

SCIENTIFIC INVESTIGATION

This activity challenges learners to expand on their "I wonder" questions from Notice like a Naturalist by choosing one to investigate by designing and presenting a scientific investigation.

POSSIBLE MATERIALS

- Measuring implements: Ruler, thermometer, kitchen scale
- Observation tools: Binoculars, hand lens, camera
- Capture devices: Butterfly net, bug box, terrarium
- Information: Field guides, identification keys
- Anything else you can think of!

INVESTIGATION TEAMS

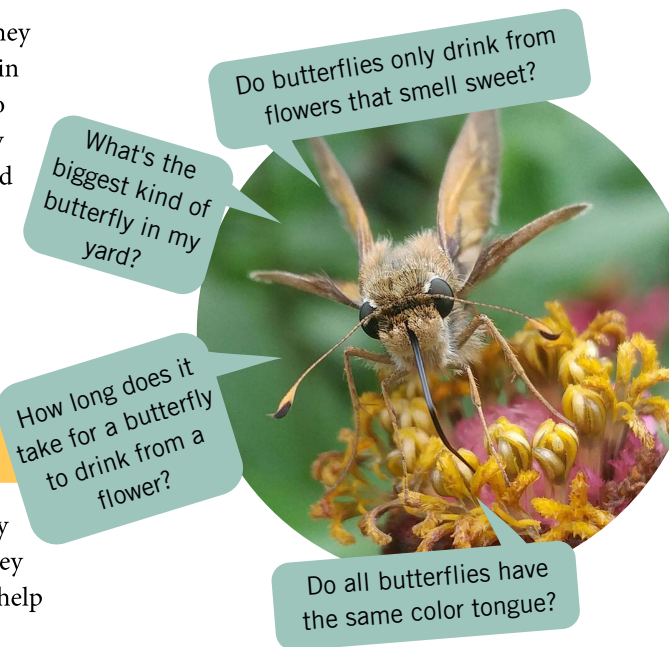
If you have more than one learner, consider compiling everyone's questions into a single list to draw from. Learners can choose to do joint or solo investigations.

ETHICAL QUESTIONS

Be sure that all testable questions posed keep the subject(s) of the investigation safe and in the same condition they were found.

CHOOSING A QUESTION

1. Gather any materials you would like to make available for your learner to use. Anything that can be used to help gather or record information is a good material. Allow your learner to find or create new materials if they choose--or challenge them to use only what you have provided!
2. As you gather materials, have your learner compile their list of "I wonder..." questions.
3. Show your learner the materials available and demonstrate how to use them safely.
4. Introduce the idea of testable and non-testable questions to your learner. Have them identify the testable questions among their list of "I wonder..." questions.
 - Testable questions: Questions we could investigate today using the tools that we have
 - Non-testable questions: Questions we could not investigate today or at all
5. Have your learner share the questions they labeled as testable. Challenge them to explain their reasoning, and allow space for them to discuss their thought process. Are there any interesting non-testable questions that could be changed to make them testable?
6. Have your learner choose their favorite testable question to investigate with the materials they have available.



DESIGNING AN INVESTIGATION

1. Ask your learner how they would go about answering the testable question they have posed. Have them take 10-15 to brainstorm a plan that includes both what they need to *have* and what they need to *do* in order to answer their question. It might help your learner to represent their plan as a numbered list or a flow chart.

The questions below can help you facilitate the brainstorming process.

- What information do you need in order to answer your question?
 - How can you collect the information you need?
 - How could your investigation change if...?
 - Do you think _____ might affect the result of your investigation?
2. Let your learner investigate! You may choose to set a time limit to keep them from getting bogged down in the details, or you can allow limitless time to investigate. Be sure they are recording any information they collect in their journal.
 3. Once your learner has finished collecting information, give them time to analyze their data. That is, have your learner use their new information to pose an answer to their question. When they are finished, have them present their findings to you!

PRESENTING FINDINGS

There are lots of ways that your learner can present their findings. Consider having them create a graph, poster, video, or other work.

WHAT'S NEXT?

Do you have any new questions now that you have completed your investigation? What would you have done with more time? What did you learn from the investigation process? What questions do you still have? Where can you find out more about what you investigated? The possibilities are endless!



Share your findings with us by tagging us on Facebook (@GSMITremont) or Instagram (@tremontinstitute)!