

Scientific Method Steps

Step 4: Experiment

We've formed our hypothesis, so now we need to conduct an experiment to see if it's correct. In the case of our TV that won't turn on, what could we do to test that theory? What if we plug it into a different outlet? Could that help determine the problem? It could. We could try out several outlets and see if the TV works. We could also try to plug the TV into the same outlet to see if the problem is with the TV or the outlet.

Step 5: Collect Data

As mentioned above,

Scientific Method Steps

Do you like to ask questions? Do you wonder about the world around you and how it functions? If this is so, you might make a good scientist! Did you know that scientists specialize in finding the answers to people's questions? Of course, they don't just answer any questions, but ones that are scientific in nature. To answer these questions, scientists must use something called the Scientific Method. The Scientific Method is a process scientists use to research and discover answers to commonly asked questions. The Scientific Method consists of several steps.

Scientific Method Steps

Name: _____

6. What does the word specialize mean?
- to be an expert at something
 - to like something
 - to be special
 - to talk a lot

7. What is the main idea of the text?
- some kids are scientists
 - a scientist is someone who studies science
 - scientists are people who study science
 - kids can be scientists

8. Which of the following is NOT a step in the Scientific Method?
- analysis
 - data collection
 - doing a new experiment
 - hypothesis

9. What is the logical connection between the TV and the outlet?
- TVs work with outlets
 - TVs work when plugged into outlets
 - TVs work even if not plugged into outlets
 - TVs use batteries

Close Reading Steps

1

Read the text

2

Annotate the text

3

Read the text again

4

Define unknown words

Read the text again

Name: _____

1. Select the word or phrase from the paragraph that helps the reader understand the meaning of the word observation.
- what they see
 - their surroundings
 - ask a question
 - scientists

2. What evidence does the author use to support the idea that the original power outlet was broken?
- you try a couple of other outlets too
 - when you plugged the TV back into the original power outlet, it still received no power
 - that plug is then plugged into an outlet, which provides power
 - you need to try to solve the problem to fix your TV

Where in the text does the author show evidence to support the claim that you need to form a hypothesis of what you believe the problem is?

- Paragraph 2
- Paragraph 3
- Paragraph 4
- Paragraph 5

What is the main idea of paragraph 2?

This resource includes:

- Teacher Tips
- Questions to Ask Students
- Student Bookmarks:
 - Close Reading Steps
 - Annotate/Mark the Text
- 4 Informational Texts:
 - Steps in the Scientific Method
 - Experiments vs. Investigations
 - Experimental Trials
 - Control Groups
- 40 Multiple Choice Questions – 10 questions for each text
- 7 Graphic Organizers
- Answer Key

Scientific Method Steps

Step 4: Experiment

Step 4: Experiment
We've formed our hypothesis, so now we need to do a test to see if it's correct. In the case of our TV that won't turn on, what could we do to test that theory? What if we change the outlet? Could that help determine the problem? If we put it into a different outlet. We could try out several outlets to see if the

Annotate the Text

- 1** Number the paragraphs

- Underline important statements**

- 
- Circle unknown words

- Question?
Confusing?**

- Interesting!**

Scientific Method Steps

Do you like to ask questions? Do you wonder about the world around you and how it functions? If this is so, you might make a good scientist! Did you know that scientists specialize in finding the answers to people's questions? Of course, they aren't just answering any questions, but ones that are scientific in nature. To answer these questions, scientists must use something called the Scientific Method. The Scientific Method is a process scientists use to research and discover answers to commonly asked questions. This process consists of seven steps scientists must go through to answer a question thoroughly.

Step 1: Make Observations & Ask Questions

To start, scientists must make an observation about what they see in their surroundings or ask a question. This observation or question is what will drive their research. If you want to practice the scientific method, look at the world around you and see what questions you have. For example, let's say that you sit down and are ready to watch TV. You turn it on, but your TV won't work. You now have a problem. You've made an observation, and now you need to try to solve the problem to fix your TV.

Step 2: Research

Non-F

Step 3: Hypothesis

Passa

Scientific Method Steps

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 - a. to be an expert at something
 - b. to like something
 - c. to be special
 - d. to talk a lot
7. What is the main idea of paragraph 2?
 - a. some kids like to ask a question
 - b. a scientist's job is to ask a question
 - c. scientists like to answer questions
 - d. kids can be good scientists
8. Which of the following is NOT a step in the scientific method?
 - a. analysis
 - b. data collection
 - c. doing a new experiment
 - d. hypothesis

Scientific Method Steps

Name: _____

1. Select the word or phrase from the paragraph that helps the reader understand the meaning of the word observation.
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 - b. their surroundings
 - c. ask a question
 - d. scientists
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 - a. you try a couple of other outlets too
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 - d. you need to try to solve the problem to fix your TV

Where in the text does the author show evidence to support the claim that you need to form a hypothesis of what you believe the problem is?

- a. Paragraph 2
 - b. Paragraph 3
 - c. Paragraph 4
 - d. Paragraph 5
4. What is the main idea of paragraph 2?
 - a. scientists make observations
 - b. scientists only use the scientific method sometimes
 - c. scientists use the scientific method to answer questions
 - d. scientists ask questions
 5. Which of the following details is most important to the topic of what happens if your original hypothesis is incorrect?

10 Multiple Choice Questions

Experiments vs. Investigations

Scientific Investigations

Scientific investigations are similar to experiments. However, where experiments have a hypothesis that must be proven, scientific investigations are a process that occurs over time. Scientists observe, ask questions, and conduct scientific investigations in several ways. One way is to see what happens. Another way is to make a prediction and see if it is true.

Annotate the Text

- 1 Number the paragraphs
- Underline important statements
- Circle unknown words
- ❓ Question? Confusing?
- ! Interesting!

Experiments vs. Investigations

When we discuss the world of science-related things, we often swap out different terms to mean the same things. However, we must use the correct terminology when talking about science. Although they are often used interchangeably, "experiment" and "scientific investigation" differ. Let's unpack the difference to ensure we use these words correctly.

Experiments

Experiments are a type of investigation. However, they are more thorough and accurate. In order to be successful, experiments follow a specific plan that helps them determine a relationship. To test this, scientists start with a hypothesis. This hypothesis explains what scientists predict will happen in the experiment. They formulate this hypothesis by making an educated guess based on facts and information they already know. Look at this example hypothesis: ice will melt faster in water than in juice. An experiment would need to be performed to prove whether or not this statement is true. To test this theory, variables must be determined and tested to get valid results.

One of the most vital parts of an experiment is the independent variable. This is the variable that the scientist changes. In the example hypothesis, the independent variable is the liquid. The dependent variable is the time it takes for the ice to melt. The independent variable is the one that changes, and the dependent variable is the one that is measured. In this case, the independent variable is the liquid, and the dependent variable is the time it takes for the ice to melt. The independent variable is the one that changes, and the dependent variable is the one that is measured. In this case, the independent variable is the liquid, and the dependent variable is the time it takes for the ice to melt.

Non-Fiction Passage

Experiments vs. Investigations

Name: _____

6. What does the word interchangeably mean?
 - a. to do something
 - b. to go inside
 - c. to be changed
 - d. in a way to be exchanged
7. What is the main idea of paragraph 1?
 - a. experiments and investigations are not
 - b. scientists conduct experiments
 - c. scientists conduct investigations
 - d. scientists conduct experiments, but in
8. Which of the following is NOT a way of conducting an investigation?
 - a. observing
 - b. graphing
 - c. researching
 - d. making a hypothesis
9. What is the logical connection between investigations and experiments?
 - a. neither have a hypothesis
 - b. scientists complete neither
 - c. both are not important to scientists
 - d. scientists complete both for different reasons

Experiments vs. Investigations

Name: _____

1. Select the word or phrase from the paragraph that DOES NOT help the reader understand the meaning of the word hypothesis.
 - a. experiments follow a specific plan
 - b. what scientists predict will happen
 - c. an educated guess
 - d. an explanation
2. What evidence does the author provide to support the idea that independent and dependent variables are necessary?
 - a. these variables are independent because their form does not change
 - b. variables need to be determined and tested to get valid results
 - c. these variables must be present to determine whether or not the experiment worked
 - d. they formulate this hypothesis by making an educated guess
3. Where in the text does the author show evidence to support the claim that scientists make observations and ask questions during investigations?
 - a. Paragraph 2
 - b. Paragraph 3
 - c. Paragraph 4
 - d. Paragraph 5
4. What is the main idea of paragraph 5?
 - a. babies gain weight each month
 - b. scientists ask questions and observe the results in an investigation
 - c. scientists can complete an investigation to measure baby weight gain
 - d. scientists don't use hypotheses in an investigation
5. Which of the following details is most important to the topic of experiments needing to be done to determine validity?
 - a. an experiment would need to be performed
 - b. variables need to be determined and tested to get valid results
 - c. to prove a hypothesis, it first needs to be tested
 - d. scientists can investigate without making a hypothesis

10 Multiple
Choice
Questions

Control Groups

Negative control groups show that parts of the experiment will cause a negative result. These control groups show that outside factors may have impacted the results and seek to discover which factor caused that result to occur. A scientist's goal is to have a positive experimental group.

A Control Group in Action

You may think that you understand water. An actual experiment may help clarify. An experiment that tries to determine if plants that receive water

Annotate the Text

1 Number the paragraphs

2 Underline important statements

3 Circle unknown words

4 Question? Confusing?

5 Interesting!

Control Groups

Scientific experiments are the norm for scientists. It helps them discover new substances that work together to create our favorite products. Without scientists, science wouldn't advance, and we wouldn't have medications, sunscreens, or beauty products, just to name a few things that scientists tested. So how do scientific experiments work?

Many scientific experiments feature a control group and an experimental group. Control groups receive no treatment or a treatment that is already known. Experimental groups represent what the scientist is testing and trying to discover. These two groups help the scientist reach the best conclusion of whether or not their hypothesis or predicted outcome is valid.

Although all parts of a scientific experiment are important, control groups are needed because they test and rule out other possibilities without negatively impacting the results. This is done to help keep the results-focused.

Types of Control Groups

Non-Fiction Passage

Control Groups

Name: _____

6. What does the word receive mean?
 - a. was given
 - b. lost
 - c. was part of
 - d. took away
7. What is the main idea of paragraph 1?
 - a. how do scientific experiments work
 - b. scientific experiments are common for
 - c. medications, sunscreens, and beauty experiments
 - d. scientific experiments are needed to
8. Which of the following is NOT a reason why the plant watering experiment?
 - a. too much water
 - b. too little water
 - c. no water at all
 - d. some water
9. What is the logical connection between positive and negative control groups are made?

Control Groups

Name: _____

1. Select the word or phrase from the paragraph that helps the reader understand the meaning of the word deprived.
 - a. plants that receive water would be the experimental group
 - b. the outcome won't change due to outside factors
 - c. these plants serve as the control group
 - d. have no access to water
2. What evidence does the author provide to support the idea that negative control groups are what scientists try to avoid?
 - a. show that parts of the experiment will cause a negative result to occur
 - b. show that outside factors may have impacted the results
 - c. a scientist's goal is to have a positive control group and then eventually a positive experimental group
 - d. seeks to discover which of those factors or contaminants may have caused that to occur
3. Where in the text does the author show evidence to support the claim that positive control groups determine the validity of the test?
 - a. Paragraph 2
 - b. Paragraph 3
 - c. Paragraph 4
 - d. Paragraph 5
4. What is the main idea of paragraph 4?
 - a. positive control groups occur in studies
 - b. studies have two types of control groups: positive and negative
 - c. negative control groups occur in studies
 - d. some studies have no control groups
5. Which of the following details is most important to why control groups are important?

10 Multiple
Choice
Questions

Experimental Trials

Some experiments fail, and that's okay. This shows the scientist that changes need to be made to get the outcome they were hoping for. If scientists don't get the conclusion they wanted, the product or treatment may not be used. For example, if medicine doesn't do its job, people shouldn't be able to buy it yet. Scientists must choose the right ingredients to have the product do what it's intended to do.

Did you know that people can participate in experiments? The medicine mentioned above. How would we know if it worked? One didn't try it out first? When people try a new medicine, they may ask for people to be a part of the experiment to convince people to try it.

In the case of medicine, people helped get rid of their pain. After the study, then scientists choose the right ingredients to ensure the product is safe and effective about other products.

Close Reading Steps

1

Read the text

2

Annotate the text

3

Read the text again

4

Define unknown words

5

Read the text again

6

Respond to reading

Experimental Trials

When your teacher introduced multiplication tables, did you learn them right away? Probably not. It likely took a lot of practice for you to learn your multiplication tables and be able to easily solve math problems using them. Have you ever heard the phrase, "Practice makes perfect"? This applies to learning your multiplication tables. The more you practiced them, the more easily you could recall and apply the answers.

Just like with learning something new, experimental trials take time to perfect. An experimental trial is an experiment conducted to prove or disprove a hypothesis. Because science takes time to perfect, experimental trials need to be repeated to provide confidence that the results are valid. Accurate results are important. After all, they show people they can trust the results because they are correct.

How is an Experimental Trial Performed?

Just like with any other experiment, scientists use different variables, independent and dependent, and test out their theory. As the experiment occurs, scientists collect data.

After the experiment is over, scientists look at the data to know if their hypothesis was correct. They must ask themselves, was the experiment a success? Should anything in the experiment be changed to affect the results? Each time the experiment is repeated, scientists sit down and look at the data. They must ask themselves, was the experiment a success? Should anything in the experiment be changed to affect the results?

Non-Fiction Passage

Experimental Trials

Name: _____

6. What does the word outcome mean?
 - a. how something turns out
 - b. to come outside
 - c. when something works
 - d. when something fails
7. What is the main idea of paragraph 1?
 - a. it takes many tries to learn math
 - b. multiplication is hard
 - c. it's important to practice math
 - d. the more you practice something, the better you get
8. Which of the following is NOT a reason why someone might fail an experiment?
 - a. to make money
 - b. to get an incentive
 - c. to make someone angry
 - d. to relieve their pain

Experimental Trials

Name: _____

1. Select the word or phrase from the paragraph that helps the reader understand the meaning of the word accurate.
 - a. they show people that they can trust the results
 - b. because they are correct
 - c. provide confidence that the results are valid
 - d. science takes time to perfect
2. What evidence does the author provide to support the idea that it's okay if an experiment fails?
 - a. scientists must find the correct ingredients
 - b. just shows the scientist that changes need to be made to get the outcome they were hoping for
 - c. the product or the solution isn't ready to be used
 - d. medicine didn't do its job to relieve pain; then people shouldn't be able to buy it yet
3. Where in the text does the author show evidence to support the claim that people can participate in experimental trials?
 - a. Paragraph 2
 - b. Paragraph 3
 - c. Paragraph 4
 - d. Paragraph 5
4. What is the main idea of paragraph 3?
 - a. scientists conduct experiments
 - b. scientists repeat experiments many times to prove they're accurate
 - c. scientists use independent and dependent variables in experiments
 - d. some experiments thrive, and some fail
5. Which of the following details is most important to why scientists may need to complete several experiments?
 - a. after the experiment is over, scientists do it all over again
 - b. each time they record the data from that experiment
 - c. scientists may repeat the same experiments three to five times to ensure their results are valid
 - d. after between three and five experiments are finished, scientists sit down and take a look at the data

10 Multiple
Choice
Questions

Close Reading

Close Reading: A reading strategy that is used to comprehend and analyze a text closely. Students will typically read the text at least twice for comprehension, details, analysis, and deep questioning of the text's purpose and meaning.

Steps for Close Reading:

1. Read the Text
2. Mark Up the Text or Annotate the Text
3. Read the Text Again
4. Define Unknown Words
5. Read the Text Again
6. Respond to Reading

Includes:

- Teacher Tips
- Questions to Ask Students
- Close Reading Steps - Bookmark
 - Version with "Mark the text"
 - Version with "Annotate the text"
- Steps to "Mark the Text" Bookmark
- Steps to "Annotate the Text" Bookmark
- Informational Text: The
- 10 Multiple Choice Questions
- 7 Graphic Organizers

Teacher Tips & Suggestions

Questions to Ask Students

- What is the text mostly about?
- Who is the audience for this text?
- What's is the writer's purpose of this text?
- What's your favorite part of the passage?
- What words are new to you? What do you think the words mean?
- What detail stands out to you?
- What questions do you now have about the topic?
- If you can ask the author 2 questions, what would you ask them?
- In this paragraph, what is the author saying?
- What is the structure of the text? How does it help

Teacher Tips

Close reading: A reading strategy that is used to comprehend and analyze a text closely. Students will typically read the text at least twice for comprehension, details, analysis, and deep questioning of the text's purpose and meaning.

1. Read the Text: When students read the text for the first time, they are reading just to identify what the passage is mostly about. The first read is surface level and allows the students to understand the gist of the text.
2. Mark Up the Text or Annotate the Text: Encourage students to use their annotation bookmarks (provided below) to make notes directly on the text. Students can write in the margins, use sticky notes to make notes, use color coding. You can even slip the text inside a dry-erase pocket and encourage students to use dry-erase markers to mark up the text.
3. Read the Text Again: If the teacher is working with the students for this, the teacher can read the text aloud this time. Model think-alouds and use expression while you read. If students are working with partners in a station, encourage them to each read a paragraph then switch readers.
4. Define Unknown Words: During this step, invite students to circle any unknown or unfamiliar words. Use the provided graphic organizer to select 4-5 unknown words and work to identify the meaning of each word.
5. Read the Text Again: With this third time reading the text, encourage the students to read the passage independently.
6. Respond to Reading: Students will now use the text to answer the 10

Graphic Organizers

- Main Ideas with Text Evidence
- Central Ideas with Text Evidence
- Central Ideas with Details
- Main Idea, Details, Conclusion
- KWL: What I Know, What I Want to Know, What I Learned
- Overview: Topic, Author's Purpose, Key Vocabulary, Most Important Thing, I Wonder, Important Facts, Illustration
- Context Clues (3 Versions: 3 words, 4 words, 5 words)
- Arthropods

Name: _____

Unknown Word

Context Clue

Word Meaning

Name: _____

What I Know

What I Want to Know

What I Learned

Name: _____

Topic

Author's Purpose

Key Vocabulary

Most Important Thing

I Wonder...

Important Facts

Illustration

Graphic
Organizers

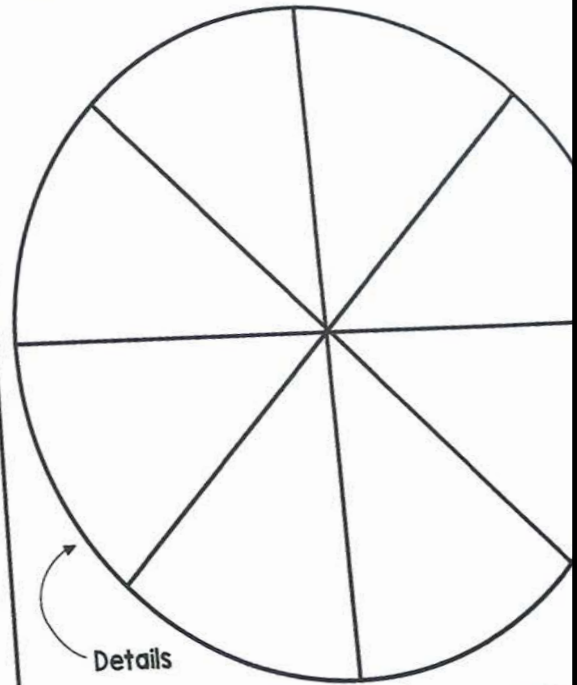
Ideas for Use

- Science or ELA Stations
- Whole Group Instruction
- Partner Practice
- Guided Reading Groups
- Substitute Plans
- Send home to practice
- ELA Work Stations or Centers
- Assessment

Unknown Word	Context Clue	Word

Name: _____

Central Idea



Details

Name: _____

Main Ideas

- 1
- 2
- 3

Text Evidence #1

Text Evidence #2

Text Evidence #3

Name: _____

Main Idea

Detail

Detail

Graphic Organizers

Purchase now to
connect science
and literacy
in your
classroom!