Pre lab questions

1. What environmental variables might affect the rate of transpiration?
2. Do all parts of a plant transpire?
3. Do all plants transpire at the same rate?
4. Is there a relationship between the habitats in which plants evolved to their rate of transpiration?

Analyzing results

1. How was the rate of transpiration affected by your choice of experimental variable as compared to the control?
2. Think of a way you can effectively communicate your results to other lab groups. By comparing results and conclusions, explain how changes or variables in environmental conditions affect transpiration rates?
3. Based on data collected from different lab groups, which environmental variable(s) resulted in the greatest rate of water loss through transpiration? Explain why this factor might increase water loss when compared to other factors.
4. Why did you need to calculate leaf surface area to determine the rate(s) of transpiration?
5. What structural or physiological adaptations enable plans to control water loss? How might each adaptation affect transpiration?
6. Make a prediction about the number of stomata in a leaf and the rate of transpiration. What type(s) of experiments could you conduct to determine the relationship between the number of stomata and the rate of transpiration?
7. Create a diagram with annotation to explain how the TACT (transpiration, adhesion, cohesion, tension) mechanism enables water and nutrients to travel up a 100-ft. tree. Predict how a significant increase in ambient (environmental) temperature might affect the rate of transpiration in this tree. Explain your prediction in terms of TACT and the role of guard cells in regulation thee opening and closing of stomata.

Evaluating Results

1. Was your initial hypothesis about the effect of your environmental variable on the rate of transpiration supported by the data you collected? Why or why not?
2. What were some challenges you had in performing your experiment? Did you make any incorrect assumptions about the effect of environmental variables on the rate(s) of transpiration?
3. Were you able to perform without difficulty the mathematical routines required to analyze your data? Which calculations, if any were challenging or required help from your classmates or teacher?

Where can you go from here?

1. Design an experiment to investigate transpiration in two different types of plants -- one that is drought tolerant and one that requires a significant amount of water. What predictions can you make about the rate of transpiration in each?
2. If you had to revise the design of your experiment, what suggestions would you make? Why would you make them?