

Plants in Motion

Spring 2016

<https://sites.evergreen.edu/plantsinmotion>

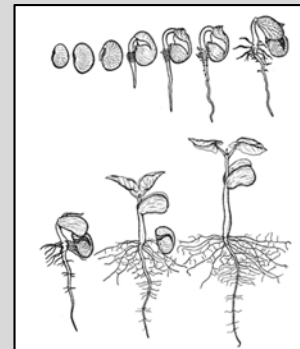
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Course Reference Numbers:

Fr (16 credits): 30282 So (16 credits): 30283



How do plants move? Growing from tiny seeds to giant trees, turning to face the sun, slowly reorienting in response to gravity, and rapidly ejecting spores, plants have developed diverse mechanisms for adjusting their bodies in physical space and in response to their environments. This program will explore the fascinating intersection of physics and botany by focusing on plants in motion. We will study plants in the lab and in the field to learn how the laws of physics constrain and enable their form and function and particularly their growth and motion. Topics will include plant growth and reproduction, tropism, transport, and conversion of energy from sunlight to sugar. Labs will involve both observation and experimentation, including the study of plant anatomy, photosynthesis, and water and nutrient transport.

We welcome students new to studying college level science, and will pay particular attention to developing foundational skills in quantitative and scientific reasoning. We will work to create a supportive learning community and to improve scientific literacy through interactive lectures, seminars, workshops, labs, and field trips. Regular assignments and assessments will include reading, homework sets, short papers, lab notebooks, quizzes, and exams. Students will complete a quarter long group research project related to plant physics that will culminate in a popular science and/or science education demonstration at Evergreen's Spring 2016 Science Carnival.

Students who successfully complete this program will have covered the equivalent of one quarter of introductory botany/plant biology with lab (6 credits), topics in algebra-based physics with lab (6 credits), and an interdisciplinary research project (4 credits) and will be prepared for further introductory programs with significant science content such as Introduction to Environmental Studies, Introduction to Natural Science, and Matter and Motion.

Weekly Schedule: Our schedule can vary from week to week but, generally, it will be as shown below:

Tuesday	Wednesday	Thursday*	Friday
Botany Lecture 9am-12:00 Sem 2 B1105	Physics Lecture 9am-11:00 Lab 1 2046	Lab 9am-12:00 Lab 1 1040 and 1050	9am-10:30 Physics Workshop Sem 2 B1107
	11:00-12:00 Project Work Lab 1 2046		10:30-12:00 Weekly Wrap Sem 2 B1107
Science Skills Workshop 1:00-3:00 Sem 2 B1107		Lab 1:00-4:00 Lab 1 1040 and 1050	

*All-day field trips will be on Thursday April 14 and Thursday May 12, leaving campus by 9am and returning by 5pm

First Class Meeting: Tuesday March 29 at 9am in Sem 2 B1105.

Prerequisites: Proficiency in algebra is required. Some background in general biology recommended, but not required.

If your algebra is rusty or if you were weak in algebra during your previous classes, and you have the time and capability to take advantage of resources like the Quantitative and Symbolic Reasoning (QuaSR) Center, then you will probably be able to keep up with the math requirements. If you are not able to devote time to developing basic algebra skills, then you should take a basic pre-college algebra course elsewhere to prepare for college-level science work in the future.

A recent general biology course that covered cell biology, diversity of life, mitosis, meiosis, and evolution is recommended. If you have not had a recent general biology course, we recommend reviewing chapters 2, 3, 11, and 12 of *Raven Biology of Plants* (or the equivalent material in any general biology reference) prior to the start of the program.

Required texts & materials:

- *Plants of the Pacific Northwest Coast*. MacKinnon, Andrew, Jim Pojar, Paul B. Alaback. Lone Pine Pub. 2004.
- *Raven Biology of Plants, 8th edn*. Evert R.F., Eichhorn S.E. W.H. Freeman/Palgrave Macmillan. 2013.
- *The Life of a Leaf*. Vogel, Steven. University of Chicago Press. 2012.
- *College Physics*. Available freely at <http://openstaxcollege.org/textbooks/college-physics>.
- Access to WebAssign, an on-line system for submitting physics homework (purchase required, <\$40).
- Lab notebook (a bound notebook with unlined paper).
- Scientific calculator (graphing calculator not required); scientific calculator apps on phones are acceptable.

Required Fees: \$50 for museum and park entrance fees.