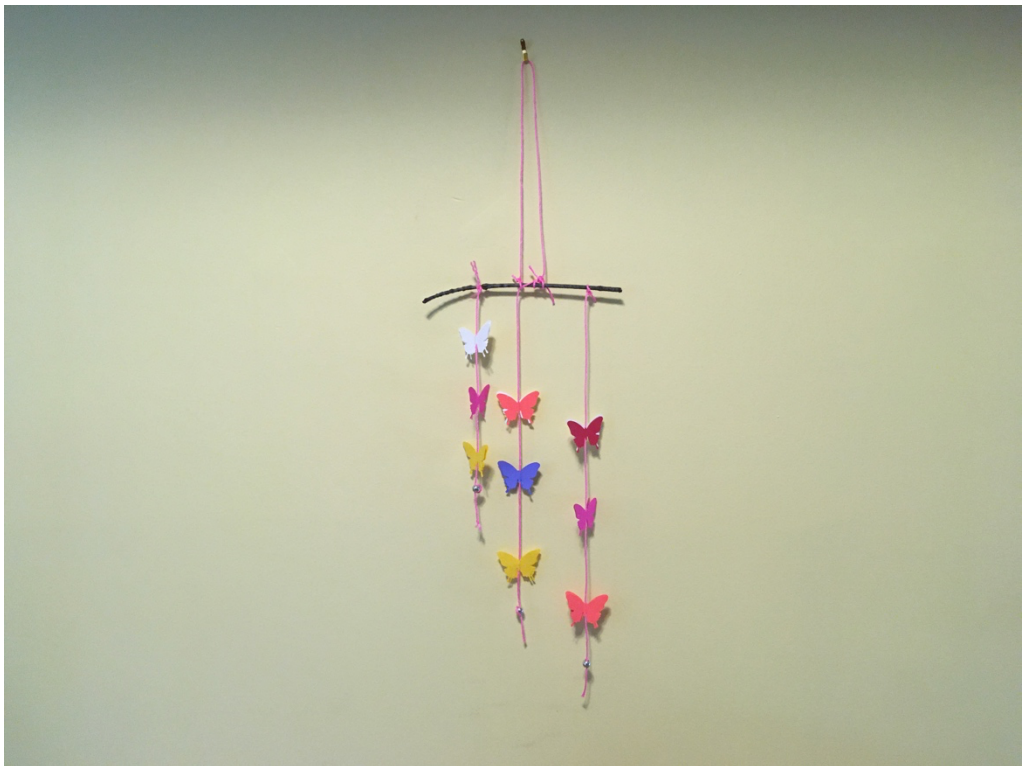
**Butterfly biodiversity**
**Grade 6**

**A FACILITATOR'S GUIDE**



*Developed by Sue McKee for Let's Talk Science in Ottawa*

**Thank you for volunteering for Let's Talk Science! The following manual will help guide you through the workshop. Please read this manual before visiting the group you are working with.**

**Let's Talk Science in Ottawa, University of Ottawa and Carleton University**
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## Introduction & Guidelines

- This manual is meant as a guide to help you prepare for your activity. The introduction includes questions that get at the curriculum link/science concept the workshop covers. You are not expected to memorize this manual. It is a guide and we want you to bring your own experiences and your style of teaching into it.

- As a general guideline, do not speak longer than the age of the students at one time.

- Most workshops fit well in a 1-hour time period but some like bridge building or some high school activities are a little longer.

- Practice your introduction and test out the activities beforehand so you can anticipate sections that may take more time or may be difficult for students.

- If you are working with a partner, work out roles and responsibilities before the visit.

## Safety

As a Let's Talk Science volunteer, safety must be foremost in our minds during all activities. As STEM role models, volunteers must always also model safe science practices.

Always keep in mind the following precautions:

- Emphasize and demonstrate appropriate safety procedures throughout the presentation.
- Be professional but have fun.
- Keep workspaces clean to avoid tripping hazards.
- Allergens should have been checked before reserving the kit (e.g. allergies to latex).
- Activity Specific Safety: na

## WHMIS

An overview of Canada's Workplace Hazardous Materials Information System (WHMIS) is included in these materials at the end of this manual where needed. No WHMIS sheets are included with this activity.

# Overview of the Workshop

## Grade Level and Curriculum Learning

**Grade 6:** *Biodiversity includes diversity of individuals, species, and ecosystems. Classification of the components within a diverse system is a beginning point for understanding the interrelationships among the components. Because all living things are connected, maintaining diversity is critical to the health of the planet. Humans make choices that can have an impact on biodiversity.*

## Materials if we are dropping materials off to the school

| |
|---|
| 18 paper butterflies per student (3 of each colour of cardstock – already printed) |
| 4 pieces of string each about 10 inches long per student |
| 1 straw (to use as a stick) per student |
| 3 beads per student |

Students need glue and a pencil/pen/pencil crayons if they want to decorate their butterflies
Video Clip link to Youtube

## Materials students need if we are not dropping off materials to the school

| |
|---|
| 18 paper butterflies per student (we have a template or you can show them how to draw a simple butterfly); or a piece of paper to draw the butterflies |
| 4 pieces of string, ribbon, yarn, etc. each about 10 inches long per student |
| 1 small stick from outside or a skewer per student |
| 3 beads with holes or something with a bit of weight to go at the end of each string per student |
| Glue or tape |

## Timing of the Workshop

| | Approx. Time | Description |
|---|---|---|
| **Introduction** | 10-15 minutes | Introduce yourself and use the guided introduction included the energy pyramid |
| **Activity** | 15 minutes | Making the mobile |
| **Greenhouse tour video** | 10 minutes | Butterfly show clip. |
| **Wrap up** | 10 minutes | Human impacts and what we can do |

## Activity

***Note:*** *The* ***questions*** *you might ask are in* ***bolded blue font****. Some things you might say are in blue font and the possible answers are in square brackets in black font. Actions are in purple font.*

### Introduction

Hi everyone! Each of you introduce yourselves: I'm a Let's Talk Science volunteer and a student at the [university name you are studying at]. I study [simple terms] _____ because [when I was your age I loved… I think it's important to… I'm curious about…].

Ask the teacher if she/he can pick students to answer questions as you ask them. Also, you might not be able to hear the answers so the teacher might have to repeat the answers. If you cannot see the students because the camera doesn't extend to where they can see you on a screen, you'll have to rely on the teacher to know if the students are ready for the next step.

We're going to do a quick chat on biodiversity, learn a little about butterfly biodiversity and classification of butterflies, and then combine biodiversity and art making a butterfly biodiversity mobile. Lastly we'll watch a little clip from this year's Butterfly Show that was held at Carleton University.

**What does biodiversity mean to you?** [simply 'bio' means living and 'diversity' means differences – these can be physical differences and/or genetic differences (differences in DNA); the variety of life on earth and how everything is connected].

**Why is it important to protect biodiversity?** [respect for other living things/organisms/species, but if that isn't enough protecting biodiversity is advantageous to humans]

About 12% of butterfly and moth species in Canada are at risk of going extinct. In Canada there are 35 species of butterflies and moths that are on the Species at Risk list. Monarchs are one of them. Butterflies and moths are found in all 10 provinces more in the southern parts of the provinces, they have been recorded as far north as the Northwest territories.

**Why are butterflies important?** [various answers] Butterflies are living things and all living things should be respected as we all play a role in the balance and variety of life on earth. Butterflies are also indicators of healthy ecosystems – ones where everything is in balance. Areas with a lot of butterfly diversity also have a high number of other species. Many species of butterflies require a specific type of plant to lay their eggs and so butterfly biodiversity can also be an indicator of plant biodiversity. Monarchs for example lay their eggs on Milkweed because that is the plant the caterpillar needs to feed on. As adults the butterfly can feed on many species of plant but as a caterpillar the Monarch needs the milkweed plant. Butterflies are pollinators but not as important as bees are to pollinating our crops and other plants. Butterflies are used in research like climate change research in order to help us understand where problems for species are happening.

Scientists love to group or classify living things by their similarities and differences. **Can anyone think of any characteristics of humans that is the same as butterflies?** [various answers;

they might say we are both living things and someone hopefully will say we are both animals]. That's right we are both animals or in the Kingdom Animals/animalia.

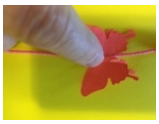
**Show Slide 1 Here's how humans and butterflies compare. Keep the slide up but use the paragraph below to go through this quickly. Classifying is part of the curriculum link but not at the level of detail on the slide.**
Butterflies and humans are both made of multiple cells that have a nucleus – that's where our DNA is stored so we are in the same Domain and we are both animals. But that's where our similarities end more or less. We are vertebrates (with a backbone and we have a nerve cord) and insects are invertebrates with no backbone or nerve cord. We are mammals and butterflies are insects. We are primates having specialized vision and large brains. Butterflies and moths have scales on their wings. That's why we have to be careful picking them up. The scales help them with flight and regulating their heat and are easily brushed off when we pick them up. Then we get into the really specific as we further identify the genus and species.

**What's the difference in a butterfly and a moth?** [various answers] Most butterflies keep their wings up when resting and moths have their wings spread flat when resting. Most butterflies have clubbed antennae (bumps on the end of their antennae) and moths have fuzzy or feathery looking antennae. Most butterflies fly in the day and moths fly in the night and butterflies in general are more colourful than moths. Let's see if we can tell which are moths and which are butterflies.

**Show Slide 2**
Which is a butterfly and which is a moth? [A and D are butterflies (clubbed antennae and wings up when at rest); B and C are moths (fuzzy/feathery antennae and wings down when at rest)]

Let's start making our biodiversity butterfly mobile, then we'll watch a clip from the Butterfly Show this year, and lastly we'll talk about the impacts humans have on butterflies and what we can do to help.

**Show them how to make the first string of butterflies using the directions below. Be sure they can see what you are doing (they don't need to see your face)**



1. Cut out your 18 butterflies. They are different colours but you can put different patterns on them with pencil crayons or pencils if you want to make them more diverse.
2. Take one bead and slip it through one piece string like the photo or tie it instead.
3. Take that piece of string and choose 2 butterflies to start.
4. Take one paper butterfly and put glue down the centre and place it along the string.
5. Put glue down the centre of a second paper butterfly and place it over the first one.
6. Repeat until you have 3 butterflies on the one string.
7. Repeat steps 4-7 twice so you have 3 strings of butterflies.
8. Tie each string to the stick trying to balance the strings across the straw.
9. Tie a fourth string to the top of the stick in a loop (a triangle shape helps to balance the stick) and hang your mobile. If it isn't balanced, slide the strings until it hangs straight.

Now that you have made a butterfly biodiversity mobile let's take a look at the diversity of butterflies in the greenhouse this past year at Carleton University's Butterfly Show.

Get the teacher to play the video.

## Wrap-Up

**How do humans impact ecosystems and the energy flow and species within the ecosystems?** [various answers; mainly we destroy species habitats, we sometimes remove species that are important to many others and break the energy flow, etc. some examples below] With butterflies and other pollinators, it is the pesticides that are one (but not the only) threat.

- Residential and commercial development (e.g. building malls, houses, etc.)
- Overfishing (taking too many fish at one time)
- Over harvesting (e.g. when we find a plant that has medicinal properties we often pick too many - like a plant called ginseng which is now threatened with extinction in Canada)
- Pollution (plastics, oil spills, chemicals from factories, car exhaust, plane exhaust, etc.)
- Forestry
- Agriculture – changing land from a forest or a meadow to a place to grow food or feed cattle; use of pesticides/pollution is also a huge threat for some pollinators
- Introducing invasive species – species that can out compete other species native to the area (Zebra mussels, buckthorn (plant)
- Transportation (building roads)
- Climate change

**How can we help protect ecosystems and biodiversity?** [we can walk or bike instead of using our cars; recycling is good but if we can reuse something it's even better; we can fly less; we can pay attention to packaging and purchase things with less packaging; we can try to eat a little less meat where this is an option; we can stop polluting and especially for butterflies and bees and other pollinators, we can stop , or use fewer pesticides; stop using single use plastics, etc.]

***NB**: If you have extra time, you can ask if they have any questions about university or being a student or about your research.*

Thank you for having us in your class today!