SN EDUCATOR GUIDE

November 26, 2016

The Artistry of Animal Coloration

About this Issue

The articles highlighted in this educator guide summarize new findings in animal coloration. "Color me dino" explores inferences scientists may be able to make about dinosaur biology, lifestyle and habitat based on what are thought to be pigment pouches found in fossilized remains. But scientists must first agree whether these are actually pigment pouches or just the remains of bacteria involved in the animals' decay. The article examines the experiments scientists are conducting and the technology used to analyze samples. Students can focus on a particular phenomenon of interest mentioned in the article or examine the cross-curricular intersections that bring biology, chemistry and technology together. "Protein paints chipmunks' stripes" also explores pigmentation, but focuses on one way fur coloration patterns may have evolved in mammals. Along with a main focus on the biology of pigments, this guide invites students to think about how molecules interact with light to produce colors and includes an activity focused on extracting pigments from plants using a low-tech technique.

Connections to Curricula

- Cell structure and function
- Color and pigmentation
- Camouflage
- Light reflection and absorption
- Scientific discourse
- Modeling based on data
- Testing equipment
- Experimental design
- Chromatography

What's in this Guide?

- Article-Based Observation: These questions focus on reading and content comprehension by drawing on information found in the article "Color me dino." Questions focus on scientists' disagreement about whether they've found fossilized pigment pouches and how scientists may further test their ideas.
- Quest Through the Archives: With Internet access and your school's digital access to *Science News*, your students can use this short section to explore fossils, camouflage and coloration as reported by *Science News* since 1922.
- Cross-Curricular Discussion: The questions and extension prompts connect to the articles "Color me dino" and "Protein paints chipmunks' stripes" and encourage students to think about animal coloration from a biological, chemical and physical perspective. The section culminates in engineering and experimental design concepts. The section is divided roughly by subdiscipline for educators who would like to focus on one particular topic area. The extension prompts are either more topic specific or more conceptually advanced.
- Activity: The activity Analyzing Plant Pigments Using Paper Chromatography teaches students a common protocol for extracting and identifying pigments in plants. In this guided experimental design experience, students first learn the process and then create their own experiment using what they've learned. The same process can be used to extract pigments from dyes, markers and other substances.

Standards Alignment

Next Generation Science	Common Core
Biological Evolution: Unity and Diversity: HS-LS4-1, HS-LS4-2, HS-LS4-4, HS-LS4-5	ELA Standards: Reading Informational Text (RI): 1, 2, 4, 7
From Molecules to Organisms: Structures and Processes: HS-LS1-1, HS-LS1-2	ELA Standards: Writing (W): 2, 7
Energy: HS-PS-3-1, HS-PS-3-2	ELA Standards: Speaking and Listening (SL): 1, 4
Waves and their Applications in Technologies for Information Transfer: HS-PS4-4	ELA Standards: Reading for Literacy in Science and Technical Subjects (RST): 1, 2, 3, 4, 5, 7, 8, 9
Engineering Design: HS-ETS1-2	ELA Standards: Writing Literacy in History/Social Studies and Science and Technical Subjects (WHST): 2, 7, 8, 9