

4: TOOLS OF THE TRADE



Kit Materials

A

- [Tools of the Trade station cards](#)
- [Bug Safari and iNaturalist guide](#)

B

- brushes
- paper straws

D

- magnifying loupe
- magnifying lenses

F

- petri dishes
- foam circles

Loose Items

- SAC notebooks
- aerial net
- pooters
- beating sheets

You provide

- digital device (with camera)

Preparation

- Load video: [How to Do a Bug Safari](#).

Magnified view of a house fly

Your mission today is to learn how to use research tools and become an expert at collecting arthropods.

5 min. | inside

Dream Job

Think about your ideal job.

1. In your notebook, list the tools you would need for that job.
2. Compare your list with a partner.

Share out: What types of tools do different jobs require? Why are these tools necessary?

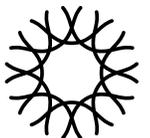
15 min. | inside

Tools of the Trade

At the California Academy of Sciences, citizen scientists like you collect organisms from nature to learn about the diversity of life on Earth. They use scientific tools to gather and examine organisms carefully.

Follow the *Tools of the Trade* station cards to practice using the collection tools. The tools will be organized into stations. Visit the tool stations in small groups. Each group spends a few minutes at each station.

- **Aerial Net:** Move your net back and forth in the air where you see flying arthropods. Twist the net a little so that whatever you catch doesn't fly out.
- **Beating Sheet:** Place or hold the beating sheet under a bush or tree branch, then gently shake or tap the plant so arthropods fall out.
- **Pooter:** Put the metal end of the tube next to an arthropod. Inhale through the straw attached to the rubber tube until the arthropod is in the jar. A small net blocks arthropods from entering your mouth. Do not share straws.
- **Brush, petri dish, and foam:** Place a petri dish close to an arthropod and use a brush to gently coax it into the dish. Place the foam gently on top to secure the arthropod in place. Avoid touching arthropods with your hands.
Note: Do not use a petri dish with live moths and butterflies because it can damage their wings. Never destroy a web to collect a spider. Instead, just take a photo.
- **Loupe and camera:** Place the loupe directly onto the petri dish so that you can look through it and see the arthropod in the center. Focus the loupe first, then hold the camera lens directly against it. Make sure the lens focuses on the arthropod before you take a photo. Shine a light sideways on your arthropod to get a better quality image.
- **Magnifying lens:** Hold the lens between your eye and the object you want to observe. Move the lens closer to or further from your eye until the object's details come into focus.



Share Out: Which tool was most difficult to use? What questions do you still have about the tools? Are there any strategies that you discovered while using the tools?

Bug Safari

Watch [How to Do a Bug Safari](#) (2 min.). Now you are ready for your first *Bug Safari*. Each time you record observations, be sure to note where you are looking.

In teams, use your tools to gently collect arthropods. Use a digital device to take photos. Then, release the animals.

Look under logs and bricks, behind sheds, under or near benches. Be sure to trade collection tools and record what you find in your notebooks. Collecting will get easier with practice.

Bug Safari keys to success:

- Be careful not to injure the animals. As scientists, it is important to treat every specimen with respect and protect life wherever possible.
- Always use tools—not your hands—to collect arthropods. Always use an empty petri dish for each arthropod.
- Return everything—dead or alive—when you are done. If your arthropod is alive, get as close as possible to the spot where it was collected. Coax it out of the petri dish onto the ground. Do not drop it from above.

Critter Chronicles

It is important for scientists to document their research experience. As a club, you will create a *Critter Chronicles* video to summarize your findings for each *Bug Safari*. Have fun with your video! Try different presentation styles and formats like a news report, talk show, or nature documentary. In Activity 11, you'll watch all of your *Critter Chronicles* videos to review what you've discovered, so be specific.

Record a 1-2 minute *Critter Chronicles* video. Make sure to:

1. Describe your procedure. Where did you go? What did you do?
2. Report on your findings. What types of arthropods did you collect? How many? Where?
3. What challenges came up when trying to collect? What strategies would you recommend for next time?



30 min. | outside



10 min. | outside
or inside

•••••
Make sure to save each video on your digital device so that you can watch them again in Activity 11.

From now on, remember to record a *Critter Chronicles* video after each *Bug Safari*.

Explore more: Next time, you'll upload your photos so that other scientists can help identify them. Watch [Observe Nature with iNaturalist](#) to see what to expect.

Call to action: Scientists are always looking to improve their techniques. Try to invent a new tool or method to help you collect arthropods.

.....

Attendance & feedback: How many youth attended? How did it go? Record notes here, then click or scan the link to let us know.

 **Explore more:**
[Observe Nature with iNaturalist](#)



How did it go?
[Let us know!](#)

