

Name _____ Day/Hour _____

Lab 12 website - www.thebiologyprimer.com/diversityoflife**Exercise A: Using a dichotomous key**

Biologists use dichotomous keys in the field and in the lab to identify organisms. In this exercise you will identify plants and animals from images given to you by your instructor. Record your answers on page 23.

How to use a dichotomous key

1. Dichotomous keys are *binary*. The specimen will fit into one of two (never more than two) mutually exclusive characteristics. Begin at step one and determine which of the categories your specimen falls in. If you do not know what the meaning of a descriptive word is, ask your instructor to clarify it for you.
2. If the specimen falls into one of the two groups, the key will point you to another set of mutually exclusive characteristics. Continue this process until you are able to identify the class of the organism.
3. Once you have identified your specimens, consult with your instructor in order to determine whether your classifications are accurate.

In this exercise, your instructor will provide you with several preserved specimens, live specimens, and/or photos of various plants and animals. Feel free to ask your instructor for clarification during classification, as not all characteristics may be observable. Using the key below, determine the phylum (or class, if possible) of each specimen. Record your answers on the last page of this lab.

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|---|---------------------------|
| 1a. Organism is photosynthetic; non-motile (Plantae)..... | 2 |
| 1b. Organism is not photosynthetic (Animalia or Fungi) | 11 |
| 2a. Plant has true roots, stems, and leaves with veins; usually taller than a few centimeters..... | 3 |
| 2b. Plant does not have true roots, stems, or leaves; resembles a carpet..... | <i>Phylum Bryophyta</i> |
| 3a. Plant does not produce seeds; reproduces via spores..... | 4 |
| 3b. Plant reproduces via seeds..... | 7 |
| 4a. Roots are not well defined; aerial portion of plant fork dichotomously (in twos); reproductive organs resemble small balls attached to a stem..... | <i>Phylum Psilophyta</i> |
| 4b. Plant has distinguishable roots, leaves may or may not be present..... | 5 |
| 5a. Plant does not have truly vertical stem, stems are arching in a cluster from the ground, large leaves or fronds are present, spore-containing structures present on back of leaf..... | <i>Phylum Pterophyta</i> |
| 5b. Plant has a nearly vertical stem, leaves may or may not be present..... | 6 |
| 6a. Plant has jointed stems with no leaves (or very short, scale-like leaves) growing upright in a cluster; ribs are prominent; usually found in moist environments..... | <i>Phylum Sphenophyta</i> |
| 6b. Plant has small leaves that each have a single vein, stem may bifurcate..... | <i>Phylum Lycophta</i> |
| 7a. Plant has flowers and fruits with seeds enclosed (<i>Phylum Anthophyta</i>)..... | 10 |
| 7b. Seeds produced naked (not enclosed by other tissues) usually in a cone; absence of flowers or fruit..... | 8 |

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- 8a. Plant has short, stout trunk; large, shiny leaves; cones bearing seeds; tropical.....*Phylum Cycadophyta*
 8b. Plant tree-like.....9
- 9a. Tree has large fan-like leaves with a large (3-5cm) naked seed.....*Phylum Ginkgophyta*
 9b. Tree is evergreen with needle-like or scaly leaves.....*Phylum Coniferophyta*
- 10a. Leaves have branching veins, flower parts in multiples of four or five.....*Class Dicotyledonae*
 10b. Leaves are linear with parallel veins, flower parts in multiples of three.....*Class Monocotyledonae*
- 11a. Organism is non-motile, digests externally and has spores for reproduction (Fungi)26
 11b. Organism is motile, ingests internally (Animal)12
- 12a. Animal has an internal skeleton, vertebrae (*Phylum Chordata*).....21
 12b. Animal lacks an internal skeleton, has no vertebrae.....13
- 13a. Animal is radially symmetrical with arms extending from a central disk, spiny body.....*Phylum Asteroidea*
 14b. Animal is bilaterally symmetrical.....14
- 14a. A hard outer covering (exoskeleton) is present.....15
 14b. Animal is soft, flat and ribbon-like.....*Phylum Platyhelminthes*
- 15a. Body has jointed legs (*Phylum Arthropoda*)17
 15b. Body has no jointed legs; has soft body; may or may not have a shell.....16
- 16a. Shell has two parts that open and close.....*Class Bivalvia*
 16b. Shell has one opening, typically with spirals.....*Class Gastropoda*
- 17a. Legs on nearly every body segment.....18
 17b. Legs only on one or a few body segments.....19
- 18a. One pair of legs per body segment.....*Class Chilopoda*
 18b. Two pairs of legs per body segment.....*Class Diplopoda*
- 19a. Two pairs of antennae; very large front claws; very thick exoskeleton.....*Class Crustacea*
 19b. One pair of antennae (or no antennae present); very small claws (or claws absent)20
- 20a. Eight legs; no antennae.....*Class Arachnida*
 20b. Six legs; one pair of antennae; wings may be present.....*Class Insecta*
- 21a. Animal has fins; lacks limbs; aquatic.....22
 21b. Animal does not have fins; limbs present (in most cases)23
- 22a. Body smooth in appearance; five to seven gill slits.....*Class Chondrichthyes*
 22b. Body covered in scales; one gill flap.....*Class Osteichthyes*

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- 23a. Body covered in scales.....*Class Reptilia*
 23b. Body not covered in scales.....24
- 24a. Body smooth in appearance, no hair.....*Class Amphibia*
 24b. Skin covered with feathers or hair.....25
- 25a. Body covered with feathers.....*Class Aves*
 25b. Body covered with hair.....*Class Mammalia*
- 26a. Between 6 and 12 sexual spores are produced in an ascus (a bag-like structure).....*Division Ascomycota*
 26b. Sexual spores are not produced in an ascus.....27
- 27a. Approximately 4 sexual spores are held on top of a basidium (a pedestal shaped structure).....
*Division Basidiomycota*
 27b. Sexual spores are not held on a basidium.....28
- 28a. Spores are singular, motile and flagellate.....*Division Chytridomycota*
 28b. Hundreds of spores are held in a spherical sporangium.....*Division Zygomycota*

☒ Identify the specimens from the lab website below using the provided dichotomous key.

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|---------|----------|----------|
| 1 _____ | 9 _____ | 17 _____ |
| 2 _____ | 10 _____ | 18 _____ |
| 3 _____ | 11 _____ | 19 _____ |
| 4 _____ | 12 _____ | 20 _____ |
| 5 _____ | 13 _____ | |
| 6 _____ | 14 _____ | |
| 7 _____ | 15 _____ | |
| 8 _____ | 16 _____ | |