Subject Area: Science
Grade Level: Middle School
Topic: Biology/Entomology

Creature Classification[1]

Purpose/Rationale

The purpose of this activity is to assess the proficiency of students in developing classification systems for biological organisms.

Knowledge, Skill, and Disposition Objectives

Students will demonstrate their ability to:

- access scientific data and/or information.
- describe biological creatures in multiple ways.
- classify organisms in useful ways.
- visually present information about scientific organisms in a manner that appeal to a specific audience.
- appropriately cite sources of information.

Related Outcomes/Standards

Life Science
- The student will investigate and understand classification of organisms
- The student will investigate and understand that interactions exist among members of a population

Prerequisite Knowledge/Skills

- general characteristics of insects and arachnids
- simple information gathering techniques
- common classification schemes
- principles of effective visual communication
- source referencing

Context

This assessment activity can take place either during class or as homework. In either case, care must be taken to insure equity in resource availability. Teachers should allot a minimum of five hours for students to work on this project, preferably spread over five days.

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[1] Adapted from: Marzano, R. J., Pickering, D., & McTighe, J. (1993). *Assessing student outcomes: Performance assessment using the Dimensions of Learning Model.* Alexandria, VA: Association for Supervision and Curriculum Development.

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Form

This assessment is to be completed individually by students with minimal teacher intervention. The assessment task and scoring rubric should be presented to students both orally and in writing prior to the start of the assessment.

Rater

The product is to be evaluated by the teacher. The teacher may wish to incorporate a peer review and/or evaluation session into the task.

Prompt

There are two prompts. Prompt 1 is designed for students functioning at grade level in knowledge and understanding of life science. Students will produce a consumer's guide to common household pests. Prompt 2 is designed for students functioning above grade level in life science knowledge and understanding. Students will produce a professional's guide to household pests that includes and classifies information not only about the pests, but also about methods used to control them.

Evaluation Criteria

Student products will be evaluated in the following areas:

- Introduction
- Bug Selection
- Thoroughness
- Ease of Use/Quality of Classification
- Appearance/Production Quality
- Referencing of Sources

Point values may be assigned to each section of the assessment. A possible grading scheme is included for reference.

As scores address separate objectives, all should be recorded as indicators of student proficiency. If an overall project "grade" is also desired, scores can be added together using the following scales[2]:

Expert = 3 points
Proficient = 2 points
Inadequate = 1 point

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[2] This scale was created using the following assumptions:
- an "A" indicates consistent performance at the Proficient level;
- work resulting in three "INT" should earn no more than a "C";
- Significantly inadequate work should be redone.

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Total Points		Grade
15-18	(& INT*=0)	A +
13-15	(& INT≤1)	A
12	(& INT=1) or 13-14 (& INT=2)	B +
12	(& INT=2)	B
11	(& INT=2)	B -
11	(& INT=3)	C +
10	(& INT=3)	C
6-9	Redo	

* in-training

Teacher Notes

Teachers may wish to give a specific number of "bugs" to be included in the guide. This requirement may be added to the "bug selection" section of the rubric.

This assessment may be adapted to measure student understanding of different content areas by modifying the scenario and rubric to revolve around anything that can be classified. (e.g., "A local natural history museum has hired you to develop a guide to the rocks and minerals found in your area.")

Teachers are encouraged to assist struggling learners with task management. (Help them set daily goals towards project completion or brainstorm sources of information, etc.)

Special accommodations may be made for students limited by their English proficiency by allowing the guide to be produced in students' dominant language.

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Creature Classification

Prompt One

A new extermination company, Peterson's Pest Control, is getting ready to start up business in your town. The firm would like to provide potential customers with a handy quick-reference guide to the different "bugs" they might find in and around their homes. They would like customers to be able to identify potential pests and their impact on humans, as well as recognize those creatures that are beneficial to humans and should be left alone.

Peterson's Pest Control has just hired <u>you</u>, a local entomologist, to develop this reference guide. They would like you to include as many local insects and arachnids as possible, categorized in a convenient, well organized, and attractive format. To keep printing costs down, Peterson would like you to limit your guide to three colors, in addition to black.

You should collect the information to be included in your guide from a variety of sources. You may wish to consider observations in and around your home, field guides and other reference media, interviews, etc. You will need to explain the purpose of the guide as well as justify your choices for inclusion and organization in an introduction to the guide.

Be sure to check the enclosed rubric for more specific requirements.

Evaluation Criteria

The guide you develop will be evaluated in the following areas:

- Introduction (Have you clearly explained the purpose of and rationale for the guide as well as how to best use it?)
- "Bug" Selection (Have you included most of the "bugs" people in this area are likely to find in and around their homes?)
- Thoroughness (How much meaningful information have you provided about these "bugs"?)
- Ease of Use/Quality of Classification (When one comes across an unknown "creature" in the house or yard, how easy is it to locate that creature in the guide?)
- Appearance/Production Quality (How "professional" does the guide appear?)
- Referencing (Have you given credit to your sources of information?)

A copy of the evaluation form that will be used can be found on the next page.

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Creature Classification Rubric
Prompt One

Prompt One	EXPERT (EXP) 3 points	PROFICIENT (PRF) 2 points	IN-TRAINING (INT) 1 point
Introduction **Score: _____**	You clearly and concisely explain the purpose of your guide. You include a convincing rationale for what is included in the guide as well as easy-to-follow directions on how to make use of it at home.	You state a purpose for the guide and explain how to use it, but you do not justify your decisions about its organization and/or the "bugs" that are included.	You do not state a purpose for the guide. You do not provide a clear explanation of how to use the guide.
"Bug" Selection **Score: _____**	You include a wide variety of local "bugs" in your guide, all of which might be found in and around homes in this area.	You include a variety of "bugs" for your guide, but also include "bugs" that are not commonly found in this area OR you are missing "bugs" that are commonly found.	You do not include a variety of "bugs" in your guide. You select "bugs" that are not native to this area.
Thoroughness **Score: _____**	You include at least four types of information about the "bugs" you are featuring, e.g., appearance (size, shape, color, markings), habitat, behavior, benefits to/problems for humans. You provide highly descriptive details so that someone using your guide gains a thorough understanding of a particular "bug" and of "bugs" in general.	You include at least three types of information about the "bugs" you are featuring, e.g., appearance (size, shape, color, markings), habitat, behavior, and benefits to/problems for humans. You provide details that allow people using your guide to readily recognize insects and/or arachnids that they find in their homes or yards, and determine whether these creatures are friend or foe.	You include fewer than three types of information about the "bugs" that you are featuring. You provide few details, making it difficult for people using your guide to readily identify insects or arachnids that they find in their homes.

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Prompt One	**EXPERT (EXP)** **3 points**	**PROFICIENT (PRF)** **2 points**	**IN-TRAINING (INT)** **1 point**
Ease of Use/ Quality of Classification Score: _____	Your guide uses a classification system with cross-referencing that is logical and easy to understand. After seeing an unfamiliar "bug" in the house, the user can rapidly locate important information about the creature in your guide.	Your guide uses a classification system, but it is not user-friendly. Still, after seeing an unfamiliar "bug" in a house, the professional is able to locate information about the creature in your guide without having to compare the specimen to every entry.	The guide uses a classification system that is illogical in sequence and cumbersome to use. After seeing an unfamiliar "bug" in the house, the user would have a difficult time locating the creature in the guide and/or difficulty finding out useful information about it.
Appearance/ Production Quality Score: _____	The guide is professional in appearance. Written information is typed or printed neatly; graphics and illustrations are eye-catching. Guide does not appear too busy or cluttered. Use of color in the guide enhances its clarity and visual appeal. No more than three colors are used in addition to black.	Written information in the guide is typed or printed neatly. Graphics and illustrations are also neatly presented. No more than three colors are used in addition to black.	Written information is difficult to read. Graphics and illustrations are messy. You use more than three colors, in addition to black.
Referencing Score: _____	Sources of information are cited according to a standardized professional format. Users are not only able to locate your sources, but are directed to sources they might use for additional study.	Sources of information are cited in a standardized format, allowing the user to locate them easily.	You do not cite your sources. OR Sources of information are not cited in a standardized way that allows the user to locate them easily.

TOTAL SCORE: _____

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Creature Classification

Prompt Two

A new professional exterminator's organization, Pests Are Us, is getting ready to start recruiting members in your town. The organization would like to provide potential members with an easy to use professional quick-reference guide to some of the professional issues involved in controlling the different "bugs" found in and around this area. Your task is to come up with a classification system for these "bugs" that takes into account the following considerations:

- Priority considerations for extermination (Which "bugs" are most important to control?)
- Extermination methods available and the pros and cons of the various methods (What is the desirability of the various methods available in terms of availability, ease of use, cost, etc.? What are the possible/probable consequences of extermination method(s) used in terms of danger to homeowner, exterminator, the environment, etc.?)

Pests Are Us has just hired <u>you</u>, a local entomologist, to develop this reference guide. They would like you to include local insects and arachnids from most common to rare, categorized in a convenient, well organized, and professional format. To keep printing costs down, Pests Are Us would like you to limit your guide to three colors, in addition to black.

You must collect the information to be included in your guide from a variety of sources. You may wish to consider observations in and around your home, field guides and other reference media, interviews, etc. Remember, you are writing for a sophisticated audience of pest control specialists. You will also need to explain the purpose of the guide as well as justify your choices for inclusion and organization in an introduction to the guide.

Be sure to check the enclosed rubric for more specific requirements.

Evaluation Criteria

The guide you develop will be evaluated in the following areas:

- Introduction (Have you clearly explained the purpose of and rationale for the guide as well as how to best use it?)
- "Bug" Selection (Have you included a range of "bugs" from common to rare that people in this area may find in and around their homes?)
- Thoroughness (How much meaningful information have you provided about these "bugs" and the issues surrounding control/extermination of them?)
- Ease of Use/Quality of Classification (When one comes across an unknown "creature," how easy is it to locate important information about the control/extermination of that creature in the guide?)

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- Appearance/Production Quality (How "professional" does the guide appear?)
- Referencing (Have you given credit to your sources of information?)

A copy of the evaluation form that will be used can be found on the next page.

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Creature Classification Rubric
Prompt Two

Prompt Two	EXPERT (EXP) 3 points	PROFICIENT (PRF) 2 points	IN-TRAINING (INT) 1 point
"Bug" Selection **Score: _____**	You include a wide variety of local "bugs" in your guide. You include a comprehensive range of "bugs," from commonly found to rarely found in and around homes in this area. The professional would keep this guide handy at all times.	You include a variety of "bugs," but make minor errors in the appropriateness of their selection for this area, or do not include a broad range of "bugs," from common to rare. The listing is useful to the professional, but not comprehensive.	You do not include a range of "bugs" and/or include "bugs" that are not native to this area (e.g., a green Irish horned beetle) and would not be found here. The listing is not complete enough to be of help to the professional.
Thoroughness **Score: _____**	You include at least four types of information about the "bugs" you are featuring, (e.g., appearance, (size, shape, color, markings), habitat, behavior, and benefits to/problems for humans, making it possible for the professional to correctly identify them. You provide detailed information about whether or not these "bugs" should be a priority for extermination, the best extermination methods available and the consequences involved in their use.	You include at least three types of information about the "bugs" you are featuring, (e.g., appearance, size, shape, color, markings), habitat, behavior, and benefits to/problems for humans, making it likely that the professional will correctly identify them. You provide general information for the exterminator in at least two of the following areas: whether or not these "bugs" should be a priority for extermination, the best extermination methods available and/or the consequences involved in their use.	You include fewer than three types of information about the "bugs" that you are featuring. It is difficult for the professional using your guide to readily identify the insects or arachnids that they come across. You provide overly-simplistic information or leave out important details in terms of whether or not these "bugs" should be a priority for extermination, the best extermination methods available and the consequences involved in their use.

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Prompt Two	**EXPERT (EXP)** 3 points	**PROFICIENT (PRF)** 2 points	**IN-TRAINING (INT)** 1 point
Ease of Use/ Quality of Classification **Score: _____**	Your guide uses a classification system with cross-referencing that is logical and very easy to understand. After seeing an unfamiliar "bug" in a house, the professional can rapidly locate important information about the creature in your guide.	Your guide uses a classification system, but it is not user-friendly. Still, after seeing an unfamiliar "bug" in a house, the professional is able to locate information about the creature in your guide without having to compare the specimen to every entry.	The guide uses a classification system that is illogical in sequence. After seeing an unfamiliar "bug" in a house, the professional would have a difficult time locating the creature in the guide and/or difficulty finding out useful information about it.
Appearance/ Production Quality **Score: _____**	The guide is professional in appearance. Written information is typed or printed neatly. Graphics and illustrations are eye-catching. The guide does not appear too busy or cluttered. The use of color in the guide enhances its clarity and visual appeal. No more than three colors are used in addition to black.	Written information in the guide is typed or printed neatly. Graphics and illustrations are also neatly presented. No more than three colors are used in addition to black.	Written information is difficult to read. Graphics and illustrations are messy. You use more than three colors, in addition to black.
Referencing **Score: _____**	All sources of information are cited according to a standardized professional format. Guide users are not only able to locate your sources, but are directed to sources they might use for additional study.	Sources of information are cited in a standardized format, allowing the user to locate them easily.	You do not cite your sources OR Sources of information are not cited in a standardized way that allows the user to locate them easily.

TOTAL SCORE: _____