Name _____ Date _____

WORKSHEET 4.5

Classifying Oaks with DNA

Introductory Discussions

1. In small groups carefully observe the three leaf drawings. Discuss the following questions. Be prepared to share your ideas with the class.
   - How many species are represented—one, two, or three?

     _____
   - On what are you basing your answer?

     _____
   - What distinctive features do the leaves have?

     _____
   - How do these features vary in the different leaves?

     _____
   - What traits could you *measure* to document differences/similarities among the leaves?

     _____

Data Collection

The class will decide what sort of data to collect. Make measurements and record your results below or in a lab notebook.

Molecular Data Analysis

Molecular biology provides powerful approaches to studying similarities and differences between organisms. The sequences on Handout 4.2 are for the same gene in the three different leaves.

1. How can they be compared for degree of similarity? Devise a strategy with your group members and then make your calculations. Record your results below or in a lab notebook.

   _____

   _____

   _____

   _____

Name _____ Date _____

Classifying Oaks with DNA, *Cont'd.*

2. Based on your calculations and those of other groups, what can you conclude about the three leaves? How closely related are the three? How many species do they represent?

Wrap-Up and Reflection

1. Use a field guide or other sources to identify the three leaves. How many species are represented? What are they?

2. Compare your analysis based on observing and measuring the leaves (morphological) to your analysis of DNA sequences. How did the two complement each other? In what ways was one more effective than the other?

3. What other information about the three leaves would have helped in deciding whether they were different species?

4. How similar do DNA sequences need to be for two organisms to be considered the same species? How is this decided?