

Name _____

Lab: Energy Dynamics in an Ecosystem

■ BACKGROUND

Almost all life on this planet is powered, either directly or indirectly, by sunlight. Energy captured from sunlight drives the production of energy-rich organic compounds during the process of photosynthesis. These organic compounds are the **biomass** of the ecosystem. This biomass is equivalent to the net amount of energy captured and stored by the **producers** in a system and is called the system's **net primary productivity**. The net primary productivity is also the amount of energy available to the next trophic level. **Gross primary productivity** is a measure of the total energy captured and turned into chemical energy during photosynthesis. To obtain the net primary productivity, you must subtract all the energy that was used in cellular respiration and ultimately released as heat, from the gross productivity.

In terrestrial systems, plants play the role of producers. Plants allocate that biomass (energy) to power their life processes or to store energy. Different plants have different strategies of energy allocation that reflect their role in various ecosystems. For example, annual weedy plants allocate a larger percentage of their biomass production to reproductive processes and seeds than do slower growing perennials. As plants, the producers are consumed or decomposed, and their stored chemical energy powers additional individuals, the consumers, or trophic levels of the biotic community. Biotic systems run on energy much as economic systems run on money. Energy is generally in limited supply in most communities. Energy dynamics in a biotic community is fundamental to understanding ecological interactions.

Learning Objectives:

-To explain community/ecosystem energy dynamics, including energy transfer between different trophic levels.

-To calculate biomass, net primary productivity (NPP), secondary productivity, and respiration.

There are two parts to this lab:

Part 1- Estimate the net primary productivity (NPP) of Wisconsin Fast Plants over several weeks.

Part 2 - You will calculate the flow of energy from plants (producers) to butterfly larvae (primary consumers). These calculations will include an estimate of secondary productivity, which would be the amount of biomass added to the larvae and therefore to the next trophic level, and the amount of energy lost to cellular respiration.

Lab Energy Dynamics In An Ecosystem

Institute of Ecology



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Researchers Shin Gijutsu Kaihatsu Jigyōdan (Japan),1993 Includes governmental policy development science and technology environmental finance health and welfare industrial agriculture forestry and fisheries international trade transportation telecommunications labor construction and home affairs agencies

Researchers, National Laboratories in Japan ,1996 [Energy Abstracts for Policy Analysis](#) ,1978 [Canadian Journal of Zoology](#) ,1980 *Ecosystems Dynamics, Ecosystem-society Interactions, and Remote Sensing Applications for Semi-arid and Arid Land* ,2003

General Biology Lab Manual Russell Skavaril,Mary Finnen,Steven Lawton,1993 This laboratory manual suitable for biology majors or non majors provides a selection of lucid comprehensive experiments that include excellent detail illustration and pedagogy

Transactions of the Missouri Academy of Science Missouri Academy of Science,1973 **Elements of Ecology** Robert Leo Smith,1992 Focuses on ecology as a science yet provides students with the basic background information they need to appreciate how economic and social issues impact on environmental problems

Current Advances in Ecological & Environmental Sciences ,1992 **Directory of environmental life scientists - north central r** , *Directory of Environmental Life Scientists: Ohio River Valley region* Institute of Ecology,1974 *Directory of Environmental Life Scientists* Institute of Ecology,1974 *Missouri River Region* Institute of Ecology (TIE),1974

Safety Science Abstracts Journal ,1979 **Federal Inventory of Energy Related Biomedical and Environmental Research for FY 1974 and FY 1975** Aerospace Corporation. Environment and Energy Conservation Division,1975 [Government Reports Announcements & Index](#) ,1978 [Government Research Directory](#) ,2010 [Research Centers Directory](#) ,2010 Research institutes foundations centers bureaus laboratories experiment stations and other similar nonprofit facilities organizations and activities in the United States and Canada Entry gives identifying and descriptive information of staff and work Institutional research centers and subject indexes 5th ed 5491 entries 6th ed 6268 entries

[Energetic Protons in the KeV Energy Region and Associated KeV Electrons Observed at Various Local Times and Disturbance Levels in the Upper Ionosphere](#) Bengt Hultqvist,1974

[5 Steps to a 5: AP Biology 2022 Elite Student Edition](#) Mark Anestis,Kelcey Burris,2021-08-04 MATCHES THE LATEST EXAM Let us supplement your AP classroom experience with this multi platform study guide The immensely popular 5 Steps to a 5 AP Biology Elite Student Edition has been updated for the 2021 22 school year and now contains 3 full length practice exams available both in the book and online that reflect the latest exam 5 Minutes to a 5 section with a 5 minute activity for each day of the school year that reinforces the most important concepts covered in class Access to a robust online platform Hundreds of practice exercises with thorough answer explanations Practice questions that reflect multiple choice and free response question types just like the ones you will see on test day Questions that represent a blend of fact based and application material Proven strategies specific to each section of the test A self guided study plan including flashcards games and more online

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Table of Contents Lab Energy Dynamics In An Ecosystem

1. Understanding the eBook Lab Energy Dynamics In An Ecosystem
 - The Rise of Digital Reading Lab Energy Dynamics In An Ecosystem
 - Advantages of eBooks Over Traditional Books
2. Identifying Lab Energy Dynamics In An Ecosystem
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Lab Energy Dynamics In An Ecosystem
 - User-Friendly Interface
4. Exploring eBook Recommendations from Lab Energy Dynamics In An Ecosystem
 - Personalized Recommendations
 - Lab Energy Dynamics In An Ecosystem User Reviews and Ratings
 - Lab Energy Dynamics In An Ecosystem and Bestseller Lists
5. Accessing Lab Energy Dynamics In An Ecosystem Free and Paid eBooks
 - Lab Energy Dynamics In An Ecosystem Public Domain eBooks
 - Lab Energy Dynamics In An Ecosystem eBook Subscription Services

- Lab Energy Dynamics In An Ecosystem Budget-Friendly Options
- 6. Navigating Lab Energy Dynamics In An Ecosystem eBook Formats
 - ePub, PDF, MOBI, and More
 - Lab Energy Dynamics In An Ecosystem Compatibility with Devices
 - Lab Energy Dynamics In An Ecosystem Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Lab Energy Dynamics In An Ecosystem
 - Highlighting and Note-Taking Lab Energy Dynamics In An Ecosystem
 - Interactive Elements Lab Energy Dynamics In An Ecosystem
- 8. Staying Engaged with Lab Energy Dynamics In An Ecosystem
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Lab Energy Dynamics In An Ecosystem
- 9. Balancing eBooks and Physical Books Lab Energy Dynamics In An Ecosystem
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Lab Energy Dynamics In An Ecosystem
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Lab Energy Dynamics In An Ecosystem
 - Setting Reading Goals Lab Energy Dynamics In An Ecosystem
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Lab Energy Dynamics In An Ecosystem
 - Fact-Checking eBook Content of Lab Energy Dynamics In An Ecosystem
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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