

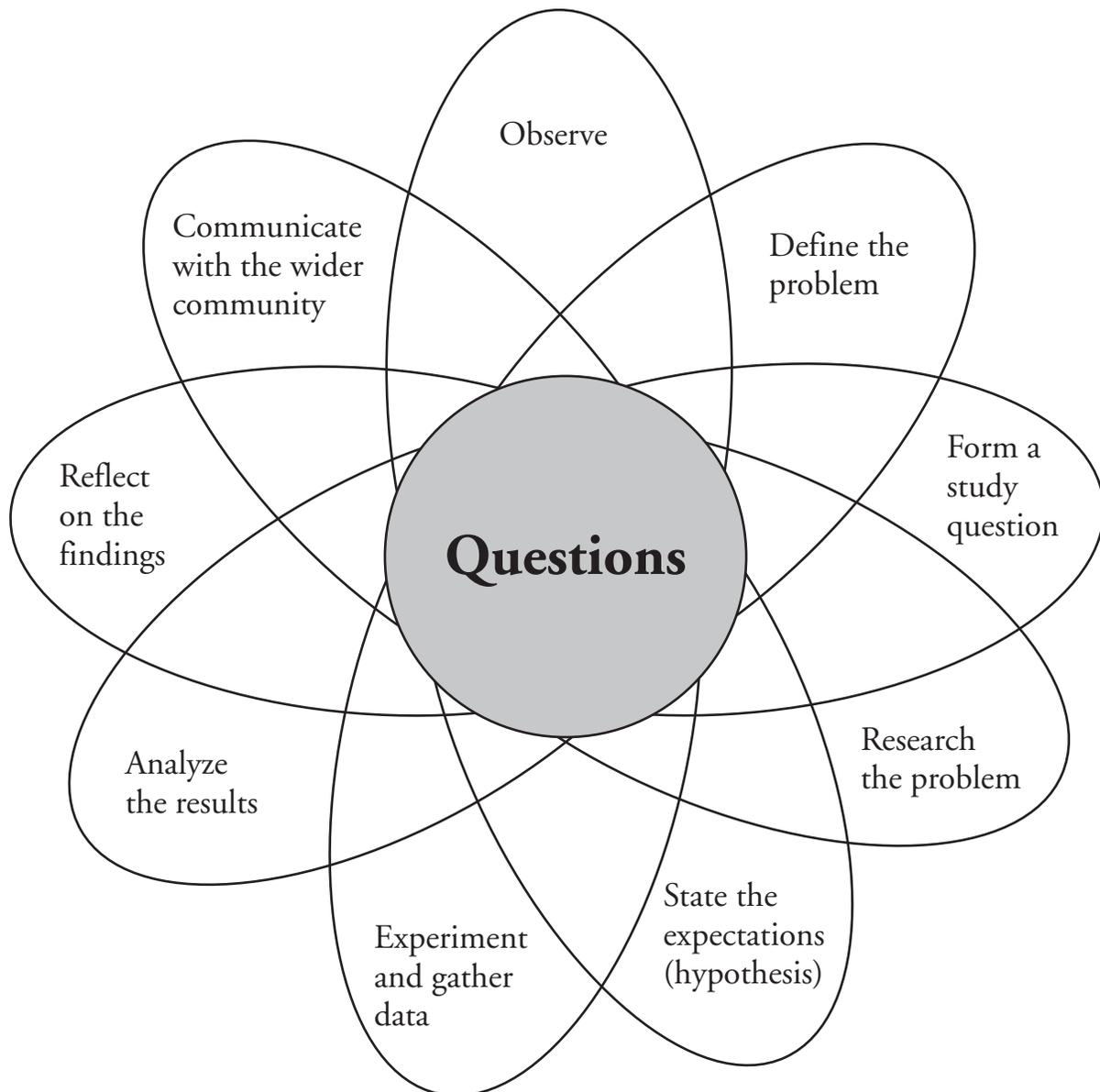
Scientific Inquiry

What do scientists do?

Why?

Science is a unique way of learning about the natural world. Scientists work hard to explain events, living organisms, and changes we see around us every day. Model 1 depicts typical activities or stages scientists engage in when conducting their work. The design of the model shows how various steps in scientific inquiry are connected to one another. None of the activities stands alone—they are all interdependent.

Model 1 – Scientific Inquiry



1. What is the central theme of all scientific inquiry as shown in Model 1?



2. What are the nine activities that scientists engage in as part of scientific inquiry?

3. Which of the activities would require a scientist to make some observations?

4. Which of the steps would require a scientist to gather data?

5. Considering the activity described as “communicating with the wider community,” in what ways might a scientist communicate?

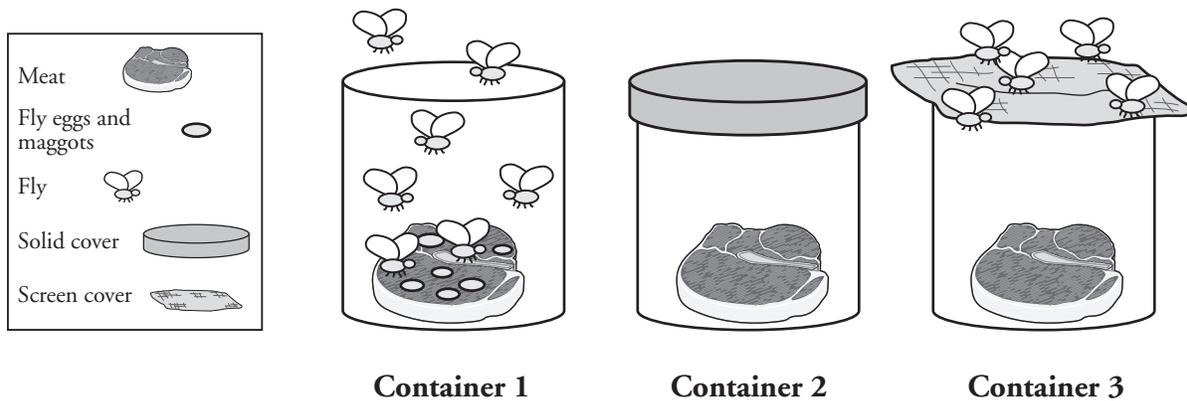


6. Remembering that scientists often work in teams, which activities would require a scientist to communicate with others?



7. Given your responses to Questions 1–6, do you think these activities must be carried out in a specific order or can multiple activities be carried out at the same time? Justify your response by giving examples to support your answer.

Model 2 – Redi’s Experiment



The table below represents the ideas the Italian scientist Francesco Redi (1626–1698) might have had as he was carrying out his experiments. The questions that follow the table relate to the process Redi may have used.

| | Scientific Inquiry |
|--|--------------------|
| Discovery of flies and maggots on a piece of meat. | |
| Where did the flies and maggots come from? | |
| Are the maggots and flies “related”? | |
| Gather information about the origins of flies and maggots. The year is 1668 and no scientific studies are available, but the common belief is that living things such as flies can be generated from nonliving things, such as rotting meat. This belief is known as <i>spontaneous generation</i> . | |
| Does meat spontaneously generate flies and maggots? | |
| If I leave a container of meat open and seal another container, then both should create flies and maggots. | |
| Set up two containers with meat; one will be open and one will be covered. Leave them for several days. | |
| Flies and maggots are found in the jar with no cover (1) but not in the covered jar (2). | |
| Was the reason for no flies in the second jar due to the “bad air” being sealed in the jar, which stopped the flies and maggots from being generated by the meat? | |
| Run the experiment again adding a third jar with a fine mesh cover. Flies and maggots are only found in the open jar. | |
| Flies lay eggs on the meat, which hatch into maggots, which become flies. | |
| Flies lay eggs on the meat, which form maggots which become flies. | |

8. What year did Redi carry out his experiment?

9. *a.* Describe the accepted theory during Redi's time explaining the origin of the flies.

b. What was this theory called?

10. How many experiments/jars did Redi set up the first time?

11. What was the purpose of having one jar left open and the other one sealed?

12. Why did Redi carry out another experiment with three jars?

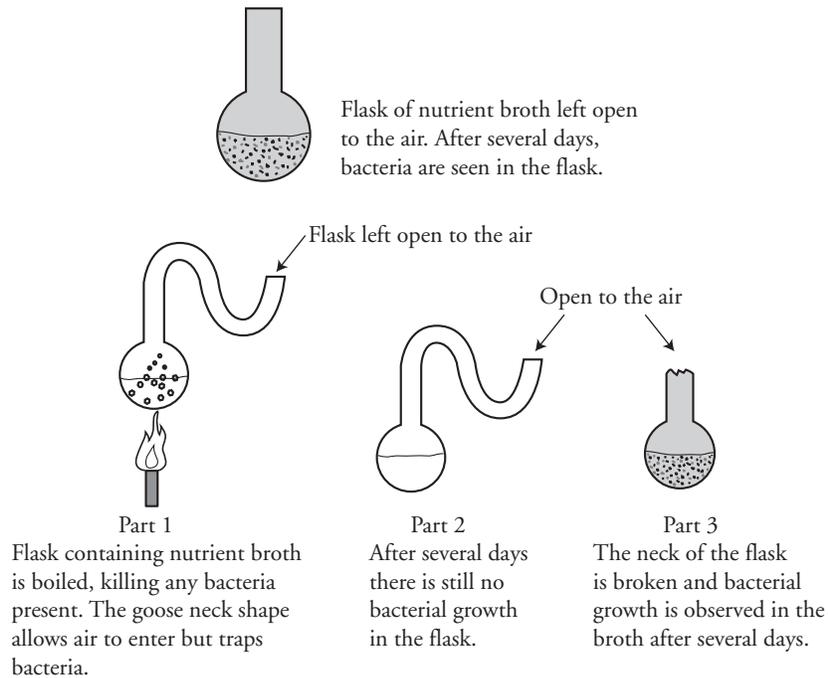


13. Using the nine activities from Model 1, complete the table in Model 2 for each of the processes Redi completed in his investigation.



Extension Questions

Model 3 – Pasteur’s Experiment



14. Study the diagrams above of another famous experiment by French chemist and microbiologist Louis Pasteur (1822–1895), which fully refuted the idea of spontaneous generation. Create a table similar to the one in Model 2 to outline the experimental processes that Pasteur carried out.

15. Had you been Louis Pasteur what would have been your reflections and conclusions based on this experiment?