

T or F 1. All ferns require the presence of liquid water for fertilization to occur.

T or F 2. Both the Equisetales and the typical ferns can exhibit a form of dimorphism in their sporophytes.

- _____ 3. The 'escape' of spores from *Equisetum* strobili when the sporangia open depends upon which of the following?
 A. shrinkage of the sporangiophores D. elongation of the central axis of the strobilus
 B. elongation of the sterile branches E. catapulting of spores by the sporangia
 C. twisting of the sporangiophores
- _____ 4. Which of the following groups of Lower Vascular Plants contains the largest number of species?
 A. club mosses B. typical ferns C. whisk ferns D. flowering plants E. horsetails
- _____ 5. What is the purpose of the annulus in fern sporangia?
 A. nutrient release B. spore protection C. splash dispersal for sperm D. spore dispersal E. cushioning
- _____ 6. Which of the following groups has species with 'winged' spores?
 A. Equisetales B. Lycopodophyta C. Pteridophyta D. Cycadophyta E. Psilotales
- _____ 7. An organized cluster of fern sporangia is called a(n):
 A. annulus B. megasporangium C. sorus D. sporangiophore E. indusium
- _____ 8. A fern with photosynthetic parts and sporangium-bearing parts separated but on the same leaf is said to have
 A. monomorphic leaves B. monomorphic pinnae C. dimorphic leaves D. dimorphic pinnae E. asexual leaves
- _____ 9. Which of the following groups is characterized by species with largely hollow, jointed stems?
 A. Anthophyta B. Lycopodophyta C. Marsileales D. Equisetales E. Salviniaceae
- _____ 10. A monomorphic species of *Equisetum* is one that has:
 A. a single type of gametophyte D. megaspores and microspores on the same individual
 B. strobili borne on photosynthetic stems E. sporangia borne on large photosynthetic leaves
 C. strobili borne only on non-photosynthetic stems
- _____ 11. A structure found on the leaves of some ferns, which functions to cover the developing sporangia is called a(n)
 A. indusium B. sorus C. annulus D. sporangiophore E. strobilus
- _____ 12. What is the **specific** stelar pattern shown in this stem?
 A. haplostele B. actinostele C. plectostele D. amphiphloic siphonostele E. eustele
- _____ 13. Name the structure indicated by the red bracket.
 A. leaf stele B. leaf trace C. leaf gap D. leaf base E. leaf axil
- _____ 14. The cells indicated by the A arrow are _____ and those indicated by the B arrow are _____.
 A. endodermis; phloem C. protoxylem; metaxylem E. metaxylem; protoxylem
 B. phloem; endodermis D. xylem; phloem
- _____ 15. Name the phylum!
 A. Coniferophyta B. Lycopodophyta C. Psilotophyta D. Pteridophyta E. Cycadophyta
- _____ 16. What is the term for the rounded yellowish structures on the lower surface of this leaf?
 A. sorus B. enation C. indusium D. ligule E. strobilus
- _____ 17. The species shown here is
 A. homosporous; dimorphic C. homosporous; monomorphic
 B. heterosporous; dimorphic D. heterosporous; monomorphic
18. _____ What is the best term for the structures at the tip of these stems?
19. _____ Homosporous or heterosporous?
20. _____ Name the stage **and** ploidy level of the individual indicated by the arrow.
21. _____ To what **genus** does this stem cross section belong?
22. _____ What is the **specific** stelar pattern?
23. _____ Name the structure indicated by the arrow.
24. _____ Is this species monomorphic or is it dimorphic?
25. _____ Name the phylum it belongs to.
26. _____ Name the special structure outlined by the yellow line?
27. _____ Name the phenomenon is illustrated here. Give a **concise** explanation of the forces involved in this process.