Aufgaben zur Systematik

Öffne den interaktiven Stammbaum auf moodle (http://www.planet-schule.de/sf/php/mmewin.php?id=197).

Finde mit Hilfe des interaktiven Stammbaums („Stammbaum des Lebens“) heraus, was die Gemeinsamkeiten folgender Tiergruppen sind und notiere Beispiele für jede Gruppe:

Gruppe	Gemeinsamkeiten	Beispiele
(Eu)metazoa ***(Gewebetiere)***		
Bilateria		
Protostomia ***(Urmünder)***		
Arthropoda ***(Gliederfüßer)***		
Deuterostomia ***(Neumünder)***		
Vertebrata ***(Wirbeltiere)***		
Amniota		
Sauropsida		
Mammalia ***(Säugetiere)***		
Kloakentiere		
Hominidae ***(Menschenaffen)***		

The Phylogeny of *Caminalcules*

Schlage dir unbekannte Vokabel auf www.leo.org oder www.linguee.com nach.

Using a large sheet of paper, construct a phylogenetic tree for the *Caminalcules*. Use a meter stick to draw 20 equally spaced horizontal line on the paper. Each line will be used to indicate an interval of one million years. Label each line so that the one at the bottom of the paper represents an age of 19 million years and the top line represents the present (0 years).

Cut out all the *Caminalcules* (including the living species). Put them in piles according to their age (the number in parentheses). Beginning with the oldest fossils, arrange the Caminalcules according to their evolutionary relationship. Figure 1 shows how to get started.

Figure 1

Hints, Suggestions and Warnings

a. Draw lines faintly in pencil to indicate the path of evolution. Only after your instructor has checked your tree should you glue the figures in place and darken the lines.

b. Branching should involve only two lines at a time:

Like this

Not this

c. Some living forms are also found in the fossil record.

d. There are gaps in the fossil record for some lineages. Also, some species went extinct without leaving any descendants.

e. The *Caminalcules* were numbered at random; the numbers provide no clues to evolutionary relationships.

f. There is only one correct phylogenetic tree in this exercise. This is because of the way that Joseph Camin derived his imaginary animals. He started with the most primitive form (#73) and gradually modified it using a process that mimics evolution in real organisms. After you complete your phylogeny compare it with Camin's original.

Questions:

1. You will notice that some **lineages** (e.g. the descendants of species 56) branched many times and are represented by many living species. Discuss the ecological conditions that you think might result in the rapid diversification of some lineages (A real world example would be the diversification of the mammals at the beginning of the Cenozoic, right after the dinosaurs went extinct.)

2. Some lineages (e.g. the descendants of species 58) changed very little over time. A good example of this would be "living fossils" like the horseshoe crab or cockroach. Again, discuss the ecological conditions that might result in this sort of long-term evolutionary stasis.

3. Some Caminalcules went extinct without leaving descendents. In the real world, what factors might increase or decrease the probability of a species going extinct?

4. Find two additional examples of **convergent evolution** among the Caminalcules. This means finding cases where two or more species have a similar characteristic that evolved independently in each **lineage**. The wings of bats, birds and bees is an example of convergence since the three groups did not inherit the characteristic from their **common ancestor**. Write your answers in complete sentences (e.g. "Species *x* and *y* both have ____ but their most recent common ancestor, *z*, did not").

   List two additional real-world examples of convergent evolution (ones that we have not already talked about in class) and discuss what might have caused the convergence.

5. Describe two examples of **vestigial structures** that you can find among the Caminalcules. These are structures that have been reduced to the point that they are virtually useless. Ear muscles and the tail bones are examples of vestigial structures in our own species.

   Explain how vestigial structures provide clues about a species' evolutionary past. Illustrate your argument with vestigial structures found in humans or other real species.

LIVING CAMINALCULES

FOSSIL CAMINALCULES

(numbers in parentheses indicate age in millions of years)

FOSSILS (continued)

Steckbrief

1. Erarbeitet den Steckbrief einer Tier- oder Pflanzengruppe (Auswahl unten). Der Steckbrief soll möglichst viele typische Kennzeichen der Gruppe enthalten.

2. Sucht eine möglichst charakteristische und aussagekräftige Abbildung einer Art, die zu dieser Gruppe gehört.

3. Präsentiert Eure Gruppe der Klasse und erläutert sie anhand der Abbildung.

4. Sucht eine Spezies, die zu Eurer Gruppe gehört und ordnet sie den entsprechenden systematischen Einheiten zu (Art, Gattung, Familie, usw.).