

Biology 112

Lab Manual

Spring 2007

Name: _____

Lab Section #: _____

Lab Instructor's Name.... _____

Syllabus and Contents:

Week of
1/29

Lab
NONE

Page (*)
-

Procedure

VERY IMPORTANT NOTICE: This lab will take you a while to complete, especially if you

1) Phyla

Choose three different phyla listed in *Campbell*

b) *Campbell* figure 34.29 shows *Archaeopteryx*

3) Common Structures

Virtually all tetrapod vertebrates (see Lab Atla

We will consi

- Step 0b: Cal

Experiment#

Experiment#

Hints for so

2) a) You need to use the Hardy-Weinberg equilibrium formula for 2 alleles to s

the 1990s, the number of people in the world who are under 15 years of age has increased by 1.2 billion, from 1.1 billion in 1980 to 2.3 billion in 1999. The number of people aged 15 years and over has increased by 1.1 billion, from 1.1 billion in 1980 to 2.2 billion in 1999.

There are a number of reasons why the world population is growing so rapidly. One of the main reasons is that the number of children born to each woman has increased. In 1980, the average woman in the world had 2.5 children. In 1999, the average woman in the world had 2.7 children.

Another reason why the world population is growing so rapidly is that the number of people who are surviving to old age has increased. In 1980, the average person in the world lived for 55 years. In 1999, the average person in the world lived for 65 years.

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Molecular Phylogeny

Purpose

Procedure

- since 7201 species listed are currently alive, they must line up vertically, like this:
- since only 2 distal 7s

I chose corn as my distantly-related organism. Here are the results I got:

- corn vs. cow:

Counting all the places where the sequences don't match (anyplace where the "Quality" bar

iii) But what about the “X” and “Y”? Since the distance between cow and donkey must be 2, $X + 1$ must = 2. Therefore $X = 1$. Since the total length from the branch at the left

Part IV: Phylogenetic Questions

4) Using these techniques, answer one of the following questions; you should choose the method (Sequence Divergence or Parsimony) that best suits the question you are asking.

In each part, we are not interested in the correct answer; we are interested in the *data* you cite and your *argument* to be correct as, or not incorrect. The most specific about the clear/TT9 Tj/TT2 is, the T9 n

For example:

- Find the date of the last common ancestor of humans and the ailanthus silkmoth (split B).
 - a) distance = $8.77 + 4.17 + 12.94 = 25.88$;
 - b) # of substitutions = $0.2588 \times 114 = 29.5$
 - c) corrected # of substitutions = 34.95;
 - d) $34.95 \times 21 = 733.95$ or roughly 750 Ma

- Find the date of the last common ancestor of humans and the alligators (split C).
 - a) distance = $8.77 + 8.77 = 17.54$;
 - b) # of substitutions = $0.1754 \times 114 = 20.0$
 - c) corrected # of substitutions = 22.31;
 - d) $22.31 \times 21 = 468.51$ or roughly 450 Ma

Tables of Organisms:

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TA
checkoff

Sample #

Phylum

Page

<u>Where it lives</u>

Microscope Warm-up

Objectives:

-

Part II: c-Ferns part I

Objectives

To observe the phenomenon of alternation

This phenotype is visible in both haploi

The following tips were prepared by Erin Williams in the Spring of 1999 as a make-up for

Here are the parts of the skull that are important for this lab: (clearer color pictures **of a different species** can be found on pages 229-230 of the Lab Atlas as a reference point).

Brain case



incisors



Plant Diversity

Objective

To observe and analyze the diversity of plants by looking at 4 major land plant groups.

Procedure

Preparation for Exam II

Bio 0001 Tf2: Moss Life-cycle

Bio 112: c-Fern Life-cycle

Bio 112: Pine Life cycle

Bio 112: Angiosperm Life cycle

Animal Behavioral Diversity

male crickets will display heightened sexual

Initial hypothesis: Red worms will move from warmer environments into cooler ones.

Response variable: The number of worms in each environment after 3 minutes of choice.

Test situation: Test 16 worms in a dish with a warm side and a cool side.

Null hypothesis: # of worms on warm side = # of worms on cool side

Alternate hypothesis: # of worms on warm side \neq # of worms on cool side

You should now decide on an initial hypothesis, your response variable, and H_0 and H_A . **Answer questions 2a-c for your lab report and have your TA approve them.**

So, a little over 8% of the time we would expect worms to exhibit this degree of preference for

3. H

Field Trip II: New England Aquarium

Objectives

During your visit, you should make notes from which you can answer the questions below. Your lab report will consist of answers to these questions written with the same care and thoroughness as any other lab report.

Artificial Life & Evolution

Objectives:

- To explore evolution with evolving digital organisms.
- To test evolutionary hypotheses.
- To try out different evolutionary scenarios.

Introduction:

Life only evolved once on earth. In addition, for most organisms, evolution happens very slowly on a human time scale. As a result, it is difficult to explore evolution

3) Click the **Panel Changer Button** (it is at the upper right of the **Petri Dish Viewpane** and is marked “Flip to Settings” to get to the settings panel. You should see this in the center panel:

This allows you to set the environmental parameters for the simulation run. The are:

- **Per site mutation rate**

11) Click the start button and let the simulation

d)

