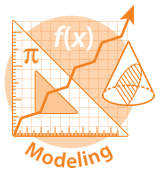
Name: **Date:**

Conceptual Task: Logs from Trees



SMP	
1	2 ✓
3 ✓	4
5	6
7 ✓	8

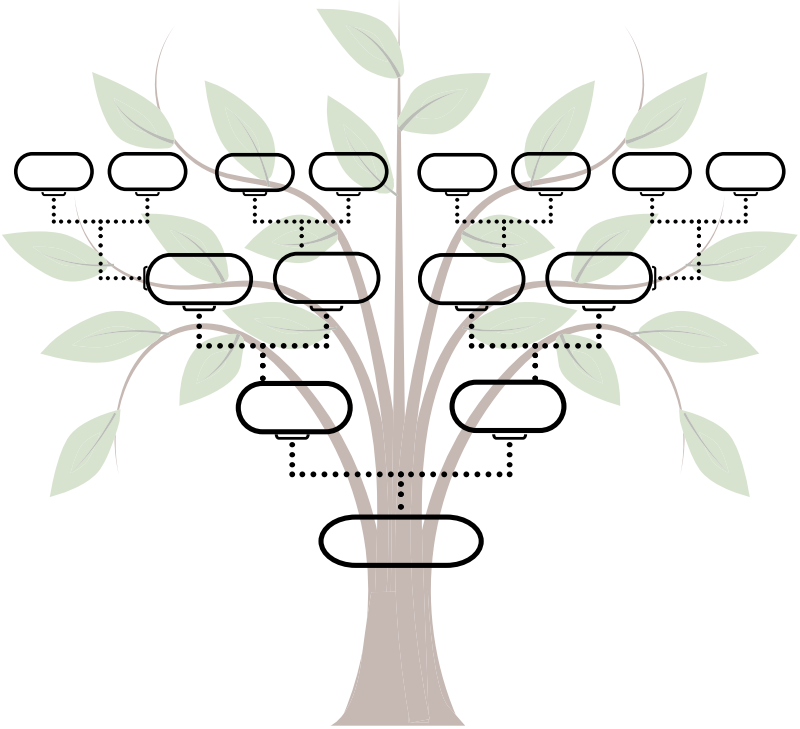
Umar and Hassan are learning about logarithmic functions in their math class. They have the following discussion on the topic:

Umar: Someone tried to explain logarithms are like a family tree, but I don't get it.

Hassan: Look at the tree: one person has two parents, and each parent has two parents, and so on. So, how many generations back would you have to go for there to be 32 ancestors in the generation?

Umar: Well, there are 2 parents, 4 grandparents, 8 great-grandparents, then 16 in the next generation, and 32 in the one after that. If you go back 5 generations there are 32 ancestors in the generation. But that seems like exponential growth to me.

Hassan: The question "How many ancestors are in a given generation" is exponential, yes. But the reverse question "How many generations back do you have to go to find a given number of ancestors in that generation" is a logarithm. It's basically asking how many times you have to multiply 1 by 2 to get the given number.



Name: **Date:**

Conceptual Task: Logs from Trees

Exploration Questions

a. What are Umar and Hassan discussing?

b. According to their discussion, what does a family tree have to do with logarithmic functions?

c. Is Umar correct that there is exponential growth involved? Explain your answer.

d. Explain the problem that Hassan asks Umar to solve.

e. Could a logarithmic function be used to solve the problem above? Explain your answer.

f. What would a graph of the exponential situation Umar described look like? Create this graph. Be sure to label the axes.

g. What would a graph of the logarithmic situation Hassan described look like? Create this graph. Be sure to label the axes.

h. What is the connection between exponential growth and logarithms?