

Teacher Guide

Insects Identification Activity

Introduction:

Insects are common culprits of damage in museum collections. Many species feed on specific materials found in museums such as paper, textiles, or wood. Other insects are attracted by debris or food that may be brought into museum buildings. In addition to consuming the objects, insects leave stains, webs, or shed casings on objects and in casework. A pest problem can be identified by examining the type of damage caused or by catching and directly observing the insects. Insect traps are placed throughout museums and are regularly inspected as part of preventive maintenance procedures. Conservators and collections managers must identify the insects in order to determine risks and choose methods for extermination. In this lab, students will construct and use a dichotomous key as a classification tool. Students will also examine insects under magnification.

Objectives:

- To create and use a dichotomous key from visual observations
- Classify insects based on external features
- Define binomial nomenclature
- Identify characteristics common to all insects

K-5th grade Science Georgia Performance Standards:

SKL1. Students will sort living organisms and non-living materials into groups by observable physical attributes.

- b. Group animals according to their observable features such as appearance, size, motion, where it lives, etc. (Example: A green frog has four legs and hops. A rabbit also hops.)

SKL2. Students will compare the similarities and differences in groups of organisms.

- a. Explain the similarities and differences in animals. (color, size, appearance, etc.)

S5L1. Students will classify organisms into groups and relate how they determined the groups with how and why scientists use classification.

- a. Demonstrate how animals are sorted into groups (vertebrate and invertebrate) and how vertebrates are sorted into groups (fish, amphibian, reptile, bird, and mammal).

7th-12th grade Science Georgia Performance Standards:

S7L1. Students will investigate the diversity of living organisms and how they can be compared scientifically.

- a. Demonstrate the process for the development of a dichotomous key.
- b. Classify organisms based on physical characteristics using a dichotomous key of the six kingdom system (archaeobacteria, eubacteria, protists, fungi, plants, and animals).

SEN2 Students will investigate the reasons for insect success.

- a. Investigate the insect body plan and compare and contrast to other arthropods (e.g., Arachnida, Crustacea).
- b. Explain advantages of different insect life cycles (e.g., complete vs. incomplete).
- c. Use morphological characteristics (e.g., wing structure) to recognize major insect orders.
- d. Compare and contrast how insect structure and function are integrated and reflect evolved adaptations to different environments.

SB3 Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.

- b. Compare how structures and function vary between the six kingdoms (archaeobacteria, eubacteria, protists, fungi, plants, and animals).
- c. Examine the evolutionary basis of modern classification systems.

Supplies:

Pencil and paper

Internet access

Insect glue traps (from hardware store, pest management service may provide)

Stereomicroscopes or hand-held magnifying lenses

Pre-Lab (may be done by teacher OR students)

- Place glue traps around home or school to collect insects. Place the traps along walls, in corners, and in or near doorways, garages, basements, etc. These traps do not attract insects, instead they collect those insects that happen to encounter the traps. Therefore, longer collection periods will be most effective.
- Gather images of common insects, using resources such as the following websites:
<http://www.orkin.com/pestcontrol/the-pest-threat/?adid=GO228WEB>
<http://www.museumpests.net/identification.asp>
<http://www.insectslimited.com/insects>

Images should be drawings or photographs that clearly illustrate features of the insect body. The selection of images should include at least six of the following:

- carpet beetle
- fly
- ant
- moth
- silverfish
- termite
- cockroach
- booklouse
- mite
- beetle (wood-boring, cigarette, drugstore, etc.)
- spider (cellar, house, garden, grass, etc.)

Procedure:**Making a dichotomous key:**

1. Using the selected insect images, write a question that will divide the insects into two distinct groups based on a single characteristic.
2. Focusing on ONE of your two groups, write another question for a different characteristic so you create two smaller groups.
3. Continue dividing the insects into subgroups and adding questions to your key until there is only one insect in each group.
4. Use internet resources to find the scientific name for each insect.

Using the key:

1. Obtain an insect trap with insects on it.
2. Examine the trap under magnification. For each different insect on your trap, observe the characteristics that you used to make your key.
3. Follow the flow of the key and try to identify the insect(s) on your trap.

Selected Resources:

- Child, R. (1998). Monitoring Insect Pests with Sticky Traps. *Conserve O Gram*, (3/7). Retrieved July 28, 2021 from:
<http://www.nps.gov/museum/publications/conservoogram/03-07.pdf>
- Klein, D. (2008). Identifying Museum Insect Pest Damage. *Conserve O Gram*, (3/11). Retrieved July 28, 2021 from:
<http://www.nps.gov/museum/publications/conservoogram/03-11.pdf>
- Philadelphia Museum of Art. (2010). Research: Conservation. Retrieved July 28, 2021 from:
<http://www.philamuseum.org/conservation/10.html?page=5>
- Pinniger, David (2001). *Pest Management in Museums, Archives and Historical Houses*, Archetype; London.