

Writing & Drawing

IN THE

Naturalist's Journal

*Reviving the tradition of
the naturalist's journal as
an effective learning tool*

- Coleoptera - 2 sets of wings



Found in morning pool
filter collection feet
Just like other beetle
and wasps. This one came
back from the dead.

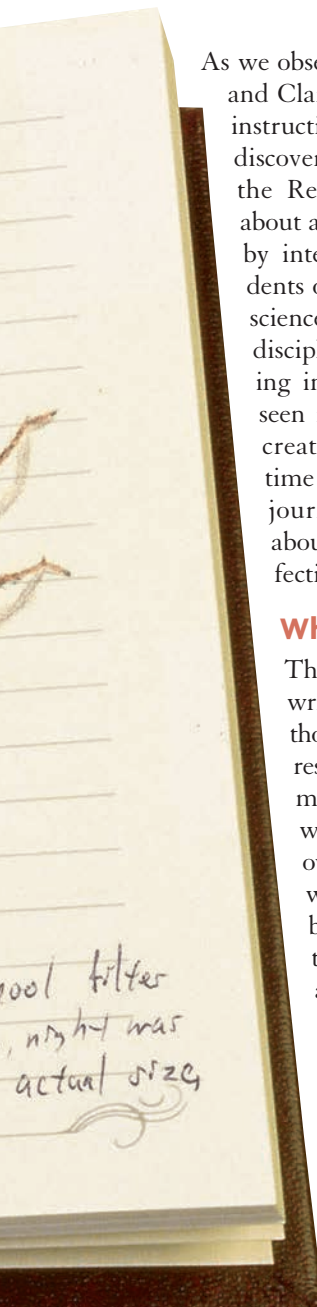


- Aranea
- 8-legs
- baggy eyes
- mandibles (big)

Found very thankfully dead in
at damn collection 7:30am
partly cloudy 1/2 moon (drawn
few ever very gross and scary)

“Your observations are to be taken with great pains and accuracy, to be entered as distinctly and intelligently for others as well as yourself, to comprehend all the elements necessary...”

—Letter from Thomas Jefferson to Meriwether Lewis, June 20, 1803



As we observe the 200th anniversary of the Lewis and Clark expedition, we recall that Jefferson's instructions to keep journals of the expedition's discoveries reflected an outlook prevalent since the Renaissance: The proper way to learn about and record our experience of nature was by integrating science and art. Today's students often think of the goals and methods of science and art as separate and even opposing disciplines. However, the mutually reinforcing integration of science and art is clearly seen in the journals and notebooks kept by creative thinkers and explorers since the time of Leonardo da Vinci. The naturalist's journal is an effective tool for learning about nature and science and can be an effective teaching strategy.

What is a naturalist's journal?

The naturalist's journal is a collection of writings and sketches that captures selected thoughts or observations of nature and represents both immediate learning and raw material that is available for more polished work. During one course or sometimes over several related courses, our students write and draw in bound, unlined notebooks to nurture their powers of observation and encourage constructive thought about their environment. The journal places students in the frame of reference of past centuries of naturalists.

Why revive the naturalist's journal as a teaching and learning tool? Creating naturalist's journals helps students connect to and engage with nature, as they increase their familiarity, understanding, and positive attitudes regarding the natural environment.

For many students, life in the artificial environment of climate-controlled schools, malls, and automobiles makes the natural environment seem peripheral and irrelevant. In addition, formal learning is increasingly based on electronic, prepackaged information transfer. Yet science teachers know that direct experience and creative use of that experience is essential to excite and engage the learner. Furthermore, while creating their naturalist's journals, students learn that science is a process that requires creativity based on their observations of the natural world and the questions these observations create. Ownership of their experiences of creating the journal reinforces active learning.

Finally, much learning theory suggests that authentic learning happens more often when the full range of human abilities is integrated. Writing and drawing—the major elements of the naturalist's journal—use verbal, analytic, and logical abilities (writing) and also nonverbal, spatial, and synthetic abilities (drawing). In addition to the seven “intelligences” originally identified by Howard Gardner's pioneering work on multiple intelligences, he has identified an additional intelligence: the *naturalistic intelligence*, which includes the ability to recognize and classify patterns and organisms in the natural environment (Gardner 1999).

General guidelines and suggestions

The journal can be used in many settings, from nature centers to museums to the classroom. The journals are ideal for field trips, which may be as simple as visits to woods or parks or even in the schoolyard or campus itself. Journals can be further developed in the lab, where specimens collected in the field can be examined and described more easily.

In their journals students should use both written descriptions and drawings. Students can experiment with these modes of thought and expression to discover how they complement each other in capturing field experiences. Students should keep an open mind, but also learn to be selective. At first, they may not know what to observe and record. However, as student abilities improve, they often become overwhelmed by the abundance of possibilities. It is important to help them focus on limited sets of observations selected to fit that day's learning goals.

The concept of the naturalist's journal is flexible. For example, students could each create a few loose pages of notes and drawings and then share their findings to create one group journal. Regardless of the finished product, specific criteria for grading can be established. Criteria may include completeness and clarity (did the students make an effort?), effective use of outside information (were students able to relate observations to previous knowledge?), observation ability (are there details that indicate student really looked?), and synthesis of observations and thoughts (did students think about what they observed?). Students are often interested in what others have done, and looking at the journals of others allows them to share observations, interpretations and style. After discussing what they selected and how they presented that in their journals, students might list new strategies they will use during their next field experience. The variations in student sketches of the same scene point out that observation is subjective and that selection of features to include in a sketch may be personally and even culturally embedded.

The field is often wet and dirty and time is limited, so consider having students keep two sets of records. They can use a pocket-size field notebook for capturing impres-

FIGURE 1

Representing only part of the radially symmetric anemone captures needed information. Perhaps, what is of interest or is relevant is the bird's foot, so why draw the whole bird?



SKETCHES BY JOSEPH M. DIRNBERGER

sions under difficult conditions and later transfer the day's records to the journal (at least 14 × 12 cm). This system also allows them to expand the notes (using their memory of the day's experiences) and to consult field guides or other resources to answer questions.

Writing in journals

Writing is an effective way to personalize an experience and to learn from it. Most thinking and communicating uses language, and writing requires us to “make sense” of our observations and experiences. In addition, writing elicits associations with past experience and knowledge, providing opportunities for synthesis. Importantly, the act of writing is often generative—new insights and questions may occur as we write. Here are some suggestions on how students should approach writing in their journal.

For each field experience students should answer the classic journalistic questions: who, what, when, where, why, and how. They identify the study site, describe its location relative to other landmarks, describe the environmental conditions, and note the date and time of day. *Why-* and *how-*type questions may be more speculative as we observe, for example, relationships between components of the environment or the

FIGURE 2

Note the scribbling stroke and how the pencil has rarely been lifted from the page in parts of the picture. Also note that the pencil was lifted when drawing finer branches. Though all branches on the tree are connected, it is not necessary to do this in the drawing.



structures and behaviors that allow organisms to survive in that environment.

Generally, the writing style should be straightforward, simple declarative sentences. Full sentences are

FIGURE 3

This cross-sectional view of the beach was not observed directly, but instead reconstructed after collecting from forest to shoreline.

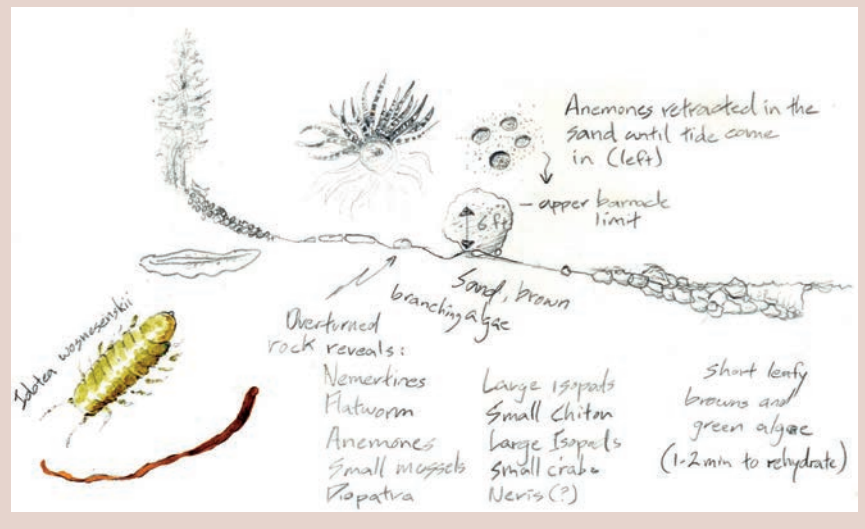
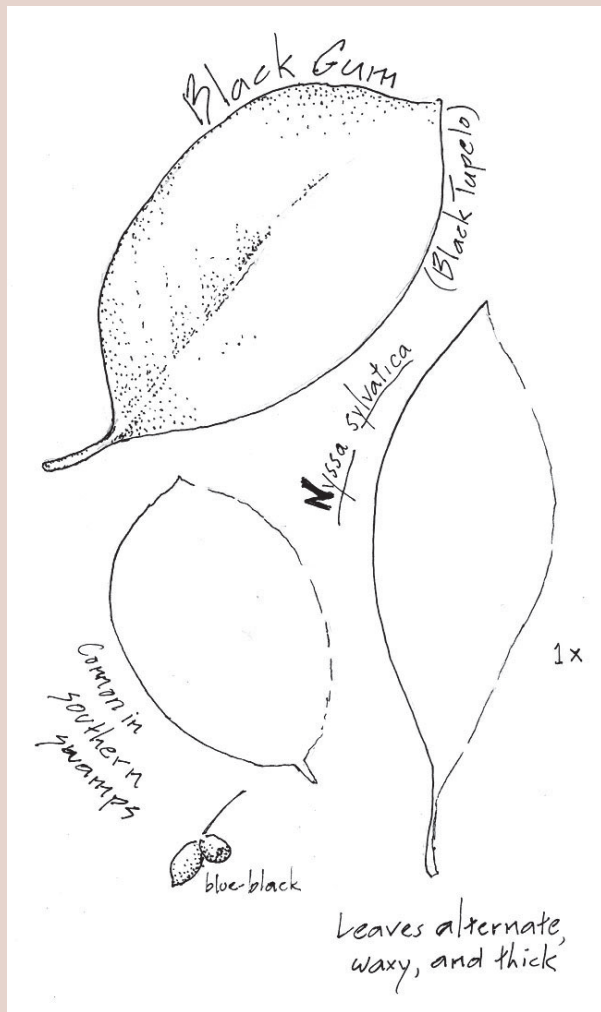


FIGURE 4

Detail on veins is only drawn on part of one leaf, yet the drawing conveys the needed information.



best—they force the writer to tell the whole story. Lists (e.g., of organisms observed) or other organizing strategies and descriptions of quantitative data-gathering techniques that are part of the field study are also appropriate. Students should also include relevant nonvisual information, such as sounds, smells, and textures.

In addition to using descriptive writing, students can also record questions that arise from their field observations. These questions can be a rich source for discussion and future studies. Students should leave room in the journal to respond further to those questions after additional experiences and insights.

Students should practice thinking and communicating using terms that are appropriate for the goals of the experience. Often part of the learning task is connecting the most precise language to observations made in the field. Examples include descriptive terminology appro-

priate to particular habitats or common and scientific names for organisms. (Students could use a straight underline for scientific names of organisms and a wavy underline for common names and major place names.)

Personal reactions can be useful in engaging student and recalling experiences later. However, students should try to transform the aesthetic reaction “Great sunset...” into several descriptive lines (e.g., noting colors, time and duration, and atmospheric conditions), to make the journal richer and more meaningful.

Students should be flexible and experiment. Depending on the goals of the field experience, it may even be appropriate to capture observations through poetry. The ultimate examples of focused selection and disciplined expression may be the poetic forms of Japanese haiku.

Finally, students should leave room in the journal to tie things together. Periodically, students should write a brief synthesis from the experiences of that day or week, or in a particular environment. Even for brief field experiences, the teacher can ask students “What were your three most outstanding observations?”

Drawing in journals

Artists and natural scientists follow remarkably similar paths in the way they learn to see the world (Dirnberger 2004). The first step in the scientific process is observing the natural world. To develop truly original ideas and insights, investigators must see things outside their normal context. To draw effectively, artists must do the same. Betty Edwards writes, “Drawing is not very difficult. *Seeing* is the problem, or, to be more specific, shifting to a *particular way of seeing*...to see things in a different way” (1999). Edwards’s book provides numerous exercises to help beginners overcome the belief that they cannot draw. Alternatively, an art teacher may be invited in to help reluctant students get their pencils moving. (Note: The article by April Hobart, “*Sketching in Nature*,” found in this issue on page 30, provides one artist’s specific strategies to help students and teachers become more confident in their drawing.)

Some students will be discouraged with their drawing attempts despite practice, but teachers should remind them that drawing has purposes other than to produce a masterpiece. Drawing enhances observation and retention and requires attention to detail and overall composition. In addition, drawing captures large amounts of information. For example, a simple sketch of topography can easily convey what otherwise would be difficult to describe in a few words.

Limited time in the field provides both challenges and opportunity. Students must use techniques that lend themselves to capturing information rapidly; in doing this they learn to “see things in a different way,” as artists and scientists should. Students must select from what they see, that which conveys important information (Figure 1). Often, drawing only part of an organism or landscape ac-

FIGURE 5

Maps can effectively synthesize observations made sequentially over time, such as in this hike upstream.



completes this (Figure 1, p. 40). A scribbling stroke is a useful technique for rapid sketches in the field (Figure 2, p. 40). Not every drawing must be “as it is seen.” Observations can be synthesized into conceptual illustrations that summarize information (Figure 3, p. 40). Students should take advantage of lighter spaces and lack of defined edges. By leaving light space and subtle edges blank,

penciled in next to partial sketches will make this easier. However, often a quick field sketch alone will suffice in conveying information.

Connecting with nature

We have found that the naturalist’s journal can help students use their field experiences to change the way they understand nature and science. The journal is a tool for translating their experiences into verbal and visual language through processes that are both analytical and creative. At the same time, it can bring to the surface feelings about nature. Most importantly, the naturalist’s journal can be a vehicle to help students explore the connections between how they perceive and think about natural phenomena and how they value our natural environment. It is our hope that learning to see the natural world in a different way may lead to thinking, feeling, and acting with more appreciation and respect for nature. ■

Joe Dirnberger (e-mail: jdirnber@kennesaw.edu) is a professor of biology and Steven McCullagh (e-mail: smculla@kennesaw.edu) is an associate professor of biology, both at Kennesaw State University, Department of Biological and Physical Sciences, 1000 Chastain Road, Kennesaw, GA 30144; and Tom Howick (e-mail: thowick@bellsouth.net) is a former professor at Kennesaw State University, 387 Wiggins Creek Drive, Sewanee, TN 37375.

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- Gardner, H. 1999. *Intelligence reframed: Multiple intelligences for the 21st century*. New York: Basic Books.

FIGURE 6

Depth is given to the subject by wetting and smearing water-soluble ink near areas that should be darker.

