

Primary: Invent a Bug!

Students will learn to recognize bugs by identifying common characteristics and structures and investigate how their adaptations help them to adapt to their environment.

Subject Levels/ Suggested Grade

Science K-3

Arts Education K-3

Written by Sabrina Bhojani, Education Specialist 2020-2021

Primary Lesson Plan: Invent A Bug!

Teacher Background

In this lesson, students will learn to recognize bugs by identifying common characteristics and structures. Students will also look classifying bugs into various categories (such as spiders and insects) and investigate how their adaptations help them to adapt to their environment. Students will gain an appreciation for diversity of bugs and create an artistic work by using ideas inspired by imagination, inquiry, experimentation, and past observation.

	Curricular Competencies	Content Connections
Subject &	Students are expected to be able to do the	Students are expected to know
Grade Level	following:	the following:
SCIENCE K-3	Questioning and predicting• Demonstrate curiosity and a sense of wonder about the world• Observe objects and events in familiar contexts• Ask simple questions about familiar objects and events• Identify questions about familiar objects and events• Identify questions about familiar objects and events that can be investigated scientifically 	 Kindergarten basic needs of plants and animals adaptations of local plants and animals living things make changes to accommodate daily and seasonal cycles Grade 1 classification of living and non-living things names of local plants and animals structural features of living things in the local environment behavioural adaptations of animals in the local environment of the local landscape, plants and animals Grade 2 metamorphic and nonmetamorphic life cycles of different organisms similarities and differences between offspring and parent Grade 3 biodiversity in the local environment the knowledge of local First Peoples of ecosystems
ART K- 3	 Exploring and Creating Explore elements, processes, materials, movements, technologies, tools, and techniques of the arts Create artistic works collaboratively and as an individual, using ideas inspired by imagination, inquiry, experimentation, and purposeful play Reasoning and Reflecting Develop processes and technical skills in a variety of art forms to nurture motivation, development, and imagination Reflect on creative processes and make connections to other experiences Communicating and documenting Interpret how symbols are used through the arts Express feelings, ideas, stories, observations, and experiences through the arts Describe and respond to works of art Experience, document and share creative works in a variety of ways 	 visual arts: elements of design: line, shape, texture, colour; principles of design: pattern, repetition variety of local works of art and artistic traditions personal and collective responsibility associated with creating, experiencing, or sharing in a safe learning environment

Materials

- Teacher Handouts:
 - Bug Photos
 - Bug Habitats (adapted with permission from the California Academy of Science resources)
- Art Supplies
 - Egg cartons (enough for 3 segments per student)
 - Multiple colors of tempera paint
 - Pipe cleaners (enough for legs and antennae)
 - Scraps of construction paper
 - Foil wrap (for wings or decoration)
 - Colorful markers
 - Glue
 - Clear tape
 - Paint brushes
 - Scissors

Procedure

Part 1

- 1. Spread the pre-printed Bug Photos around the class. Use as many photos as there are students in the class (e.g. If you have 30 students, print 2 sets of the Bug Photos).
- 2. Explain to students that they will be studying all sorts of bugs, insects, and spiders. Ask them to share what they know about insects and spiders. Let students know that all around the room are pictures of different kinds of bugs and invite them to find one picture each.
- 3. Ask students to find a partner and describe their bug to their partner without showing them the picture. Encourage them to talk about the bug's body parts, colors and any features they can see.
- 4. Ask the class if anyone knows the difference between insects and spiders. On the board, write the headings "Insects" and "Spiders" and have the students place their pictures under the appropriate heading.
- 5. Discuss student's choices for placing bugs in each category ensuring that you review the following information while doing so:

INSECTS	SPIDERS
Have six legs	Have 8 legs
Have 3 body parts: head,	Have 2 body parts:
thorax, and abdomen	cephalothorax, and abdomen
Have 2 eyes and 2 antennas	Have 8 eyes and spinnerets
Have their skeletons on the	Have their skeletons on the
outside (exoskeleton)	outside (exoskeleton)

Part 2

- 1. Provide egg cartons (cut into segments of three) to students and have student write their names on the inside of the cut egg cartons.
- 2. Cover the desks with newspapers and set out various colors of paint with paintbrushes.
- 3. Distribute the three-cupped egg cartons and ask students to think about what kind of bug they want to make. What will their bugs look like? What color? Will they have stripes or

spots? How will they move? Will they have wings? What type of environment will they live in?

- Send students back to their desks and invite them to paint the three body parts of their bug any way they like, leaving time for paint to dry. (Note: If they decide they'd rather create a spider, tell them to remove 1 segment of the egg carton)
- 5. Have students then add eyes, legs and other structural features of their choosing. Provide students with time to decorate their bugs.

Part 3:

- 1. Once their bugs are completed, have students gather and ask students the following, "Where do you typically find bugs?"
- 2. Place the Bug Habitats photos on the board. Discuss various habitats for bugs and ask students to identify which habitat their invented bug be best suited for and why.
- 3. Discuss what adaptation means. Use the Bug Photos as examples and have students try to identify which habitat they may be found in. Next, ask students to identify which adaptations that they can see on their invented bugs or behaviors they know their animals have and ask them to choose which habitat their bug would prefer.
- 4. Have each student present their bugs to the class and state what habitat they felt was best suited to their bug. Have students share at least one adaptation (structural feature) they gave their bug and why.

Extension Activities:

- Provide students a blank Invent an Bug sheet on which they can draw and write more information about their bug and its adaptations.
- Ask students to find a real bug found in nature that closely resembles their invented bug.
- Now that students have a perspective on bug habitats and adaptations, take them
 outside and see what bugs students can discover in their school yard or neighborhood.
 Use clear plastic containers to catch and observe the bugs with magnifying glasses, then
 release them where they were found. Additionally, students can use iPada or mobile
 devices to take pictures and bring them to class.



Intermediate: Invent a Bug!

Students will learn to recognize bugs by identifying common characteristics and structures and investigate how their adaptations help them to adapt to their environment.

Subject Levels/ Suggested Grade

Science 4-7

Art Education 4-7

Written by Sabrina Bhojani, Education Specialist 2020-2021

Intermediate Lesson Plan: Invent A Bug!

Teacher Background

In this lesson, students will learn to recognize bugs by identifying common characteristics and structures. Students will also look classifying bugs into various categories (such as spiders and insects) and investigate how their adaptations help them to adapt to their environment. Students will gain an appreciation for diversity of bugs and create an artistic work by using ideas inspired by imagination, inquiry, experimentation, and past observation.

	Curricular Competencies	Content Connections		
Subject &	Students are expected to be able to do the	Students are expected to know		
Grade Level	following:	the following:		
SCIENCE 4-7	 Questioning and Predicting Demonstrate curiosity about the natural world Observe objects and events in familiar contexts Identify questions about familiar objects and events that can be investigated scientifically Make observations in familiar or unfamiliar contexts Planning and Conducting Make observations about living and non-living things in the local environment Collect simple data Observe, measure, and record data, using appropriate tools, including digital technologies Processing and Analyzing Data and Information 	Grade 4 • sensing and responding: — humans — other animals — plants • biomes as large regions with similar environmental features Grade 5 • basic structures and functions of body systems • First Peoples concepts of interconnectedness in the environment Grade 6 •		
	 Experience and interpret the local environment. Demonstrate an openness to new ideas and consideration of alternatives Communicating Express and reflect on personal or shared experiences of place 			
	• Communicate ideas, explanations, and processes in a variety of ways	Grade 7 •		
ART 4-7	 Exploring and Creating Choose artistic elements, processes, materials, movements, technologies, tools, techniques and environments using combinations and selections for specific purposes in art making Create artistic works collaboratively and as an individual using ideas inspired by imagination, inquiry, experimentation, and purposeful play Reasoning and Reflecting Develop and refine ideas, processes, and technical skills in a variety of art forms to improve the quality of artistic creations Reflect on creative processes and make connections to other experiences Connect knowledge and skills from other areas of learning in planning, creating, interpreting, and analyzing works for art Communicating and documenting Interpret how symbols are used through the arts Express feelings, ideas, stories, observations, and experiences through the arts 	 visual arts: elements of design: line, shape, texture, colour; principles of design: pattern, repetition personal and collective responsibility associated with creating, experiencing, or sharing in a safe learning environment 		

Materials

- Teacher Handouts:
 - Bug Photos
 - Bug Habitat Photos (Note: adapted with permission from the California Academy of Science resources)
- Student Handouts:
 - Invent a Bug Worksheet
- Art Supplies
 - Various recycled materials
 - Colorful markers
 - Glue
 - Clear tape
 - Scissors

Procedure

Part 1

- 1. Request students to bring in a variety of recycled materials to create a unique bug.
- 2. Spread the pre-printed Bug Photos around the class. Use as many photos as there are students in the class (e.g. If you have 30 students, print 2 sets of the Bug Photos).
- 3. Explain to students that they will be studying all sorts of bugs. Ask them to share what they know about insects and spiders. Let students know that all around the room are pictures of different kinds of bugs and invite them to find one picture each.
- 4. Have students move into two lines so that students are facing one another. The person that they are facing is their partner. Ask students describe their bug to their partner without showing them the picture. Encourage them to talk about the bug's body parts, colors and any features they can see. See if the students can identify and guess the name of their partner's bug
- 5. Have one line of students move one person over, so that each partner has a new partner. Ask them to once again aim to guess the bug based on their partner's description.
- 6. Repeat step 3 and 4 until all students have partnered with everyone in the line-up opposite to them.

Part 2

- 1. Ask the class if anyone knows the difference between insects and spiders. On the board, write the headings "Insects" and "Spiders" and have the students place their pictures under the appropriate heading.
- 2. Discuss student's choices for placing bugs in each category.
- 3. Copy the following chart, asking students to complete it.

	INSECTS	SPIDERS
NUMBER OF LEGS		
NUMBER OF BODY SEGMENTS		
FEATURES SPICIFIC TO THE ORGANISM		
SKELETON		

- 4. Ask students to think about what kind of bug they want to make. What will their bugs look like? What color? Will they have stripes or spots? How will they move? Will they have wings? What type of environment will they live in? How will their physical structures make them well adapted for their habitats?
- 5. Provide students with a copy of the Invent a Bug worksheet and let them know they should begin planning their unique bugs and complete the worksheet. Tell them to add eyes, legs and other structural features of their choosing but think of a rationale for why the structures would be beneficial adaptations.
- 6. Have students use the art supplies to create a 3-D version of their invented bug.
- 7. Have each student present their bug to the class and what adaptations their bugs feature.

Extension Activities:

- Conduct a four-corner activity and ask students to move to a corner of the room that matches their invented bug with one of the following signs: Flies, Swims, Crawls, Jumps. Ask students in each group to speak to others and see what physical characteristics would be shared between organisms that share the same mode of locomotion.
- Have students create a "Guess Who" game using the various bug photos provided.
- Ask students to find a real bug found in nature that closely resembles their invented bug.
- Ask students to list similarities and differences between the two bugs by using a simple Venn diagram including food, predators, habitat, method of locomotion
- Ask students to use iPads or mobile devices to take pictures of unusual bugs and bring them to class to identify and classify.



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"Orange spider" by Wanderin' Weeta is licensed under CC BY-NC-ND 2.0



Name:				

Date: _____

Invent a Bug

Using the space provided below, draw a picture of your bug. Label the bug's major body parts including head, legs, thorax/abdomen or cephalothorax, as well as eyes, antennae and/or wings (if any).



HABITAT:

Where does my bug live?

FOOD:

What does my bug eat? How does it find food?

LOCOMOTION:

How does my bug move?

PREDATION:

What can eat my bug? How can my bug escape predators?

SPECIAL ADAPTATIONS:

What are some things that make my bug special? What are the advantages to these "special" traits?





windy beaches

Food Sources

nectar from flowers, other arthropods, dead plants, dead animals



Habitat

on or in another animal

Food Sources

blood, other arthropods, dung, decaying matter

Yellowstone NPS



dark caves

Food Sources

soil, dung, other arthropods, worms and grubs, decaying matter

©matthewvenn



Habitat

dry deserts

Food Sources

leaves, nectar from flowers, dead plants, dead animals, other arthropods

©Jim Dollar



fallen treelog

Food Sources

wood, worms and grubs, dead animals, other arthropods

©monkeypuzzle



Habitat

fruit tree

Food Sources

leaves, fruit, other arthropods, nectar, dead plants, dead animals

©Daniel Piraino



forest floor leaf litter

Food Sources

decaying plants, soil, worms, grubs, other arthropods

©James E. Petts



Habitat

cold mountains

Food Sources

dead animals or plants, nectar and pollen from flowers, dung

©Martin LaBar



fresh waterpond

Food Sources

leaves, other arthropods, soil, dead plants, dead animals, dung

©gideonc



Habitat

under rocks

Food Sources

dung, worms and grubs, soil, decaying matter

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