VOL. 80 | NO. 1 THE AMERICAN

BIOLOGY TEACHER



About Our Cover

A large flock of Snow Geese (Chen caerulescens) in Lawrence County, Arkansas, in the Mississippi River Delta. The flock as a whole contained over 15.000 individuals, mostly Snow Geese, but also Ross's Geese and Greater White-fronted Geese. Snow Geese breed colonially on tundras in northern Canada and Alaska, ranging from sub- to higharctic regions. The species migrates along all four of North America's flyways, with large numbers wintering in regions where open habitat is plentiful. One such region is eastern Arkansas where flocks feed en masse in agricultural fields, searching for grains left over from harvest and other vegetation.

The plumage of a Snow Goose comes in two different color "morphs": a mostly white plumage and a "blue," mostly grayish plumage. Snow Geese mate for life, usually with another goose of the same color morph. Females lay 2-6 eggs in a simple nest scraped out of the earth and lined with down feathers and vegetation. Chicks covered in down and eyes already open, hatch about 24 days after eggs are laid. Chicks can maintain a constant body temperature, of hatching. An adult Snow Goose is 27 to 32 inches, has a wingspan of about 55 inches, and weighs from 3.5 to 7 pounds.

By 1916, populations had been hunted to such low levels that hunting the species was banned. It was not until 1975 that hunting resumed after most populations had made a recovery. Since then, Snow Goose populations have recovered so well that they are damaging the delicate tundra habitat where they breed. Seeing a flock numbering in the ten thousands or even one hundred thousand is not uncommon in major wintering areas throughout the United States. Some of the most famous include areas along the Mississippi River in the south-central United States and Bosque del Apache NWR in New Mexico.

The camera settings for this photo were 1/1600 at f/13, 420mm, ISO 800. The photographer is Mitchell Pruitt, a graduate student in conservation biology at the University of Arkansas, mlpruitt24@ yahoo.com.

Contents

reature	Articles			

Cystic Fibrosis as a Theme to Incorporate Team-Based Learning in Cell Biology Courses	
Team-based learning can be used in a variety of disciplines	
Jennifer Hurst-Kennedy	
Available online at	

Research on Learning

Assessing Student Success in a Project-Based Learning Biology Course at a Community College	
Project-based learning pedagogy offers an alternative to traditional teaching methods at the community college level	
Barbara Berchiolli, Farahnaz Movahedzadeh, Abour Cherif	. 6

Shroomroot: An Action-Based Digital Game to Enhance Postsecondary Teaching and Learning about Mycorrhizae

Increasing students' knowledge of mycorrhizal ecology by playing Shroomroot	
Julia Amerongen Maddison, Maja Kržić, Suzanne Simard, Christopher Adderly,	
Samia Khan	į

Inquiry & Investigations

Algorithms, Abstractions, and Iterations: Teaching Computational Thinking Using Protein Synthesis Translation

Teaching students to solve complex science & engineering problems using computational thinking	
Amanda Peel, Patricia Friedrichsen	21

Cloning, Over-Expression, and Purification of Carbonic Anhydrase from an Extremophilic Bacterium: An Introduction to Advanced Molecular Biology RECOMMENDED Training students to perform PCR, DNA gel electrophoresis, DNA ligation & bacterial

	I - J - ,	0	I			
ransformation						
'ijayakumar Soma	ilinga, Hannah	Klemmer, A	shikha Arun,	Stephanie	Mathews,	Hanı

Vapshott, Amy M. Grunden	
ruponote, riniy in Granden	

Investigating Plant Pathogen Responses: Using a Common Moss and a Soil Pathogen to Demonstrate Plant

Detense Meenamisms	
Students can qualitatively analyze plant responses to pathogen infection using microscopy	
Tyler Schenck, Philip Villani	

Investigating Heat Exchange in Ecosystems with Bottle Biology

Encouraging students to	develop an underst	anding of how	ecosystems trans	fer energy &	cycle water
M. Megan Woller-Skar,	Heather Snyder, C	Chris Dobson			

Tips, Tricks & Techniques

A Captive Breeding Program for the Giant Amazonian Whip Spider: Making Educational Connections to a Charismatic Arachnid and the Ongoing Sixth Mass Extinction

Instructions for high school biology students (under the guidance of their teacher) on developing a captive breeding program for Heterophrynus batesii Ron Wagler . . .

	B	io	C	S		RE	C	M	M	ΕN	I D	ΑT	10	N	

FOR AP Biology

35

. . 47

Stressed Out: Demonstrating the Effects of Abiotic and Biotic Stress on an Important Food Crop Using the genetic diversity of common beans (Phaseolus vulgaris L.) to investigate its resilience to salt stress & viral infection

Using Life History Data to Examine Trade-Offs in Body Size and Reproductive Ability

Life history trade-offs provide an opportunity for students to learn about concepts in ecology, evolutionary biology & natural	
history	
Matthew J. Heard	. 53

Departments

From the President • Working Together to Celebrate Science and Share It with the Public • Elizabeth Cowles	
Book Reviews • Amanda L. Glaze, Department Editor	. 5
Classroom Materials & Media Review • Remy Doug Department Editor	6