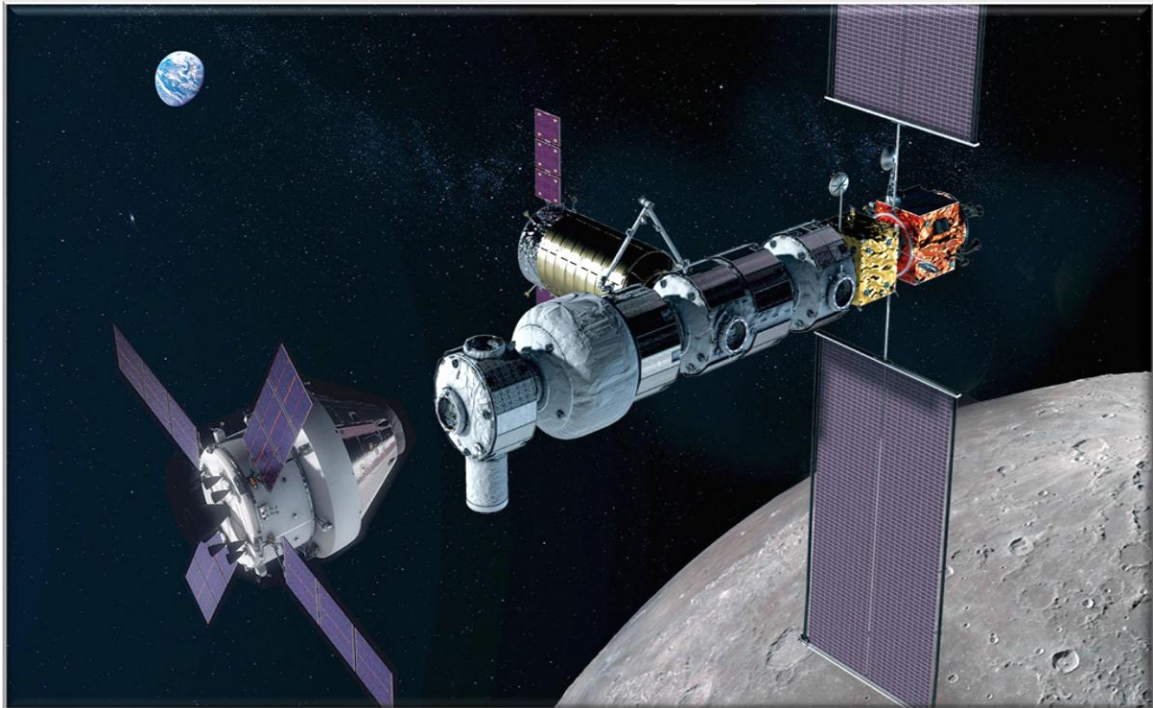


# Spacegate Station Season 6

## Episode 27



### Scientific Method

### Resource Content

- Guided Notes
- Higher Order Discussion Sheet
- Guided Notes Answer Key
- Curriculum Alignment Page

## Season 6 Episode 27

### Scientific Method Guided Notes

analysis	experiment	null hypothesis
conclusion	falsifiable	observation
confounding variable	hypothesis	research question
control	independent variable	scientific method
dependent variable	literature	testable

#### SECTION 1 — Introduction to the Scientific Method

The \_\_\_\_\_ is a systematic approach used to explore observations and test hypotheses.

The first step in the scientific method is making an \_\_\_\_\_.

Scientists often review existing \_\_\_\_\_ to understand what is already known.

#### SECTION 2 — Research Questions & Hypotheses

A \_\_\_\_\_ helps guide the direction of an experiment and is often phrased as “How does X affect Y?”

A \_\_\_\_\_ is an educated guess based on prior research and observations.

A good hypothesis must be \_\_\_\_\_ and \_\_\_\_\_.

The \_\_\_\_\_ is a statement that there is no effect or relationship between variables.

#### SECTION 3 — Variables in an Experiment

The \_\_\_\_\_ variable is the one that is changed or controlled in a scientific experiment.

The \_\_\_\_\_ variable is the one being tested and measured.

A \_\_\_\_\_ variable is not included in the experiment but can affect the results.

A well-designed experiment includes \_\_\_\_\_ to eliminate the influence of external variables.

## **SECTION 4 — Designing & Conducting Experiments**

During the \_\_\_\_\_ phase, the experiment is carried out and data is collected.

After data is collected, scientists perform \_\_\_\_\_ to interpret the results.

The final step is drawing a \_\_\_\_\_ and sharing the results with others.

## Higher-Order Discussion Sheet

- 1. Systems Thinking** — Why is it important to follow a structured process like the scientific method when conducting experiments?
- 2. Human Impact** — How can understanding variables help scientists design better experiments?
- 3. Cause and Effect** — Why is it important to identify confounding variables in an experiment?
- 4. Cross-Cultural Understanding** — Why is it important for scientists around the world to use consistent methods and terminology?
- 5. Data Interpretation** — How does analyzing data help scientists draw accurate conclusions?
- 6. Ethical Decision-Making** — What responsibilities do scientists have when reporting their findings?
- 7. Engineering and Technology** — How might technology help improve the accuracy of experiments in space?
- 8. Language and Science** — Why is it important to use clear and precise language in scientific communication?
- 9. Real-World Application** — How can the scientific method be applied to solve everyday problems?
- 10. Reflection** — What part of the scientific method do you find most challenging, and why?

## **Guided Notes Answer Key**

### **SECTION 1 — Introduction to the Scientific Method**

1. scientific method
2. observation
3. hypothesis

### **SECTION 2 — Research Questions & Hypotheses**

4. research question
5. independent variable
6. dependent variable
7. confounding variable

### **SECTION 3 — Variables in an Experiment**

8. research question
9. testable, falsifiable
10. null hypothesis
11. experiment

### **SECTION 4 — Designing & Conducting Experiments**

12. analysis
13. conclusion
14. literature
15. control

## Curriculum Alignment Page

### *Spacegate Station – Season 6, Episode 27*

**Grade Band:** Middle School (6–8)

**Focus Areas:** Scientific Method, Experimental Design, Variables, Hypothesis Testing

**Episode Length:** 18 minutes

**Instructional Purpose:** Enrichment, remediation, and core science instruction

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### Learning Objectives

After viewing this episode, students will be able to:

- Describe the steps of the scientific method.
- Differentiate between independent, dependent, and confounding variables.
- Explain the importance of forming a testable and falsifiable hypothesis.
- Understand how to design and conduct an experiment.
- Analyze data and draw conclusions based on evidence.
- Recognize the importance of clear communication in science.

### NGSS Alignment (Middle School)

**MS-ETS1-1** — Define the criteria and constraints of a design problem.

**Episode Connection:** Identifying the purpose of the experiment, recognizing environmental limitations, understanding why the experiment is needed.

**MS-ETS1-2** — Evaluate competing design solutions using a systematic process.

**Episode Connection:** How scientists review existing literature and evaluate what has already been tested. Reviewing background research, comparing what is known vs. unknown, and identifying gaps in scientific understanding.

**MS-ETS1-3** — Analyze data from tests to determine similarities and differences.

**Episode Connection:** How scientists collect and analyze data to confirm or reject hypotheses. Data collection, data interpretation and using evidence to draw conclusions.

**MS-ETS1-4** — Develop a model to generate data for iterative testing.

**Episode Connection:** Designing experiments, identifying variables and iterative testing and refinement

**MS-LS1-3** — Use argument supported by evidence for how the body maintains internal conditions.

**Episode Connection:** (Indirect connection — scientific method foundation) Students learn how evidence is used to support or refute hypotheses. Evidence-based reasoning, rejecting or confirming hypotheses.

**MS-LS1-5** — Construct a scientific explanation based on evidence.

**Episode Connection:** How scientists draw conclusions and communicate results. Forming conclusions, communicating findings, and using evidence to support explanations

### **Science & Engineering Practices (SEPs) Asking Questions & Defining Problems**

- Developing & Using Models
- Planning & Carrying Out Investigations
- Analyzing & Interpreting Data
- Using Mathematics & Computational Thinking
- Constructing Explanations & Designing Solutions
- Engaging in Argument from Evidence
- Obtaining, Evaluating, & Communicating Information

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## **Florida B.E.S.T. Science Standards Alignment**

**C.6.N.1.1** — Define a problem, plan and carry out scientific investigations.

**Episode Connection:** The scientific method step-by-step. Observation, research question Hypothesis, experiment design, and data collection

**SC.6.N.1.2** — Explain why scientific investigations should be replicable.

**Episode Connection:** Emphasizes testable, measurable, and falsifiable hypotheses which are all essential for replication. Testable hypotheses, controlled variables, repeatable procedures.

**SC.6.N.1.3** — Distinguish between experiments and other types of scientific investigation.

**Episode Connection:** Discussion about controlled experiments, references literature review and observation. Observational, experimental, and background research

**SC.6.N.1.4** — Identify variables in an experiment.

**Episode Connection:** Detailed explanations of independent, dependent, and confounding variables. Independent variable, dependent variable, confounding variables, and controls.

**SC.7.N.1.1** — Define a problem, use reference materials, plan and carry out investigations.

**Episode Connection:** Students see how scientists use prior research to form hypotheses and design experiments. Literature review, research question formation, and experimental planning

**SC.7.N.1.2** — Differentiate between qualitative and quantitative data.

**Episode Connection:** How scientists collect and analyze data. Data collection, data analysis, and evidence-based conclusions