

Plant Development and Morphogenesis

Molecular and physiological bases of development

Jan	20	Central Question: continuous dev. and plasticity in plant form
	25	Cellular information; polarity; cell wall and developmental fate
	27	Embryogenesis, axis dev, germination, and imprinting
Feb	1	Germination strategies, vivipary, neoteny
	3	Positional information; cell fate; totipotency and the unsilencing of genes
	8	Auxin-induced regulation of gene expression
	10	Signalling between shoot apical meristem and leaf primordia
	15	ABC model and flowering
	17	<u>EXAM: 100 points</u>

Expressions of development: themes and variations in plant form

	22	Shoot organization; phase changes in morphogenesis (juv. and adult)
March	1	Phyllotaxis; control of leaf position and branching
	3	Specialized branches; control of branch outgrowth; internode elongation
	8	Internode growth; axis thickening
	10	Specialized shoots; compensatory growth and the economy of plant form
	15	<u>Vitis</u> (Grape) and vines
	17	<u>EXAM: 100 points</u>

Developmental responses to environmental factors

	29	Signal integration and regulation in shoots; tree architecture
	31	Leaf development and its control
April	5	Mechanism of variation in leaves: bananas and ferns
	7	Versatility in root systems
	12	Development in extreme environments: stem succulents
	14	Cacti
	19	Wetland and aquatic plants
	21	Epiphytic plants
	26	Parasitic plants
	28	Overview: coordination of cell fate, pattern development, and autotrophic life

FINAL EXAM (F+ TR Block) : Friday May 6 at Noon (150 points)

LEARNING OBJECTIVES, 2011

Biology 108: Plant Development

Students successfully completing this course are able to:

- 1) Highlight unique aspects of plant development such as open growth, alternation of generations, and genetic imprinting in seeds (double-fertilization).
- 2) Explain evidence for positional (extrinsic) information as a developmental driver.
- 3) Evaluate evidence for the diversity of signaling molecules in plants.
- 4) Illustrate pattern formation in cells, tissues, and organs.
- 5) Explain homology in developmental *vs* phylogenetic contexts.
- 6) Extract examples from the primary literature to show environmental constraints driving novel plant development in extreme climates.
- 7) Cite and suggest experimental approaches to test for factors that control timing and structure in plant development.
- 8) Qualify for research or graduate work in plant biology aimed at improving agriculture and predicting the effects of climate change.