**Citation:** Using the Tier III Experiments to Investigate the Effects of Drought and Fertilization on Forest Water Use and Stomatal Conductance . (Feb. 2014) . PINEMAP Year 3 Annual Report: Mapping the Future of the Southern Pine Management in a Changing World. Gainesville, FL : United States Department of Agriculture .

PINEMAP Article Reflection
**Name: TEACHER GUIDE**

*After reading the PINEMAP article, answer the following reflection questions. Be prepared to discuss and share the main ideas of the article and your interpretation of the information presented.*

1. What is stomatal conductance?

Stomatal conductance is a measure of the degree of opening of the stomata. In lay terms, it measures how much in terms of size the stomata are open. pg. 18 para. 1

1. How is stomatal conductance related to transpiration?

If stomata are open more, then more water is lost to transpiration. Higher stomatal conductance results in higher transpiration rates. pg. 18 para. 1

1. What heavily influences the total amount of photosynthesis and transpiration for a stand (group) of trees?

Photosynthesis and transpiration is heavily influenced by the amount of leaves in the tree canopy or the Leaf Area Index LAI. pg. 18 para.1

1. Do our class results from the transpiration investigation support your answer to question #3? Please explain.

Yes, we found that the larger the total leaf surface area the higher the amount of water usage or transpiration rate. If there are more leaves and more leaf surface area, that means there are more stomata that water can escape or transpire through.

1. Why is the understanding of forest transpiration important for the PINEMAP study?

Stomata regulate water loss through transpiration, and carbon gained from the atmosphere, so they are linked with forest growth, productivity and carbon uptake potential. pg. 18 para. 1

1. How are PINEMAP scientists quantifying transpiration at the Tier III research sites?

They are using sap flux density (a measure of the sap flow in a tree) and leaf area index. They are quantifying it as Ec. pg. 18 para. 1&2

1. Briefly summarize the results of the Tier III study?

They found that transpiration is higher in fertilized stands. In Georgia the stand that was under drought conditions (throughfall reduction) had a reduction in transpiration rates. They think that drought conditions causes trees to shift carbon allocation from the roots to the leaves, so trees under drought produce more leaves. ANSWERS MAY VARY SLIGHTLY BUT SHOULD BE CONSISTENT WITH pg. 19 results and discussion section.

1. Why do you think this research is important? How do you think it will impact society?

Students answers may vary but should be logical and consistent with article findings.