Managing Forest Resources

Background

People rely on wood from trees to heat their homes, cook their food, and provide building materials for homes, schools, and businesses. By-products of the lumber industry make other materials such as paper possible.

The more people there are, the greater the demand for wood. While it takes only seconds to cut down a tree, it takes years to grow a new one. We also depend upon forests to regulate climate, clean air and water, conserve precious soil, and provide homes for many species of birds and other animals.

As important as forests are, in almost every part of the world, trees are being cut down at a faster rate than they are being replaced.

Timber! Managing Forest Resources

The following simulation illustrates what happens to a given forest when the demand for tree products outpaces the supply.

Materials: 120 sticks in cup, 32 sticks in rubber band, stopwatch

Procedure:

1. Assign roles to the students in your group in the following way:
    a. 3-student group – lumberjack, forest manager, timer
    b. 4-student group – lumberjack, forest manager, timer, forest
2. The 120 sticks in the cup represent the trees present in a forest available to a lumberjack for cutting.
3. The forest manager will possess the 32 sticks in the rubber band. They will represent the trees that will grow during the course of the simulation.
4. The lumberjack will record the removal of trees each minute in the *Data Table* below.
5. Use the
    a. The simulation begins when the timer starts the stopwatch. After 15 seconds elapse, the timer must tell the forest manager to provide the forest with another tree. This should be repeated every 15 seconds to approximate the average rate of growth for trees to reach maturity.
    b. Stop the timer at the end of the first minute so the lumberjack can remove one tree from the forest. This removed tree represents the amount of lumber resources the world needs at its present population.
    c. Continue the timer. The forest manager should continue to provide trees to the forest as s/he did during the first minute of the simulation.
    d. At the end of the second minute, the lumberjack should remove two trees from the forest to represent the lumber resources the world needs due to its growing population.
    e. The simulation should continue in each subsequent minute with the forest manager supplying the forest with one new tree every 15 seconds, and the lumberjack doubling the number of trees removed each minute to represent the wood resources required by the growing world's population.
6. Sort the "trees" back into their original container/group.
7. Answer the questions in the *Results & Analysis* section.

Data Table

Minute	# of trees at start of minute	# of new trees	# of cut trees	# of trees at end of minute
1	120	+4	-1	123
2				
3				
4				
5				
6				
7				
8				

Results & Analysis

On a separate sheet of paper, answer the following questions thoroughly using complete sentences. You must either: write out the question, or include the question in your response.

1. Graph the decline of the forest and the growth of demand. Use two colors to represent the supply and demand, respectively.
2. As with many aspects of environmental science, our understanding of processes and phenomena is based (at least in part) on, and also limited by, our use of models like this one. Describe some variables that are not taken into account in this model, and how incorporating them into this simulation would make it more realistic.
3. How many minutes did it take for the lumberjack to cut all the trees in the forest?
4. Was the size of the forest always shrinking? Explain.
5. If the forest manager could develop a tree that grows at a rate of one tree every five seconds, would tree growth keep up with the lumber demand? Why or why not?
6. What could be done to prevent the decimation of the forest in this scenario? List and describe two potential ideas.
7. Create a two-column table and make a list of 3 reasons why forests are **economically** important on one side, and why forests are **ecologically** important.
8. Compare and contrast an old growth forest, versus a second-growth forest. What are the characteristics of each?
9. A large proportion of domestic logging in the U.S. occurs in national forests. Describe one positive and one negative aspect of allowing harvesting trees by private companies on public lands such as national forests.

Analyze the graph you constructed to answer the following questions:

10. Describe the supply and demand at the 5-minute mark. At what point does supply and demand become equal?
11. Draw a third line (in a third color) on your graph to represent the growth of the forest, assuming no cutting occurred. Also, assume that the carrying capacity of the land is far greater than any tree growth during the 8-minute time period. What would the tree population have been at the 7-minute mark, assuming no cutting occurred?