Instruction Manual – School

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DNA barcode 'em all!

Welcome to BugQuest!

This manual contains everything you need to successfully complete your BugQuest! Inside, you will find step-by-step instructions for setting up your trap, collecting your insects, and returning your bottles so they can be DNA barcoded. By following these instructions, you and other participants across Canada will help us learn more about our national insect biodiversity while making the most out of your BugQuest experience.

Quest Kit Contents:

Collection bottles pre-filled with salt

External sticker & internal paper labels

- **Instruction Manual**
  - ❑ General Timeline & Key Dates
  - ❑ Site Selection Guide
  - ❑ Preparation Guide
  - ❑ Trap Set-up Guide
  - ❑ Collection Guide
  - ❑ Shipping Guide

- **Malaise Trap Kit**
  - ❑ 1 Malaise trap tent
  - ❑ 1 long tent pole
  - ❑ 1 short tent pole
  - ❑ 9 support ropes
  - ❑ 16 metal tent pegs
  - ❑ 1 trap carrying bag

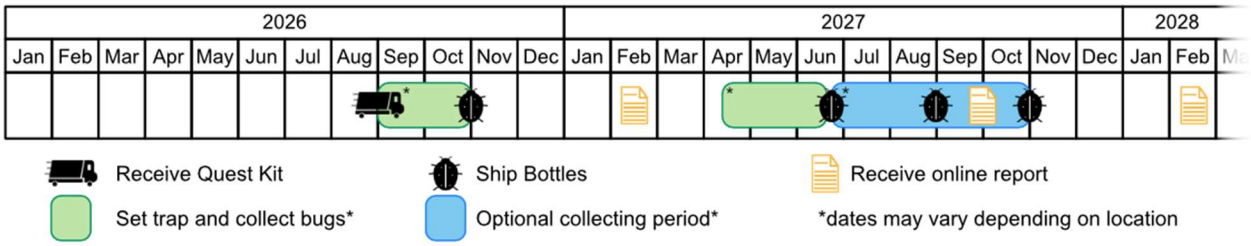
- **Collection Equipment**
  - ❑ Collection bottles, pre-filled with table salt, 1 per week
  - ❑ External sticker labels
  - ❑ Internal paper labels
  - ❑ Collection Log Sheets
  - ❑ Pencils
  - ❑ Flagging tape
  - ❑ Reusable cable ties
  - ❑ *BugQuest: Science in Progress* sign

- **Return Shipping Materials**
  - ❑ Pre-filled return mailing waybills
  - ❑ Shipping boxes and/or envelopes
  - ❑ BugQuest address stickers
  - ❑ Large plastic bags

What you'll need:

- ❑ Tap water
- ❑ Marker
- ❑ Tape
- ❑ Freezer or refrigerator
- ❑ Paper towel (or other absorbent material)

General Timeline & Key Dates



Key Dates

Fall 2026

- **Receive Quest kit, set-up trap, and begin collections:** Early September
  - *Deadline to begin collections:* **September 25, 2026**
- **Weekly bottle collections:** September-October
- **Ship bottles back**: End of October
  - *Deadline to ship collection bottles:* **November 06, 2026**
- **After final collection**: Pack up the trap and store the Quest Kit until Spring

Spring 2027

- **Set-up trap and begin collections:** April-May
  - Trap set-up is determined by local temperatures (daytime temp above 10°C).
  - *Deadline to begin collections:* **May 28, 2027**
- **Weekly bottle collections:** April-June
- **Ship bottles back:** end of June
  - *Deadline to ship collection bottles:* **July 02, 2027**
- **After final collection**, you have the following options:
  1. Pack up the trap and return the Quest Kit to the BugQuest Team (you may include the last collection bottles in this shipment)
  2. Pack up the trap and store the Quest Kit until Fall 2027 to restart the collection
  3. Continue collecting throughout the summer (trap can be relocated)

Site Selection Guide: Where Should Your Trap Go?

Once your Quest kit arrives, it's time to become an insect explorer! One of the most important steps in BugQuest is choosing the right place to set up your Malaise trap. Where you place your trap will affect what insects you collect, so take time to explore and choose wisely.

💡 **Quest Tip** – Make sure you have all the proper permissions/collecting permits to set up the trap in the property you're considering (i.e. from landowners, site managers, etc.)

Before setting up, walk around your community, schoolyard, or natural area and look for different habitats. You might be surprised by how many ecosystems are nearby! This is a great opportunity to observe nature, map habitats, and think about how people and wildlife share the environment – all important parts of your learning.

Accessibility: Easy to Reach, Safe to Stay

Your trap needs to be checked at least once a week, so choose a spot that is easy to access and safe to visit regularly. School grounds often work well, as long as the trap won't be in the way of sports, playground activities, or lawn maintenance.

Students are naturally curious, and interest in the trap is encouraged. However, consider the risk of accidental disturbance or vandalism. If this is a concern, an alternative secure location – such as a teacher's private property – may be used, as long as it meets program requirements.

Environment: Think Like an Insect

Now look closely at the habitat around your chosen spot. Insects are more active in certain areas, and your local knowledge will help you decide what's best. Great places for a Malaise trap include the edge of a wooded area, near a stream, or beside a garden.

Your trap will work best when placed on flat ground with short plants around it. Tall grass or thick vegetation near the trap opening can block insects from flying in, which means fewer insects to study.

Trap positioning: Catching the Insect "Highway"

Insects often move along natural "flight pathways", such as open corridors in vegetation or animal trails. Invite participants to look for these pathways and think about how insects travel through their environment.

Position the trap so that the middle panel blocks the flight path, guiding insects upward into the collection bottle. This hands-on setup helps students understand how the trap works and reinforces concepts related to animal movement and behaviour.

By thoughtfully selecting and positioning your Malaise trap, you will be working together to support meaningful data collection while building skills in observation, inquiry, and environmental stewardship.

Preparation Guide

What you'll need:

- ❑ Collection bottles (pre-filled with table salt)
- ❑ External sticker labels
- ❑ Internal paper labels
- ❑ Pencil
- ❑ Marker
- ❑ Tap water (~300mL/bottle)

Bottle preparation:

The saltwater mixture will help preserve the DNA from the insects.

1. Make a saltwater mixture by adding ~300mL of tap water to a collection bottle (~300mL=10cm/4 inches). Use the measurements on the side of this page for reference. Close the lid tightly and shake for 30 seconds to dissolve the salt.

2. Labels are provided in batches of 10, so you may have more labels than bottles; any unused labels can be discarded. Cut out individual **internal paper labels**.

3. Attach the **external sticker label** to the bottle with the matching **internal paper label** slid slightly underneath (see the image below). The Internal paper label will later be placed inside the bottle. Make sure the BQ# on both labels are the same.

External Sticker Labels

BUGQUEST Store sample at -20°C! Sample # BQ#00003
Collector: Dates: - Province: Locality: Notes: Lat: Lon: Elev:

BUGQUEST Store sample at -20°C! Sample # BQ#00004
Collector: Dates: - Province: Locality: Notes: Lat: Lon: Elev:

BUGQUEST Store sample at -20°C! Sample # BQ#00005
Collector: Dates: - Province: Locality: Notes: Lat: Lon: Elev:

Internal Paper Labels

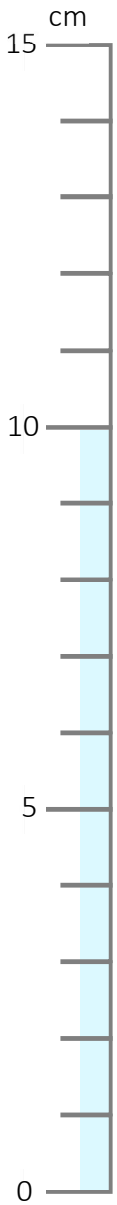
Sample # BQ#00003
Dates: -
Locality:
Notes:

Sample # BQ#00004
Dates: -
Locality:
Notes:

Sample # BQ#00005
Dates: -
Locality:
Notes:

External sticker label

Internal paper label



4. Find the bottle with the lowest BQ# and, using a permanent marker, write "week #1" on the lid and above the **external sticker label**.

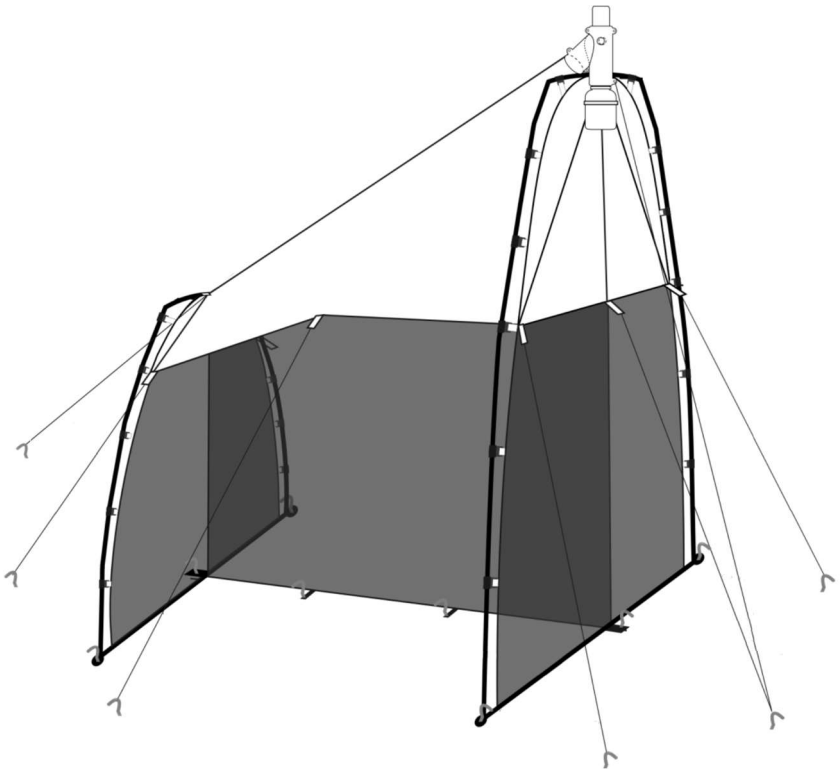
5. Repeat steps 1 to 3 for the following weeks for this sampling season.

6. Store prepared bottles away from the sunlight until they are needed.

Trap Set-Up Guide

What you'll need:

- ❑ Malaise trap kit
- ❑ Flagging tape
- ❑ *BugQuest: Science in Progress* sign
- ❑ Reusable cable ties
- ❑ Prepared collection bottle - 2 labels attached and filled with saltwater mixture



Before you set-up the trap:

1. Watch our Trap Set Up Video: https://www.youtube.com/watch?v=sU9rW71f5ZA

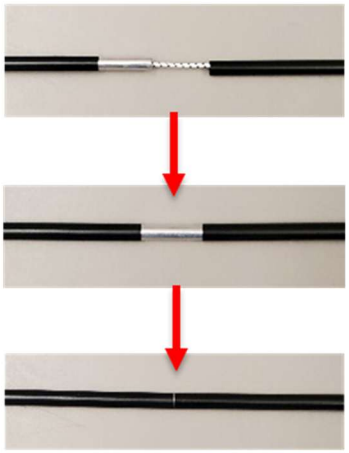
2. Based on the key dates and local weather conditions, determine the best starting dates for you and make sure you can collect the bottle on the same day every week.

Trap set-up:

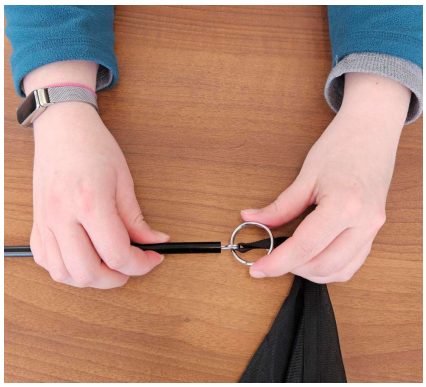
3. Bring the **Malaise trap kit** and the **prepared week #1 bottle** (see Preparation Guide and Collection Guide) to the selected site.

4. Lay the trap tent flat on the ground with the white side facing up.

5. Assemble the short and long tent poles. Ensure each segment of the poles is securely fitted to each other.



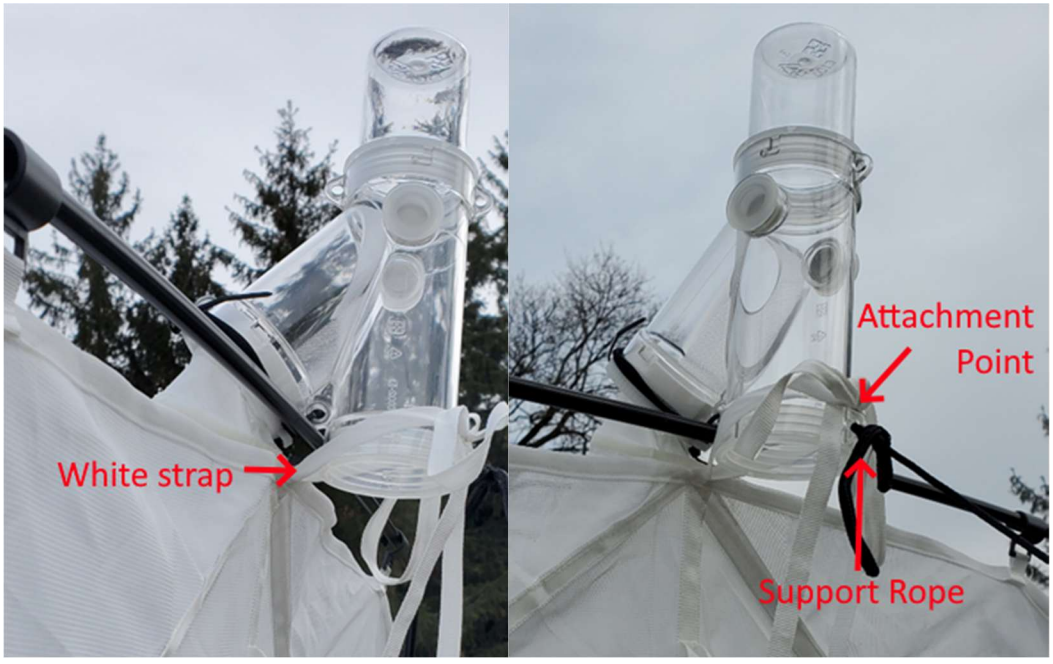
6. Start with the long tent pole and the tall end of the trap. Insert the spring pins found at the bottom corners into the pole.



7. Clip the hooks on the trap around the pole to form a mesh panel.

8. Repeat steps 6 and 7 for the short end of the trap using the short tent pole.

9. With two people, stand up both the tall and short sides of the trap. Ensure that the trap head is over the long pole and fasten it with the white strap already attached to the trap. Tie a support rope to the lower attachment point on the trap head and stake the other end of the rope into the ground with a metal tent peg.



10. At the short side of the trap, tie a support rope to the white strap loop and stake the other end of the rope into the ground.

11. Adjust the base of the trap so the trap body is fully stretched. Stake the trap to the ground using the metal tent pegs (8 pegs total), ensuring the 2 attachment points in the middle panel are also staked down. See images and diagram below.

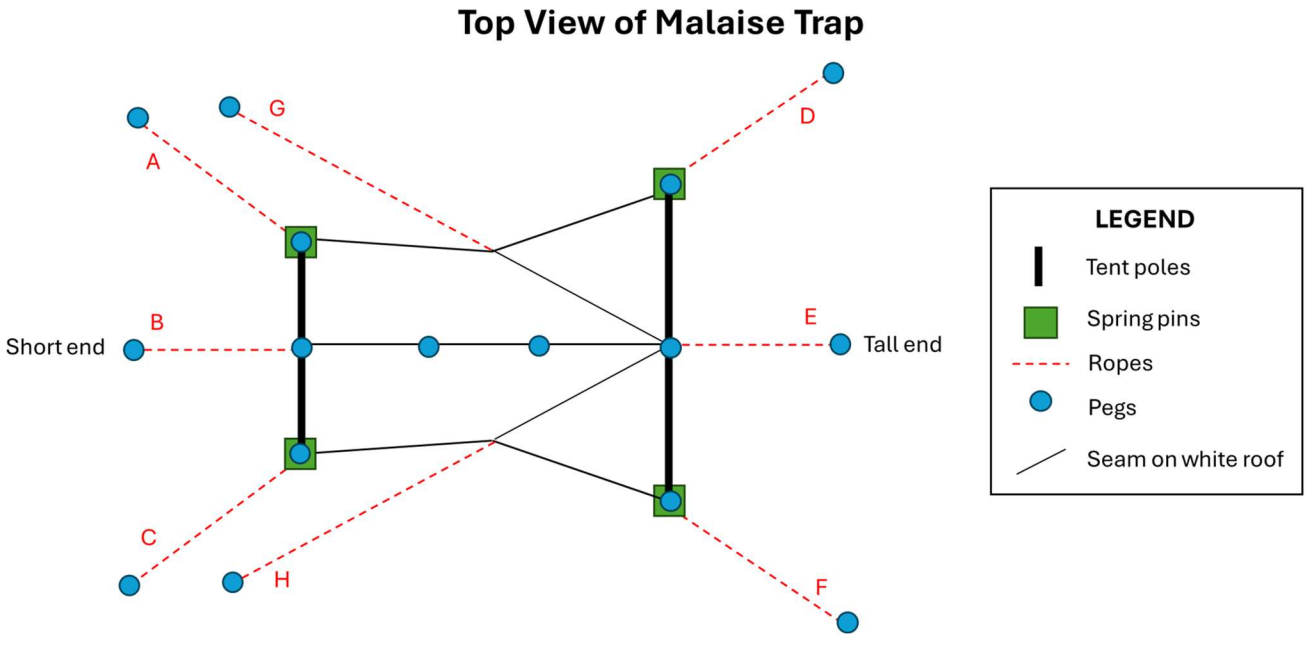
12. Attach the remaining support ropes and adjust them to achieve proper trap shape and tension (8 ropes total). Secure the support ropes to the ground with the metal tent pegs.

    See the diagram below: there are 3 support rope attachments at the short end (A, B, & C), 3 at the tall end (D, E, & F), and 1 on either side (G & H).

    For the side support ropes, follow the white seam line along the trap roof to achieve the best shape.

    This helps funnel flying insects toward the trap head.

    💡 **Quest Tip** – If there are trees nearby, tie the support ropes to them instead of using pegs.



13. Attach flagging tape (provided) to each support rope to help prevent tripping.

💡 **Quest Tip** – If needed, place additional flagging tape around the entire trap area for visibility.

14. Once the trap is upright, attach the *BugQuest: Science in Progress* sign to the tall part of the trap (or a wall or stake) using the reusable cable ties, extra rope, or tape. You may use a hole punch to create attachment points as needed; 3-4 attachment points are recommended.

15. The Malaise trap is now set up! Take some pictures of your site and record the GPS coordinates for when you fill out the **Digital Field Collection Form** at the end of the collection season.

16. Continue to the **Collection Guide** to attach the **week #1** bottle.

💡 **Quest Tip** – Return to the trap the next day to make sure it is still standing properly and adjust if needed.

Collection Guide

What you'll need:

- ❑ Prepared collection bottle(s) - 2 labels attached and filled with salt water mixture
- ❑ Pencil
- ❑ Collection Log Sheet
- ❑ Freezer/Refrigerator
- ❑ Optional: collection bottle lid from previous week if already sampling

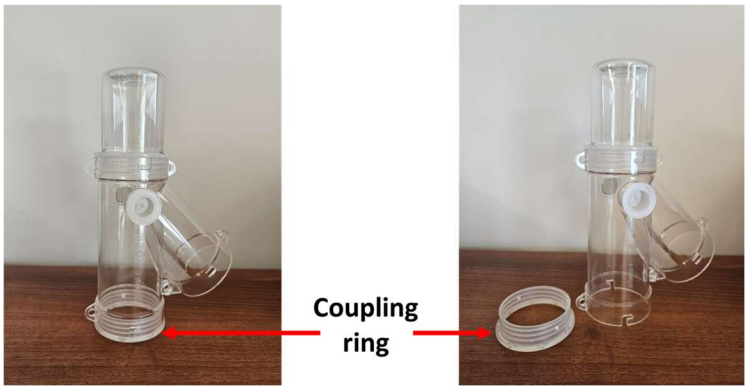
Bottle collection:

1. Select **week #1 bottle**. Write the "**Start Date**" on both the **external sticker** and **internal paper labels** using a **PENCIL**.
2. Bring the week #1 bottle to the trap, take the lid off and save it for later. Then screw the bottle onto the bottom half of the trap head and tie it to the trap with the white straps. Review the trap set-up video if needed.

💡 **Quest Tip** – Check the trap and the opening to the collection bottle **every other day** for damage, blockages, and after major weather events. Contact bugquest.canada@gmail.com if repairs or replacement parts are needed.



3. Return to the trap 1 week (7 days) later with the week #1 lid and next week's bottle. Make sure you go on the same day each week**.**
4. Carefully untie and unscrew the previous bottle and close it with the matching lid, then screw the next bottle (e.g., week #2, week #3, etc.) onto the bottom half of the trap head and tie it down with the white straps. Please ensure the coupling ring remains on the trap head and reattach if needed.



5. On the completed bottle, write the "**End Date**" on both the **external sticker** and **internal paper labels** using a **PENCIL**. Tear off the internal paper label and place it inside the bottle with the insects.

6. Now record your observations. Use the **Collection Log Sheet** (and optional poster) to note any important details or any scientifically significant events (e.g. trap was down at collection, bottle was dry, weather information, trap disturbances, etc.).

Example log sheet:

Week #	Bottle # (BQ#)	Start Date (yyyy-mm-dd)	End Date (yyyy-mm-dd)	Notes
1	BQ#00001	2026-09-14	2026-09-21	Light rain, repaired long pole
2				

The cold helps prevent the DNA from degrading, making it easier to extract.

7. **Store samples in a standard household freezer (e.g., -20°C) or refrigerator (e.g., 4°C).** Avoid exposure to heat, light, or changing temperatures. If freezer or refrigeration is not possible, contact bugquest.canada@gmail.com before making other arrangements.

8. Repeat the above steps for the rest of the collection bottles.

💡 **Quest Tip** – If you'd like to continue sampling at your site and need additional supplies, contact bugquest.canada@gmail.com before collecting your last bottle to make arrangements.

9. **At the end of the collection season**, take your trap down, remove the *BugQuest: Science in Progress* sign and reusable cable ties, and store them with the rest of your Quest Kit. You may then pause until the next season or conclude your BugQuest participation, depending on your site timeline.

💡 **Quest Tip** – Make sure your trap is dry and remove any debris before packing it back into the bag.

Shipping Guide

What you'll need:

- ❑ Pre-filled return mailing waybill
- ❑ BugQuest address sticker
- ❑ Shipping boxes/envelopes
- ❑ Large plastic bags
- ❑ Tape
- ❑ Completed collection bottles
- ❑ Completed Collection Log Sheet
- ❑ Paper towel (or other absorbent material)

Shipping address:

BugQuest Sample Submission – Ross Stewart
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Guelph, ON N1G 2W1

Return shipping:

1. Using your completed Collection Log Sheet, enter the details of the site(s) and bottles that you are shipping into **Digital Field Collection Form** — https://bugquest.fillout.com/digital_collection_form.

2. Ensure the bottle lids are secured very tightly.

3. Pack the bottles with some paper towels into a large plastic bag (provided) and then seal the bag.

4. Place the sealed bag into another large plastic bag (provided) and seal.

5. Take a picture of your Collection Log Sheet for future reference and place the sheet and the packed bottles into a single shipping box (for a max of 8 bottles) or shipping envelope (for 4 or less bottles) for safe return shipping.

💡 **Quest Tip** – BugQuest bottles must be shipped within 8 weeks of collection to preserve DNA quality.

6. Make sure you have filled out the **Digital Field Collection Form** and included your shipment details; this will notify the BugQuest team that the package is on its way.

7. **Ship your package via FedEx:**
    - Ensure that the details on the waybill are correct.
    - Stick the pre-filled FedEx waybill and a BugQuest address sticker to the outside of the package.
    - Call 1-800-GoFedEx (1-800-463-3339) to arrange a pick-up.

💡 **Quest Tip** – If you encounter any shipping issues or are unable to ship with FedEx contact the BugQuest Team (bugquest.canada@gmail.com) to discuss alternative methods.

Now that you have completed your part of the Quest, the BugQuest Team will be in touch to help you learn more about what you have discovered.

Results delivery. Samples will be processed at the Centre for Biodiversity Genomics, and results will be emailed to participants in **February 2027**. Project reports will also be made available online on our website.