Station 1 – Digestive System

Dolphins have conical teeth used to grab and tear prey but not for chewing. From the esophagus the food travels to the Fore Stomach where it can be stored or regurgitated at will, it then passes to a spherical stomach where digestive juices and acids are released, then though the connecting stomach to the Pyloric stomach and finally through the Pyloric sphincter where Pancreatic and Bile ducts empty their digestive enzymes and juices. From this point we empty into the Intestines terminating at the anal opening from where waste is excreted. They have a shortened intestinal track. (Information retrieved from: https://sites.google.com/site/dolphinnnsss/home)

Dolphin Stomachs have 4 chambers. Fore, main, connecting and pyloric

marinemammalconservancy.org

Marine Mammals 2nd Ed.

http://food-pictures.feedio.net/
Station 2 – Respiratory System

Dolphins, like other mammals, need air to survive. Oxygen is one of the main sources of energy. Unlike fish, dolphins have to rise to the surface frequently to breathe. The lungs of dolphins are not significantly larger than other mammal. However, the dolphin lungs contain a lot more air cells than human lungs do. Dolphin lungs are made up of two layers of capillaries, and this arrangement increases the efficiency of gas exchange since most mammals have only one layer of capillary. Therefore, this means that the surface area of the lungs has been greatly increased and gas exchange can occur more quickly. Unlike other mammals who breathe through their nose and mouth, dolphins breathe through the blowhole, which is on the top on its head. Since the blowhole is at the top of the head, only a small region of the head is required to break the surface of the water to inhale air.

(Information retrieved from: https://sites.google.com/site/dolphinnnss/home)

The pie charts show Oxygen storage in Humans and Dolphins.

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<th>Human</th>
<th>Dolphin</th>
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<td>muscles</td>
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Station 3 – Sound Production/Communication

Dolphins communicate with whistle-like sounds produced by vibrating connective tissue, similar to the way human vocal cords function. Unlike humans, dolphins lack vocal cords, but they produce sound by sphincter muscles within the blow hole. They communicate using whistles, squeaks, moans, trills and clicks. The clicking sounds bounce off objects and the returning sound waves are picked up by the dolphin's forehead and lower jaw and interpreted as to distance, size and shape of object. This sound system is particularly useful at night or in murky waters as it allows the dolphin to navigate even if visibility is poor.

(Information retrieved from: https://sites.google.com/site/dolphinnnsss/home)

Now go to the website: http://www.nefsc.noaa.gov/psb/acoustics/sounds.html and listen to the different sounds dolphins make.
Station 4 – Circulatory System

A bottlenose dolphin’s circulatory system adjusts to conserve or dissipate body heat and maintain body temperature. This is called heat exchange system. Arteries in the flippers, flukes, and dorsal fin are surrounded by veins. Thus, some heat from the blood traveling through the arteries is transferred to the venous blood rather than the environment. This countercurrent heat exchange aids dolphins in conserving body heat.

In cold water, circulation may decrease to blood vessels near the surface of the flippers, flukes, and dorsal fin, and increase to blood vessels circulating blood to the body core, thus conserving body heat. During prolonged exercise or in warm water, a dolphin may need to shed excess heat. In this case, circulation increases to blood vessels near the surface of the flippers, flukes, and dorsal fin, and decreases to blood vessels circulating blood to the body core. Excess heat is shed to the external environment.

(Information retrieved from www.seaworld.org)
Station 5 – Nervous System/Sensory System

The dolphin's brain is the second most powerful and complex brain in animals. Large brain animals like humans, chimpanzees, and dolphins have a number of things in common like generally long lives and stable communities. They live in fluid social groups. And they demonstrate total parental dependence during childhood.

The cerebral cortex measures intelligence. The more folded the cortex, the more room within the brain to hold additional brain cells with which to perform processing of information. Recently published information regarding the increased folding of Albert Einstein's cerebral cortex compared to that of other humans supports this theory. The only animal to have a more folded cortex than man is the dolphin.

(Information retrieved from: https://sites.google.com/site/dolphinbrains/home)

Listen to Dr. Lori Marino talk about the dolphins brain at the website:

After you answered the questions, go to the website: http://www.dolphin-institute.org/resource_guide/dolphin_perception.htm to learn about the dolphins’ senses.
Comparative Anatomy Lab – Dolphins vs. Humans

Station 6 – Support System: Muscular and Skeletal

dolphin4life.weebly.com

www.stpeters.k12.nf.ca

Visual.merriam-webster.com
Station 7 – Integumentary System

A dolphin's skin is smooth and feels rubbery. The skin has no hair or sweat glands.

A dolphin's outer skin layer, the epidermis, is about 10 to 20 times thicker than the epidermis of terrestrial mammals. Just like human skin, dolphin skin constantly flakes and peels as new skin cells replace old cells. A bottlenose dolphin's outermost skin layer may be replaced every two hours. This sloughing rate is nine times faster than in humans. This turnover rate ensures a smooth body surface and probably helps increase swimming efficiency by reducing drag (resistance to movement).

The skin layer beneath the epidermis is the dermis. The dermis contains blood vessels, nerves, and connective tissue.

A dolphin's blubber (hypodermis) lies beneath the dermis. Blubber is a layer of fat reinforced by fibrous connective tissue.

- Blubber contributes to a dolphin's streamlined shape, which helps increase swimming efficiency.
- Blubber stores calories, which provide energy when food is in short supply.
- Blubber reduces heat loss, which is important for thermoregulation.
- Blubber thickness fluctuates by season as well as with body size and health status.

(Information retrieved from www.seaworld.org)