From the Air to Where?
a preliminary investigation into the
winter ecology of butterflies and
moths

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Kindergarten
45 minutes
This lesson is inspired by a cohort of kindergarteners who have been learning about animals in winter.

The lesson is structured around a central question, “What do butterflies and moths do during the winter?” a question chosen because of its potency as an authentic, living mystery -- both to kindergarteners and to scientists.

In short, each student answers the question in an illustration. Their theories, or “predictions,” generate impetus for art-making and serve as evidence of their thinking -- platforms for reflection and analysis -- and tools for communication.

Using their illustrations to share their predictions with their classmates, learners bridge art and science by practicing modes of inquiry common to both fields -- collaborative theory production and critique. While not formally assessed, it is my intention, throughout the lesson, that learners invigorate their elaborative, inventive, and imaginative thinking skills, blend critical examination with recall and revision of prior knowledge, and strengthen their visual/verbal communication and storytelling skills.

The class concludes with a look at how some butterflies and moths cope with the winter months. Students are given a chance to visit with (and handle) some “special guests” -- live pupae of several local species of overwintering Lepidoptera (butterflies and moths). This is an opportunity for learners to compare their predictions to their direct observations and tactile experience -- not to learn the “correct answer,” but to push their inquiry forward by analyzing possibilities, noticing and creating distinctions among observed phenomena and identifying new questions.

In the future, I imagine this lesson as part of a curriculum centered on cycles of prediction, observation, analysis, classification, and question-formation -- embedded in an ongoing study of representation and visual communication.
OBJECTIVES

➔ Learners predict possible answers to the question, *What do butterflies and moths do in the winter?* and represent those predictions in illustrations.
➔ Learners describe how their predictions are represented in their drawings, sharing them with the teacher or with the whole class.
➔ Learners push into new areas of inquiry by identifying new questions emerging from their experiences making predictions and handling overwintering pupae.

Maine Learning Results

➔ B3, Meaning Making: “Students create artwork that communicates ideas . . .”
➔ B1, Media Skills: “Students use basic media, tools and techniques to create original works of art”.

Assessments

<table>
<thead>
<tr>
<th>Student</th>
<th>Prediction</th>
<th>Question(s) Asked</th>
<th>Observations about density and specificity of visual information and contextual clues in illustration</th>
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➔ Success of the instruction will be defined in reference to the following indicators:

1. Learners formulated predictions which posit answers to the question, *what do butterflies and moths do during the winter?*
2. Learners illustrated their predictions, including, to some extent, revealing visual information or contextual clues.
3. Learners described their illustrated predictions to the class or to the teacher, one-on-one.
4. Learners identified new questions based on their observations of living pupae.
Materials

➔ Medium weight drawing paper, one sheet per student
➔ An assortment of two dimensional media; crayons, pencils -- possibly oil pastels.

Visual Provocation

➔ A variety of pupating native Lepidoptera. As pictured: *Callosamia Promethea, Eacles imperialis, Actias luna, Hyalophora cecropia, Antheraea polyphemus* and *Automeris io*.

Vocabulary

➔ Prediction: a best guess, informed by prior knowledge, to be reflected upon once more information/understanding is gathered.

Direct Instruction

➔ The class will begin with a discussion, in part to gauge the group’s existing understanding of winter ecology in the animal kingdom. The discussion is oriented toward arriving at the central point of inquiry, “What do butterflies and moths do in the winter?”
➔ The teacher describes the concept and process of using art in the creation and communication of predictions.
➔ An agenda/checklist, displaying the following tasks, is introduced: 1. Think of a prediction; 2. Draw your prediction; 3. Share your prediction; 4. Special Guest/Think of a new question.
➔ Learners work for approximately 15 minutes. The teacher encourages learners to make drawings detailed enough so they may be understood without explanation.
➔ The class regroups and each student is given a chance to describe their prediction and supporting illustration. The checklist is revisited.
➔ The teacher brings out the special guests, letting learners arrive at the guests’ identity for themselves. Students handle the pupae (with flat palms only), and a discussion about observations and emerging questions commences.
Each learner identifies a new question for him/herself and the teacher records it, alongside their prediction. Examples include: Why is there a stick? What are cocoons made of? How are cocoons made? Where do you find them? Why are they all different (colors, shapes, sizes, include different objects)? Why are some not in cocoons?

**Provoking Questions**

- Why is life harder during the winter → What do animals do in winter to cope → What kinds of animals do you see during the winter → Do you ever see any butterflies or moths?
- What do butterflies and moths do in the winter?
- What can you learn by making guesses?
- How might you help someone understand your thinking by using art?
- How is what you’re seeing different from what you were thinking? How is it similar?

**Modifications**

- Making predictions relies on blending imagination and prior knowledge. Students with little prior knowledge may undertake a somewhat different process than those with an abundance of prior knowledge. Both experts and novices make predictions about things which lie outside their experience.
- For students who are English language learners or unfamiliar with butterflies and moths, a brief explanation of the typical differences between the two groups (ideally involving a few pictures) may be helpful. Additionally, *prediction*, the vocabulary word, may be used interchangeably with *best guess*, because it gets at a similar idea while being somewhat more likely to reference previous language learning.
- To extend the cognitive challenge of the lesson, learners may swap illustrations and interpret, or even share their classmates’ work.
- As an alternative instructional order, the lesson may be reversed. The pupae may be viewed first, then predictions made about what the objects are or what they contain -- this might be especially interesting in the absence of living cocoons, if photographs must be used. Photographs of the pupae in situ may add additional richness to the lesson.
Learning Resources


Student Work Samples