



# Forest Growth and Rainfall Data (1 of 2)

NAME \_\_\_\_\_

DATE \_\_\_\_\_

Imagine that forest researchers at three research stations in the Southeast planted loblolly pine trees 10 years ago. At each location, they planted six different families of loblolly pine trees. The families are groups of individuals that are genetically related because they share one or both parents. Some of these families originated from western populations of loblolly pine forests and some families originated from eastern populations. For 10 years, forest scientists collected data for the families at each site including rainfall, tree survival, and tree height.

The table below summarizes the results for survival and height for families at the three locations.

- Column A provides the site number and average annual rainfall at each location for years 1 to 10.
- Column B identifies the family.
- Column C is the average percent of the trees planted that are still alive after 10 years.
- Column D is the average height of surviving trees after ten years of growth.

| A: Location and Average Rainfall (centimeters, cm) | B: Family | C: Percent Survival at Year 10 | D: Average Height at Year 10 (meters, m) |
|--|-----------|--------------------------------|--|
| Site 1:<br>100 cm per year                         | A         | 40                             | 6  |
|  | B         | 80                             | 9  |
|  | C         | 20                             | 5  |
|  | D         | 75                             | 10                                       |
|  | E         | 10                             | 8  |
|  | F         | 60                             | 9  |
| Site 2:<br>115 cm per year                         | A         | 80                             | 13                                       |
|  | B         | 90                             | 9  |
|  | C         | 75                             | 12                                       |
|  | D         | 86                             | 11                                       |
|  | E         | 40                             | 14                                       |
|  | F         | 75                             | 11                                       |
| Site 3:<br>130 cm per year                         | A         | 90                             | 15                                       |
|  | B         | 90                             | 11                                       |
|  | C         | 88                             | 14                                       |
|  | D         | 88                             | 12                                       |
|  | E         | 92                             | 15                                       |
|  | F         | 92                             | 12                                       |



## Forest Growth and Rainfall Data (2 of 2)

1. Use the data table to make three graphs, one for each site. Column graphs with two y-axes will be easiest to interpret. For each graph, place the families on the x-axis, percent survival on the left y-axis, and height on the right y-axis. You will have two columns for each family (one for percent survival and one for average height). Include a key to indicate which column is percent survival and which column is height and label the units and axes.
2. The data table is missing important information! We don't know which families came from the western population of loblolly pine trees and which came from the eastern population. Use your graphs and what you know about the average annual rainfall at each site to predict which families came from the western population and which families came from the eastern population. Remember that families that came from the western population can survive with less rainfall, while families from eastern populations grow faster with adequate rainfall.

For each family, write the original source of the genotype (eastern or western population).

A: \_\_\_\_\_ B: \_\_\_\_\_ C: \_\_\_\_\_

D: \_\_\_\_\_ E: \_\_\_\_\_ F: \_\_\_\_\_

3. Given what you know about the different growth patterns of eastern and western populations of loblolly pine, respond to the following writing prompt:

It is 2050. You've been invited to an awards ceremony honoring an elderly forest landowner who is regionally known for his wood production. Many of his trees survive changes in climate, and a large number of them are taller than everyone else's. Unfortunately, the landowner is unable to attend the ceremony and you have been asked to substitute for him. The organizers would like you to explain why he was able to grow trees better than anyone else. You happen to know that this landowner has a brother in Texas and another in South Carolina who both grow loblolly pine trees. About 50 years ago he planted trees from both brothers on his property. You agree to explain to the audience what this landowner did that enabled his trees to thrive two generations later.