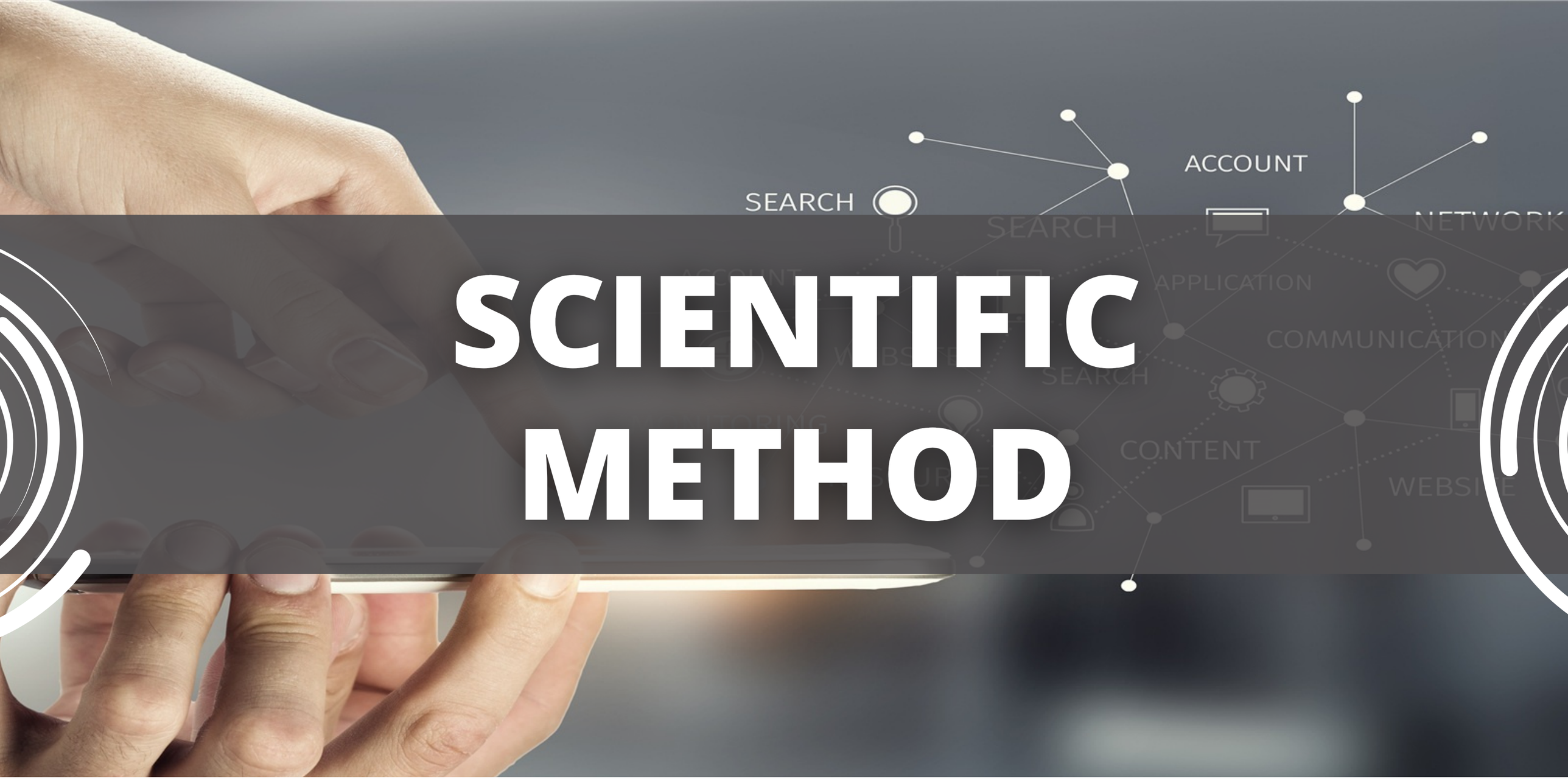

SCIENTIFIC METHOD

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PAFSE Partnerships for Science Education

Developed by:

PRP Prevenção Rodoviária Portuguesa

Science is a systematic and logical approach to discovering how things in the universe work. It is also the body of knowledge accumulated through the discoveries about all the things in the universe. When conducting research, scientists use the scientific method to establish facts or create knowledge.

The scientific method is a step-by-step process for experimentation that is used to explore observations and answer questions. The number and the specifics of each step may change depending on what is being examined, the research areas, and who is performing it.

Understanding the steps of the scientific method will help you to plan and develop your research project.

1. Define a purpose/question

The first step in the scientific method is asking a question that you want to answer about something that you observe. The question you ask should be measurable and answerable through experimentation or data collection. It is often something that can be measured with a numerical result.

2. Perform background research

With your question formulated, conduct preliminary background research to prepare yourself for your investigation. This involves doing research into what is already known about the topic and how to perform the research to answer your question. You can find information through online searches or interview experts on a topic. The more you know about a subject, the easier it will be to conduct your investigation.

3. Establish hypotheses

An hypothesis is an attempt to answer your research question based on prior observation and background research.

Your hypothesis should also include your predictions that you can measure through experimentation/data collection and research.

4. Run an experiment (gather data)

The next step in the scientific method is to run an experiment and collect data to create knowledge and test your hypothesis.

The exact research methods used to examine a hypothesis depend on what is being studied.

5. Analyse the interpret the data

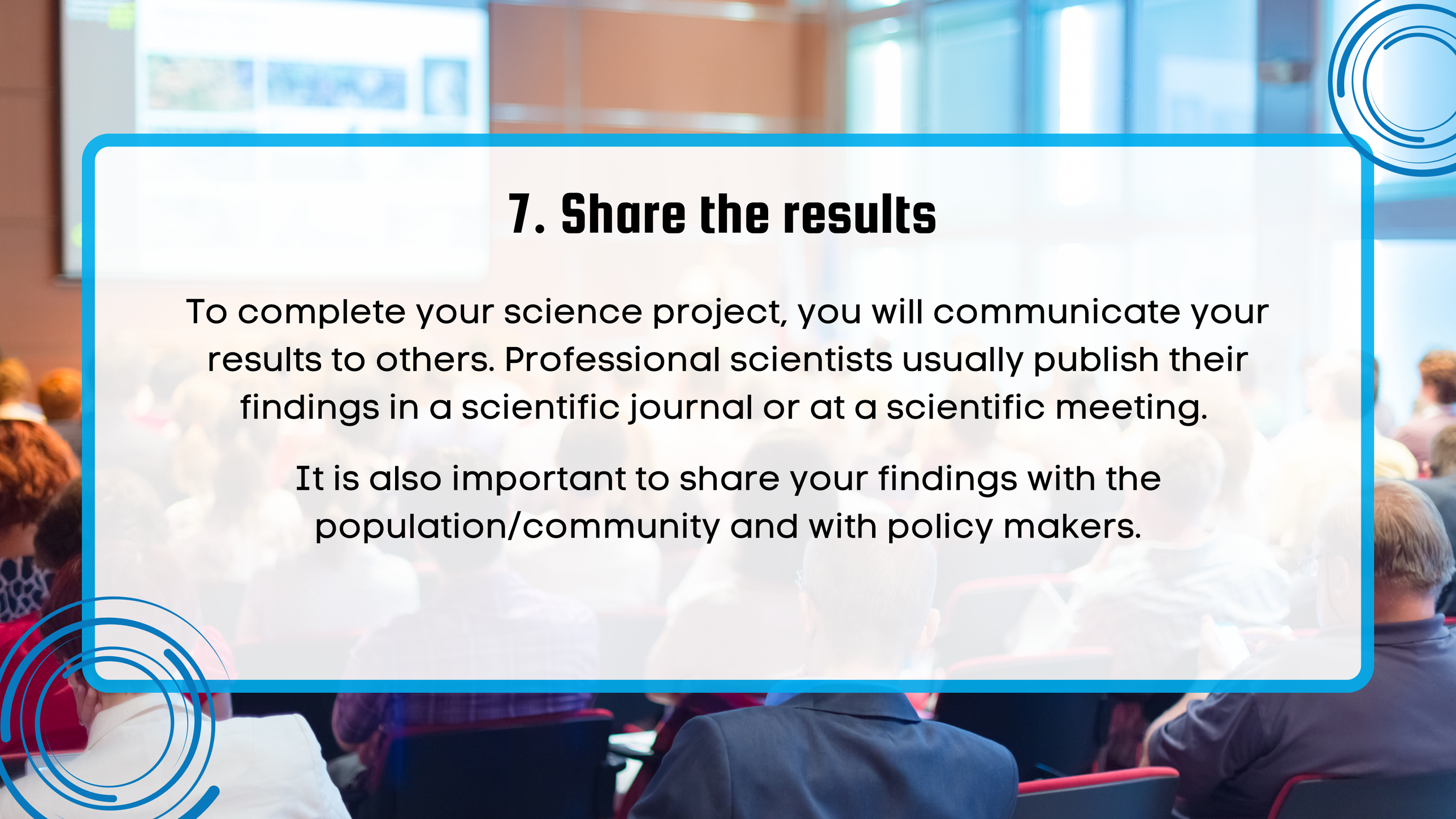
Once a researcher has designed and done the investigation and collected sufficient data, it is time to inspect the gathered information and judge what has been found.

Using analyses and statistics, researchers can summarize the data to get the results.

6. Draw conclusions

Drawing a conclusion means determining whether what you believed would happen did happen. Based on the outcomes, you will be able to answer your research question and either reject or confirm your hypothesis.

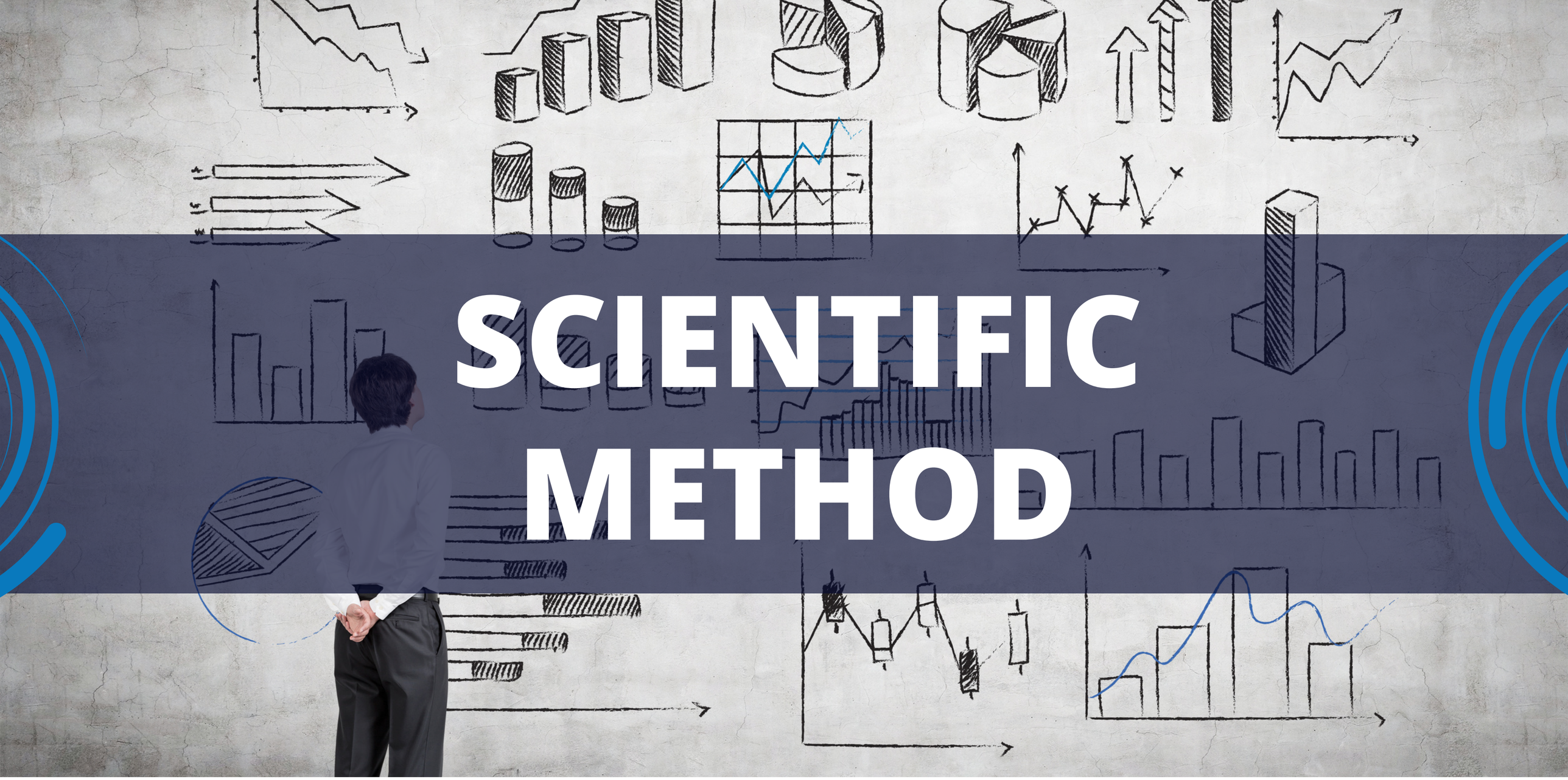
If your hypothesis is not confirmed, you can create a new hypothesis and return to step four and conduct a new experiment to prove your new theory.



7. Share the results

To complete your science project, you will communicate your results to others. Professional scientists usually publish their findings in a scientific journal or at a scientific meeting.

It is also important to share your findings with the population/community and with policy makers.



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