**Evolution from Echinoderms to Vertebrates**

**Observing Transitional Animals**

**Purpose**

To use our knowledge of evolution to view the changes in anatomy and physiology from echinoderms (an invertebrate) to vertebrates through transitional species.

**Directions**

1. Use the handouts to help you answer the questions
   1. State a clear claim by restating the question as a statement
   2. Use specific evidence from the handouts to support the claim (start a new sentence before describing the evidence)
   3. Explain how the evidence supports the claim (either with the evidence or as separate statements
2. You may work with your team, but your answers must be in your own words (no sharing or copying)
3. Brainstorm evidence before writing your answer
4. Record answers in the row below the question

**Rubric**

**Claim:** 1 point each: rephrase the question as a statement (claim). do not use this, that, these, those, they, it or because in this statement. It is a statement with no evidence.

**Evidence:** points vary by evidence required; # items required are in parentheses in the question; evidence- include facts, concepts, examples that support the claim. evidence starts your second sentences

**Reasoning:** 2 points:reasoning-within your sentences explain how and why the evidence supports the claim.

| 1. Why is it odd that Echinoderms are closely related to Vertebrates (fish, amphibians, reptiles, birds, and mammals)(2 items of evidence at least)? (5 points) |
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| **Evidence:**  **It is odd that Echinoderms are closely related to vertebrate because**   * **Regenerate limbs vs. cannot** * **Movement slow vs fast** * **Radial vs bilateral symmetry** * **Simple, small vs bigger brain** |
| **Answer:** |
| 1. What features (2) do echinoderms have in common with Vertebrates? (5 points) |
| **Evidence:**  **The features that echinoderms and vertebrates have in common are**   * **Both have an exoskeleton** * **Vertebrates and echinoderms both have brains** * **Embryonic development - deuterostomes** |
| **Answer:** |
| 1. What features do echinoderms share with cephalochordates (3)? (6 points) |
| **Evidence:**  **The features that echinoderms share with cephalochordates are**   * **Both have a digestive system** * **Both have brains that controls their body** * **Echinoderms and cephalochordates have mouths** * **No backbone** * **Embryonic development** * **Deuterostome** * **Simple brains** * **Bilateral syn of embryos** |
| **Answer:** |
| 1. What features do Cephalochordates have in common with Vertebrates (5)? (8 points) |
| **Evidence:**  **Some features that Cephalochordrates have in common with Vertebrates are**   * **They both have a notochord which was the first resemblance of a backbone** * **They have segmented muscles** * **They both have intestines and brains** * **They both have a nerval cord connected to the brain** * **Have a mouth and anus** |
| **Answer:** |
| 1. What features do Urochordata have in common with Vertebrates (5)? (8 points) |
| **Evidence:**  **Some features that Urochordata have in common with vertebrates are**   * **Have intestines and brains** * **Have a notochord which is the resemblance of a backbone** * **Have a nerve cord connected to their brain** * **They have a mouth and anus** * **They have a similar embryonic development** |
| **Answer:** |
| 1. How do Cephalochordates and Urochordates show transitional features from Echinoderms to Vertebrates? (2 items of evidence required) (8 points) *Transitional fossils/species- organisms that have body structures found in both an ancestor and descendant* |
| **Evidence:**   * **The first evidence is from the notochord which is basically the pre backbone of the body.** * **They have a similar embryonic development because they have a mouth and anus** * **Pharyngeal Gill slits** * **Post - anal tail** * **Dorsal hollow nerve cord** * **Segmented muscles** |
| **Answer:** |