

Comparative Anatomy Lesson Plan:

West Indian Manatee *Trichechus manatus* &

Bottlenose Dolphin *Tursiops truncatus* Classroom Necropsy

Description of necropsy activity provided by the Marine Mammal Research Program at the Dauphin Island Sea Lab.

Instructions for Dolphin and Manatee Anatomy Activity for Teachers/Classrooms

Things you will need:

1. Printed copies of dolphin and manatee body outlines (recommend laminated or glossy paper)
2. Printed copies of body organs (recommend laminated or glossy paper)
3. Tape or velcro to stick organs within body outline

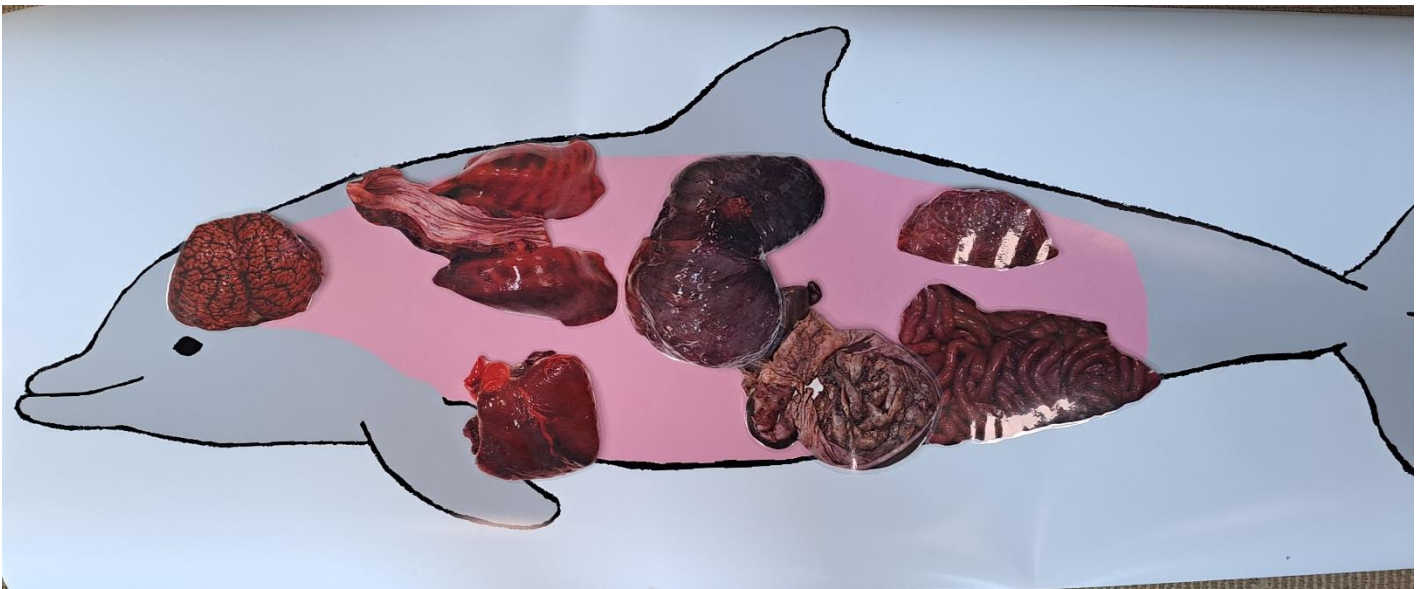
Students will learn about anatomy of bottlenose dolphins, *Tursiops truncatus*, and West Indian manatees, *Trichechus manatus*. Both animals are marine mammals, so their internal anatomy is similar to humans with a few exceptions. Researchers at the Alabama Marine Mammal Stranding Network perform necropsies, or non-human autopsies, on dolphins and manatees to determine cause of death. They also document each body organ, including noting how the organs look and photographing them.

Important: Scientists who perform necropsies on marine mammals are authorized to work on marine mammals under the NOAA National Marine Fisheries Service (NOAA NMFS). All photographs of marine mammal internal organs were collected and photographed under a Stranding Agreement between Dauphin Island Sea Lab and NOAA NMFS under authority of the Marine Mammal Protection Act.

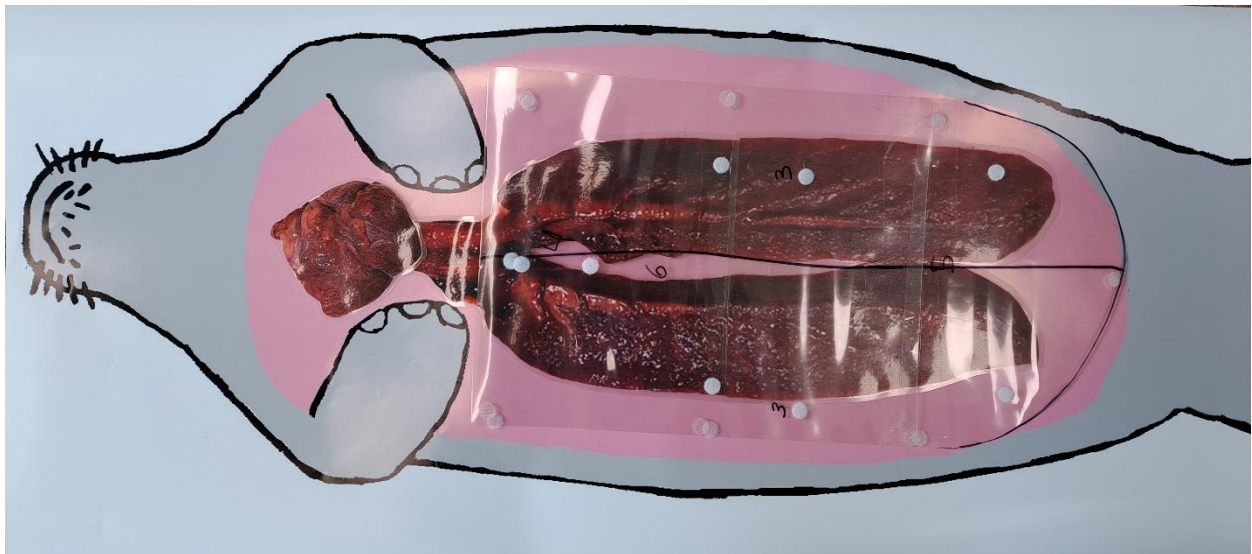
This activity includes two “empty” dolphin and manatee body outlines and individual organs with the goal to put the organ in the correct location within the animals’ bodies. This game also is a great way to talk about the physiology of each of the organs.

Organ Placement Key

Dolphin



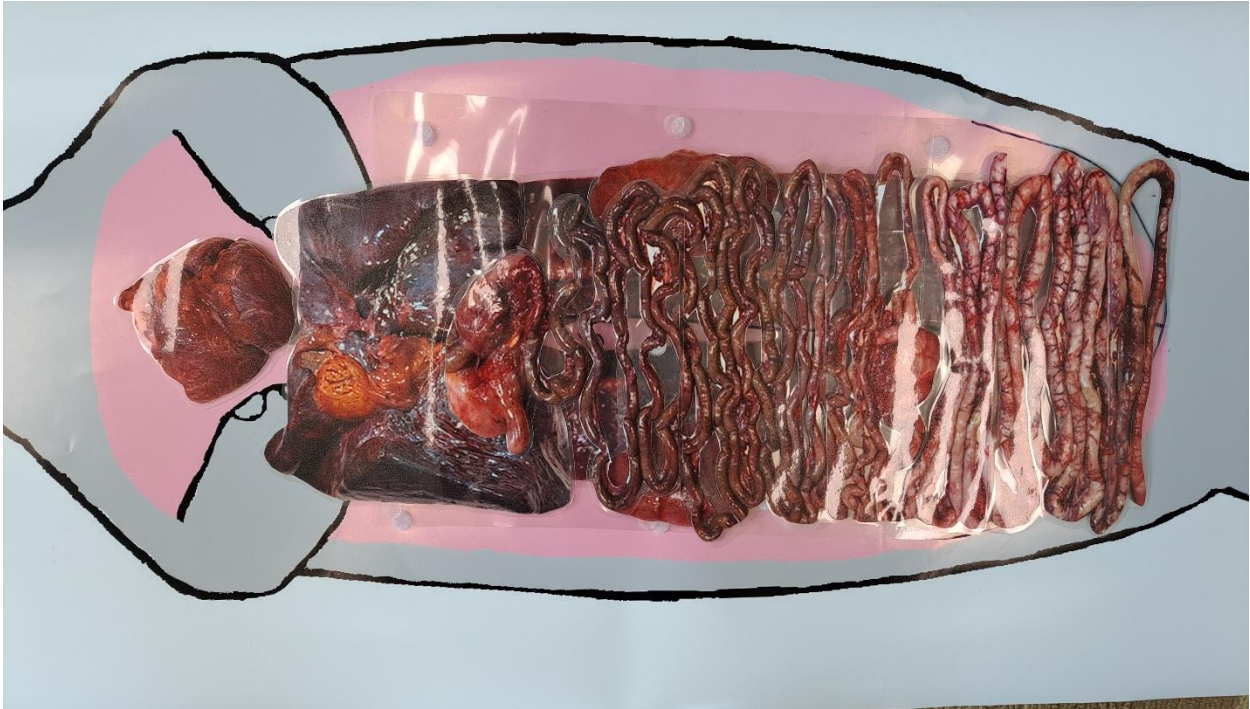
Manatee



Lungs go under the diaphragm (clear laminated sheet)



Liver and kidneys go on the hemidiaphragm.



GI tract goes under liver and over the kidneys

Dolphin Organ Glossary



Liver



Kidney



Intestines



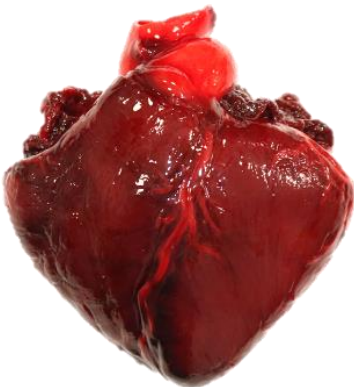
Lungs



Brain



Stomach (cut open to reveal fish contents)



Heart

Manatee Organ Glossary



Liver



GI tract



Lungs



Kidneys



Heart

Hemidiaphragm is portrayed using a clear sheet. Can use a laminating sleeve or a clear sheet protector. Draw a sharpie line down the middle to show that it is split.

Organ Functions

Heart: Pumps blood throughout the body.

- Manatee hearts are wider than dolphin hearts.

Gastrointestinal (GI) tract: Food digestion and waste transport.

- Dolphins have 3 stomach chambers (fore, main, and pyloric). They are carnivores and swallow their prey whole (can point out the fish pictured in the stomach).
- Manatees are herbivorous and have one stomach, but also have a cecum for digesting tough plant matter. This is similar to cows!

Liver: Filters blood.

- Manatees have a gallbladder (pictured, the yellow organ on the liver). Dolphins do not have a gallbladder. The gallbladder releases a fluid called bile that helps digest food.

Lungs: Respiration/breathing.

- Dolphins have a gooseneck, an extension of the trachea that goes through the esophagus and connects to the blowhole. This allows them to take in food without getting water in their trachea/airways.
- Manatees have long, flattened lungs that are along their back that help with buoyancy control. They also have a hemidiaphragm (a separated diaphragm over each lung) instead of one diaphragm like most mammals.

Hemidiaphragm: Separates the thoracic cavity (where the lungs are) from the abdominal cavity (where the digestive tract is).

- In manatees, each lung is in its own cavity, separated by the central attachment of the hemidiaphragm.
- Dolphins have a diaphragm similar to that of humans, which is not a hemidiaphragm.

Kidneys: Remove waste and extra fluid.

- Dolphins have reniculated kidneys meaning their kidneys are multilobed and look like a “cluster of grapes.” Each reniculae functions as its own individual kidney, making dolphins’ kidneys more efficient and able to handle saltwater.
- Manatees do not have reniculated kidneys.

Brain: Controls thought, memory, emotion, touch, motor skills, vision, breathing, temperature, hunger and every process that regulates a body.

- Dolphin brains are very similar in appearance and size to humans.
- Manatees have smoother brains and a very small brain to body ratio.