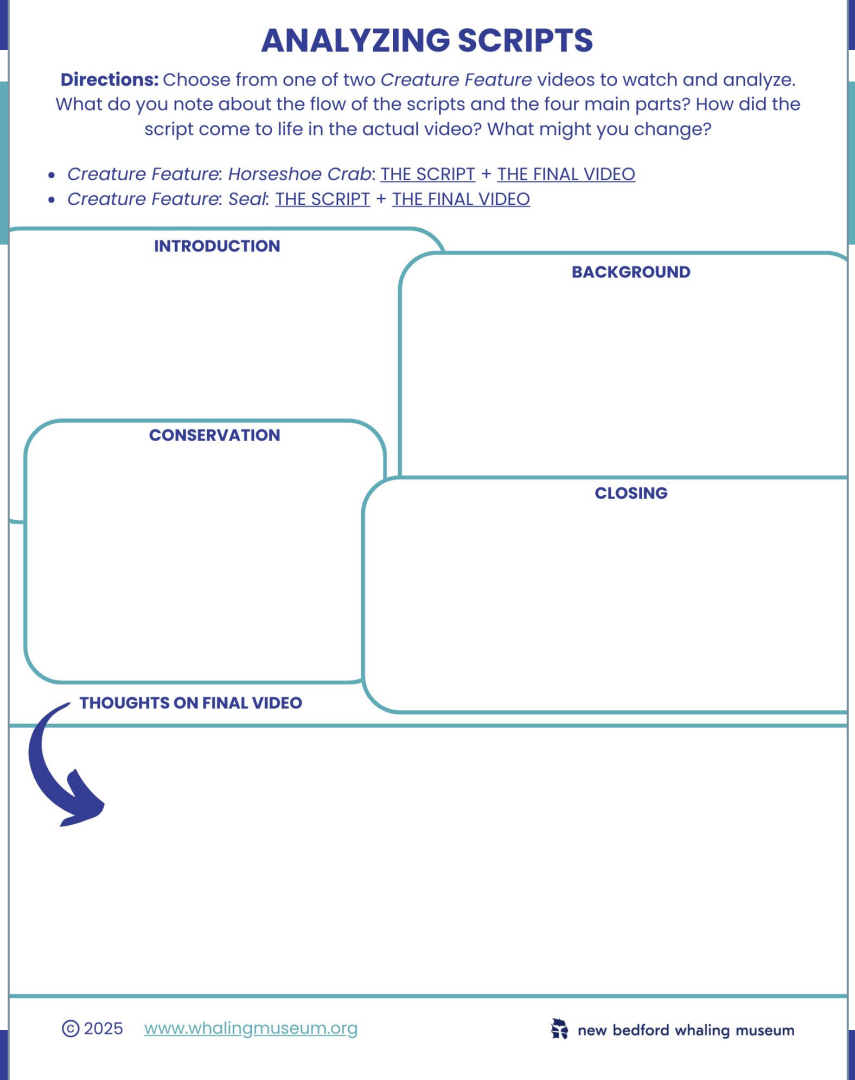
Evolutionary biologists are professional scientists who work in the field and in laboratories to study evolutionary patterns. Often they contribute to the field by publishing their findings and research in scientific journals. Many also contribute by teaching evolutionary or conservation biology in academia as an instructor or professor. In addition to earning a degree in biology, many are steeped in the disciplines of mathematics.

INQUIRE

Time to question!

The New Bedford Whaling Museum created a series of videos called *Creature Features* to highlight the unique adaptations of marine life.

Use the following guide to help you analyze the format, content, and production value of one of the following *Creature Features*. Use these resources as a blueprint to begin imagining your own production.



ANALYZING SCRIPTS

Directions: Choose from one of two *Creature Feature* videos to watch and analyze. What do you note about the flow of the scripts and the four main parts? How did the script come to life in the actual video? What might you change?

- *Creature Feature*: *Horseshoe Crab*: THE SCRIPT + THE FINAL VIDEO
- *Creature Feature*: *Seal*: THE SCRIPT + THE FINAL VIDEO

INTRODUCTION

BACKGROUND

CONSERVATION

CLOSING

THOUGHTS ON FINAL VIDEO

script

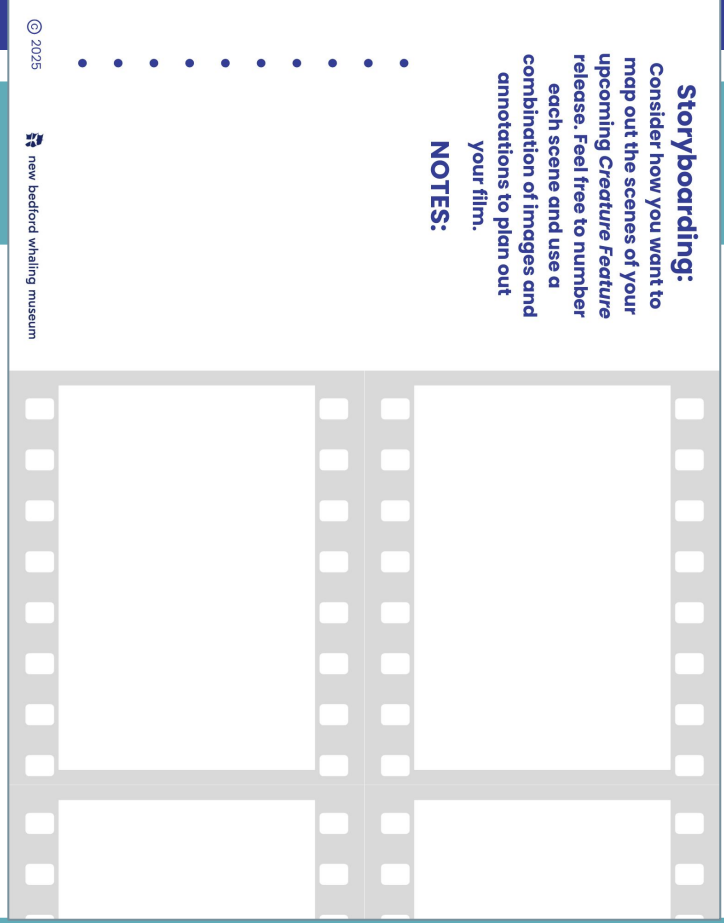
script

IMAGINE

Time to create!

Want to create your own Creature Feature video? Like the writing process, there are stages to filmmaking. The three essential stages are pre-production, production, and post-production. Pre-production is when you take your idea and begin developing the storyline and the scripting, and you consider how to block the main scenes (see this article for insight).

Follow the steps in the Activity Guide to bring your ideas to fruition via a detailed storyboard. Consider working in small groups to lean on each other's strengths in this creative process.



"IF IT CAN BE WRITTEN OR THOUGHT, IT CAN BE FILMED." - Stanley Kubrick, filmmaker

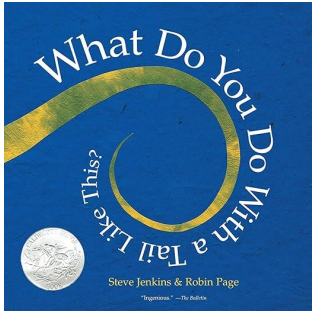
Additional resources

NATIONAL GEOGRAPHIC: *Adaptation & Survival*

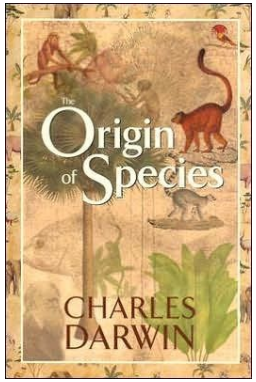
CRASHCOURSE: *Natural Selection* (video)

SMITHSONIAN MAGAZINE: *The Evolution of Charles Darwin*

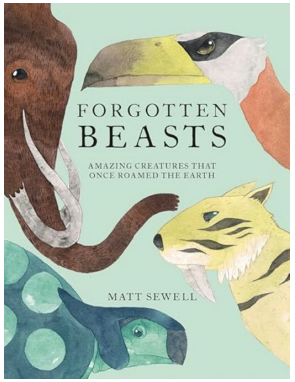
BIOEXPLORER: *Explore 15 Remarkable Adaptations of Ocean Inhabitants*



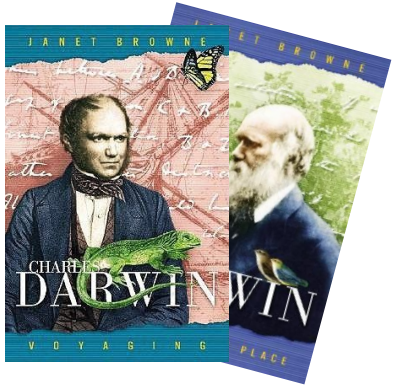
What Do You Do with a Tail like This?
by Steve Jenkins



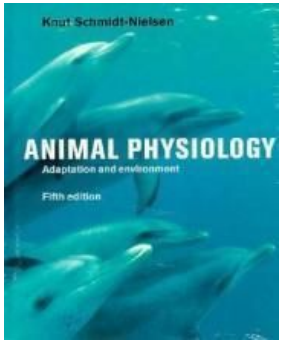
The Origin of Species
by Charles Darwin



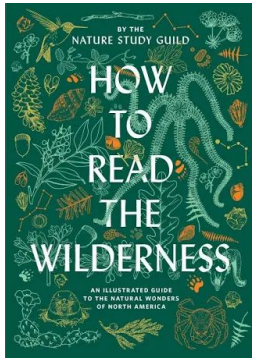
Forgotten Beasts
by Matt Sewell



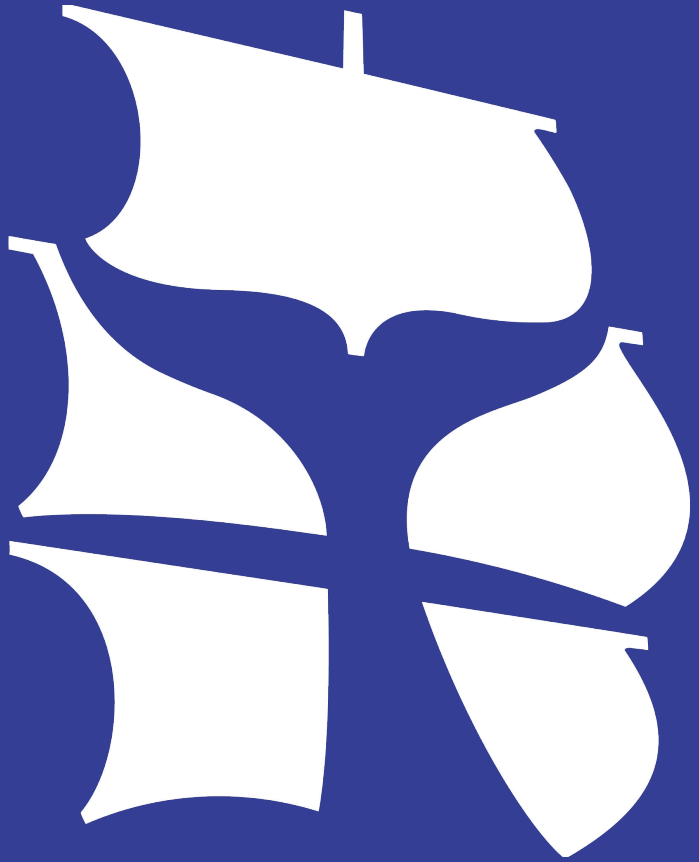
Charles Darwin: A Biography (V. 1 & 2)
by Janet Browne



Animal Physiology
by Loreen Knut Schmidt-Nielsen



How to Read the Wilderness
Nature Study Guide



For more
classroom activities,
visit the
New Bedford Whaling
Museum website:

www.whalingmuseum.org

Media citations

Slide 4 video: *Types Of Adaptations* from HighSchoolScience101; https://youtu.be/vnmPdHmRv9o?feature=shared

Slide 6 image: https://cduebooks.pressbooks.pub/wallacea/part/timeline/

Slide 8 video: *Darwin's theory of Evolution: A REALLY SIMPLE and Brief Explanation* from Science ABC; https://youtu.be/pybhlOhXkiM?feature=shared

Slide 9 image: https://www.stonybrook.edu/commcms/anthropology/undergraduate/bs-human-evolutionary-biology.php

Slides 12 & 13 videos: *Creature Feature: Horseshoe Crab* & *Creature Feature: Seals* from The New Bedford Whaling Museum