Part A: Homologous Structures

We have already discussed the word homologous in class before. Homologous means similar but not identical. First observe the diagram marked 1. In this diagram, the bones of the human arm are shown and labeled. Compare this to the diagram marked 2. On the limb labeled "human", try to identify the bones that are labeled in diagram 1. Use diagrams 1 and 2 to answer the questions on your sheet.

Part B: Homologous Embryos

We have already discussed the word homologous in class before. Homologous means similar but not identical. In diagram 1, the development of multiple animals is shown. The top row shows the early stages of embryo development. An embryo is formed after a zygote (formed from a sperm cell fertilizing an egg cell) begins dividing to create a multicellular organism. The point where a zygote becomes an embryo is when the cells begin to specialize or differentiate; cells can be identified as nerve cells, eye cells, etc. Observe diagram 1 and answer the questions on your sheet.

Part C: Geographic Distribution of Species

Observe diagram 1 provided. Shown on this map of the globe are four unusual species: the Giant Pangolin, the Spiny Anteater, the Giant Armadillo, and the Giant Anteater. Using your phancy phones, do some quick research about these four organisms. Answer the questions on your sheet.

Then observe diagram 2. Answer the questions on your sheet.

Part D: Fossil Record

Observe diagram 1 showing the layers of the earth and its fossils. Answer the questions on your sheet.

In the envelope are 5 diagrams of skeletal structures. Some of these organisms no longer exist. Put the skeletons in the order that they have evolved from "oldest" to "currently living". Observe the features of the skeletal structure to identify similarities and differences. Note: the scientific names are listed under each skeleton. Answer the questions on your sheet.

Part E: Vestigial Structures

Diagram I shows two species of salamanders: the Texas Salamander (*Eurycea neotenes*) and the Texas Blind Salamander (*Eurycea rathbuni*).

The Texas Salamander is found in shallow, freshwater creeks of central Texas. They are entirely aquatic. Most are brown in color and have bright red external gills that allow them to easily collect oxygen from the shallow waters. The Texas salamander is exposed to light and has eye organs to see and capture small insect larva for prey.

The Texas Blind Salamander lives very close to the Texas Salamander, but instead lives in the pools found deep underground in caves. The population of these salamanders is unknown because they live in unreachable places. Only 100 have ever been counted at one time. The Texas Blind Salamander has no skin pigmentation and appears almost translucent. Like its relative, it also has large bright-red external gills. The Blind Salamander also does not have functional eyes. They eyes are hardly visible and are not sensitive to light. The salamander also has structures that are thought to be remnant optic nerves, the nerves that attach the eyes to the brain to process images. It is hypothesized that this species at one time had eyes attached to the optic nerves, but, due to the migration into caves, no longer needed them. The remaining optic nerves are called *vestigial structures* in this salamander. Vestigial structure means a structure that has lost its function and may even decrease in size or shape. To make up for the lack of sight, Blind Salamanders have a heightened sense of touch in their skin and can detect even the smallest movements of prey.

Part F: DNA Similarities

There has been a lot of research done to show the similarities and differences in the DNA sequences found in different organisms. Although it takes a lot of time, it can help biologists determine the evolutionary ancestry of a species. For example, when biologists investigated the human genome they found that only 0.5% of the DNA sequences among humans is different. That means that the person sitting next to you, your teacher, even someone located on a different continent share 99.5% of their DNA sequences with you. When you consider all the different traits in the human population, we are a lot more similar than different. When comparing us to other species it turns out that we share 96% of our DNA sequences with chimpanzees, 85% with mice, and 75% with chickens.

Observe the table below and answer the questions on your sheet.

Organism Pair	% of DNA Similarity
Organism A and Organism B	97%
Organism A and Organism C	85%
Organism A and Organism D	50%