

A Seal of Approval – 3

By the sheer **success** of this family of animals, it is completely appropriate to regard the seal as **well designed**. Seals are **magnificent swimmers and divers**. Although they lack the speed of dolphins or whales, seals have greater manoeuvrability in the water. Some kinds of seals can dive to a depth of 800 ft or more for longer than half an hour.

- Several **adaptations** are involved in giving the seal its superior diving ability. In the circulatory system the **veins are larger**, and have a **greater complexity** than in similarly-sized land animals. There are networks of fine blood vessels in which the venous blood generally flows in the opposite direction of the arterial blood. These act as blood **reservoirs** that increase **oxygen stores** for use during diving.

Like other diving mammals, seals have **high amounts** of hemoglobin (in the blood) and myoglobin (in the muscle cells). This increases oxygen storing capacity to keep the working muscles going during dives. It allows them to **stay submerged** for long periods of time while still having enough oxygen. Elephant seals and other deep-diving species have blood **volumes** that make up one-fifth of their body weight.

- When diving, the seal's **heart rate** decreases, and blood flow is maintained only to the **heart, brain and lungs**. Earless seals have another physical adaptation in the large trunk of the arterial system. An **elastic aorta** absorbs the shocks of heartbeats, and so keeps the blood pressure at an even level during dives.

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Preparing to dive, seals **first exhale** about half the air in their lungs. They then close their nostrils and throat to **protect the windpipe**. Their **specially adapted lungs** have airways that are heavily **reinforced** with rings of cartilage and smooth muscle. The terminal **air sacs** of the lungs completely **deflate** during deeper dives. The heart of a seal is somewhat flattened to make extra space for the lungs. The **windpipe** is made to be **flexible** enough to collapse under pressure.

- During deep dives, the **remaining air** in their bodies is stored in the **smallest branches** of each lung and the windpipe, which **prevents** them from experiencing the illness and dizziness which would otherwise be caused by the surrounding **high pressure**.

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Seals sleep in a similar way to other marine mammals. While **snoozing** in the **water**, half of their brain is **awake** so that they can keep alert for predators, **but on land**, both sides of their brain go into **sleep state**.

- Young **pups** that live on ice have **heavier coats** than the adults. The fine soft hair of the coat, called *lanugo*, can **trap heat from sunlight** to help keep the pup warm. Seal fur is generally more darkly shaded viewed from the top in the water, and lighter from the bottom to **camouflage** the animal from predators. The bright **white fur** of the more defenceless **harp seal pups** conceals them in their Arctic environment.

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It has been argued that science does not know of any person called God, and so cannot regard God as the Designer. The owner of a smartphone could just as easily say that he does not know who was involved in **the design** of this sophisticated device, so it must be the result of a **chain of chance occurrences**.

- But such a suggestion would rightly be regarded as **completely irrational**. Even the mechanical arts and applied sciences could not operate apart from the **formation and arrangement of ideas in the mind**.