

Name: _____ Per: _____ Date: _____

Stomata Reading & Diagrams Academic

Stomata are microscopic openings on the surfaces of plant leaves that allow for the easy passage of water vapor, carbon dioxide and oxygen. They are crucial to the function of leaves as photosynthesis requires plenty of carbon dioxide as well as the release of waste oxygen and excess water. "Stomata" means "mouth" in the Greek language.

Carbon dioxide enters, while water and oxygen exit, through a leaf's stomata. Stomata control a tradeoff for the plant: they allow carbon dioxide in, but they also let precious water escape. See figure 1.

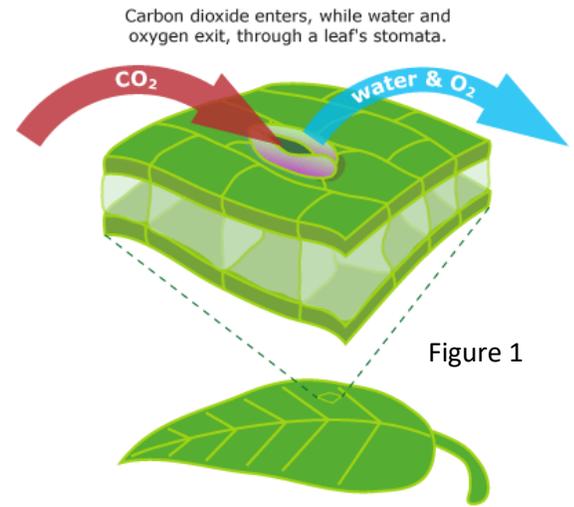


Figure 1

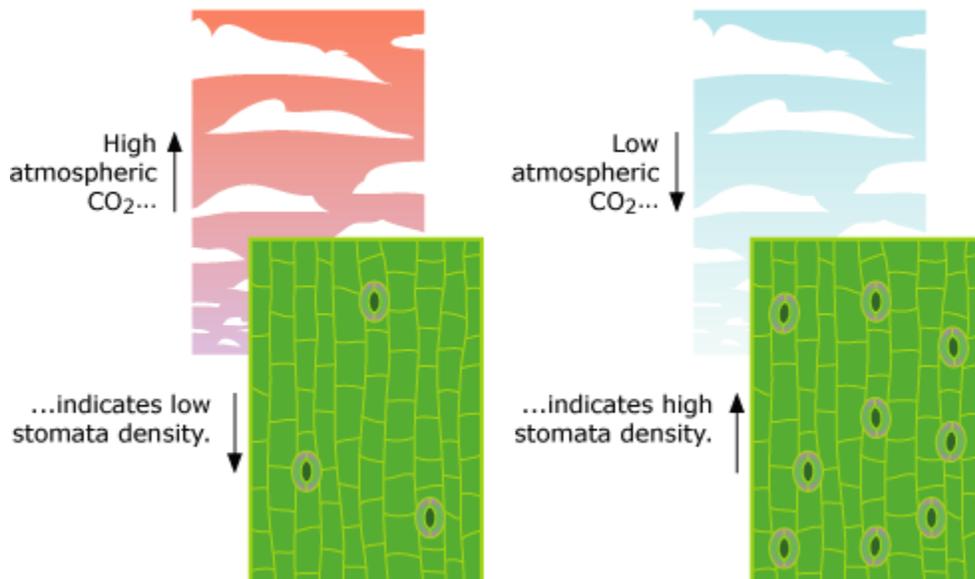


Figure 2

Levels of carbon dioxide in Earth's atmosphere change over time so at times when the atmosphere is carbon-dioxide-rich, plants can get away with having fewer stomata since each individual stoma will be able to bring in more carbon dioxide. During those high-carbon-dioxide times, plants with fewer stomata will have an advantage and will be common. On the other hand, when carbon dioxide levels are low, plants need many stomata in order to scrape together enough carbon dioxide to survive. During low-carbon-dioxide times, plants with more stomata will have an advantage and will be common. See figure 2 above.

Stomata of fossil plants can be used to directly estimate past carbon dioxide levels, and those carbon dioxide levels can then be used to make an indirect estimate of temperature. Typically (although there are exceptions to the rule), fossils with many stomata (low carbon dioxide) came

from times of low global temperature, and fossils with few stomata (high carbon dioxide) came from times of high global temperatures. See figure 3 below.

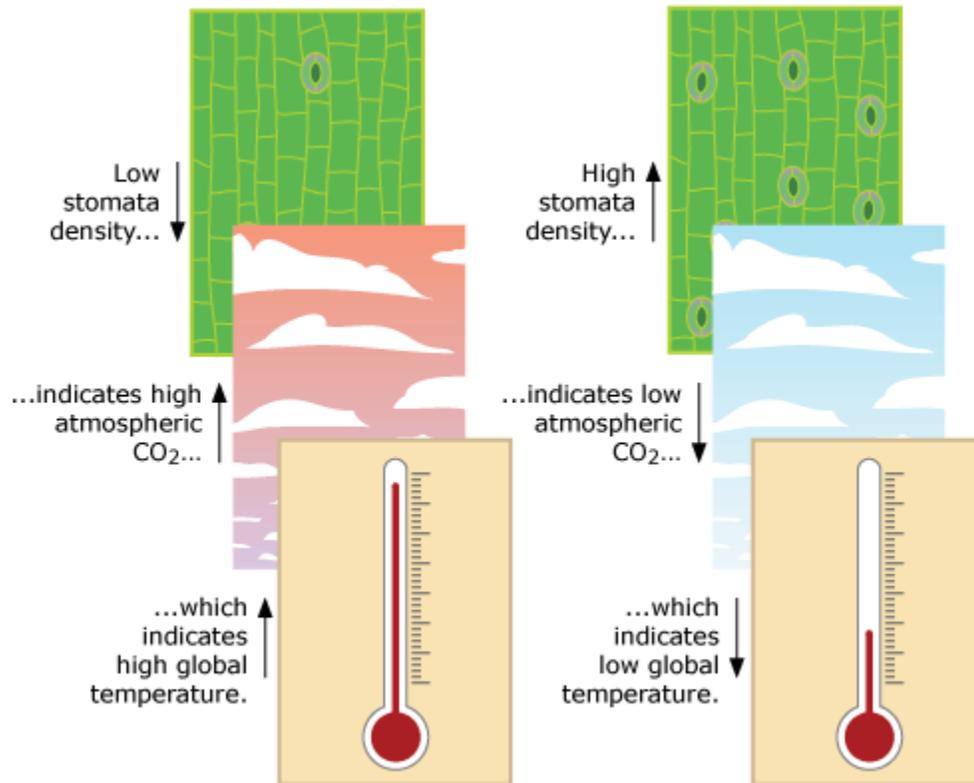


Figure 3

Questions:

1. Why are stomata important to photosynthesis in plants?
2. What gases enter the leaf and which leave?
3. Under what conditions would a leaf have more stomata? Less stomata?
4. If Venus Fly Traps have a *similar average number* of stomata as other plants growing in similar environments, what does this imply?

