Review Sheet/NYS Regents Lab Activity #1
Relationships and Biodiversity (Union-Endicott CS review sheet revision)

Important Terms

Biodiversity	Gel Electrophoresis	*Evolutionary relationships*
Molecular Evidence	Habitat Destruction	Structural Evidence
Chromatography	Human Impact	DNA
Cladograms*	Extinct	Amino Acids
Transcription	Translation	Enzymes

*Term is not actually used in lab, but essentially is what they are talking about. They do discuss and have a question on "branching tree diagrams."

Key Points

1. The diversity of life on the planet has been created through the process of evolution by means of natural selection. Differences between or within species is called _____.

2. Through natural selection, organisms have evolved to lessen competition, and therefore fill a wide array of niches. This *biodiversity* increases the stability of ecosystems.

3. Biodiversity has important benefits to mankind, including development of new_____sources and _____; as providing _____ beauty. Ecosystem destruction leads to the loss of genetic biodiversity and increases the chance that an ecosystem will become _____ stable and collapse.

Procedures:

Safety precautions for the lab include goggles in step 4 & 5 for vinegar and baking soda and paper chromatography using food coloring, vinegar, and water.

1. Seven tests are conducted to determine the relatedness of Samples X,Y, and Z to *Botana curus*. They are as follows:

    a. Structural Characteristics of Plants

    b. Structural Characteristics of Seeds

    c. Structural Characteristics of Stems (Internal Microscopic Structures)
    Examine cross sections of the stems. Look for a _____ arrangement of bundles or a _____ arrangement of bundles.

d. Paper Chromatography to _____ Plant _____
   - Using clean, _____ pipettes for each sample, transfer two drops of each plant extract to a piece of chromatography paper, two cm above the bottom. Label the top of the paper with the proper sample names.

   - Place the paper into a cup of water, 1 cm deep. The water should _____ touch the spots of plant extract.

   - Keep checking the sample to make sure the water does not reach the labeled top part of the paper. When the water is done rising, check the _____ and relative amounts of pigments and record this in the data table.

e. Indicator Test for _____
   - Placing a scoop of the indicator powder into 4 depressions of the well tray, check for the presence of Enzyme M. A _____ reaction indicates that Enzyme M is present.

f. Gel Electrophoresis (simulated) to Compare DNA
   - Obtain colored paper strips representing portions of DNA molecules. The sequence of bases are representative of molecules isolated from *Botana curus* and Species X,Y, and Z. A simulated _____ will be used to cut between C and G of the sequences to produce different sized portions of the DNA. These will be placed on a simulated gel plate to compare the relatedness of *B. curus* to X, Y, and Z.

g. Translating the DNA Code to Make a _____
   - Using the DNA codons, create the complementary messenger _____, remembering that the DNA base A specifies the RNA base ___ (*T is replaced with ____ in RNA). Using the Universal Genetic Code table, translate the mRNA base sequences into the correct _____ sequences of the protein.

Analysis

1. This lab has 7 tests used to determine the relatedness of 4 plant samples. Remember that scientists use a variety of evidence to determine evolutionary relationships, including cell types, structural morphology, DNA, behavior, embryology, and fossils. The _____ criteria that are shared between organisms, the more likely they are _____ related.

2. Relatedness can be shown using a "branching tree diagram", or cladogram. Organisms that are closely related have a more recent _____ and will be _____ together on the same branch.

3. *Botana curus* shares the most characteristics with Sample Z, making this sample the most _____ related. These characteristics included the presence of **Enzyme ____**, the same _____ blue, yellow, and pink, scattered _____, no difference in the _____ sequences, and the same DNA _____ pattern.

   The evidence that should receive the most emphasis when determining the relatedness would be the _____ or genetic evidence, as many things can look similar _____**,** but would be unlikely to share the same _____sequence if they are not truly closely related. (DNA → RNA ➔ protein)

4. The loss of even a single species **(_____**) can have major implications for mankind and natural ecosystems.

5. Scientists use _____ to separate DNA fragments. Negatively charged DNA molecules migrate through the gel like material towards the _____ charged pole. The _____ molecules migrate more rapidly through the gel than the larger ones do. Electricity must be turned on to propel the fragments through the gel and restriction enzymes must cut the fragments so they fit through the gel. _____ are holes in the gel where the DNA fragments are placed.