

# Introduction to 4<sup>th</sup> Grade Science

What is science?

What is a scientist?

How can scientists be safe?

What equipment do scientists use?

What is the scientific method?

Name \_\_\_\_\_





# Science Interest Inventory

Name \_\_\_\_\_

Put a checkmark next to the things you like to do during science class.

- \_\_\_ watch science videos
- \_\_\_ read a science textbook
- \_\_\_ create models of real-life things
- \_\_\_ do science experiments
- \_\_\_ complete science computer activities
- \_\_\_ do activities in work stations
- \_\_\_ read science picture books
- \_\_\_ use art in science

Circle 5 things you are most interested in learning more about.

- |                  |           |                    |
|------------------|-----------|--------------------|
| weather          | space     | life cycles        |
| water cycle      | moon      | animals            |
| states of matter | landforms | plants             |
| force and motion | erosion   | rocks and minerals |

Do you read books or magazines about science? \_\_\_\_\_ If so, which ones?

\_\_\_\_\_

Do you watch TV shows about science? \_\_\_\_\_ If so, which ones?

\_\_\_\_\_

Do you prefer to work alone, in pairs, or in small groups? \_\_\_\_\_

What do you think about science? Write at least 2 sentences.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

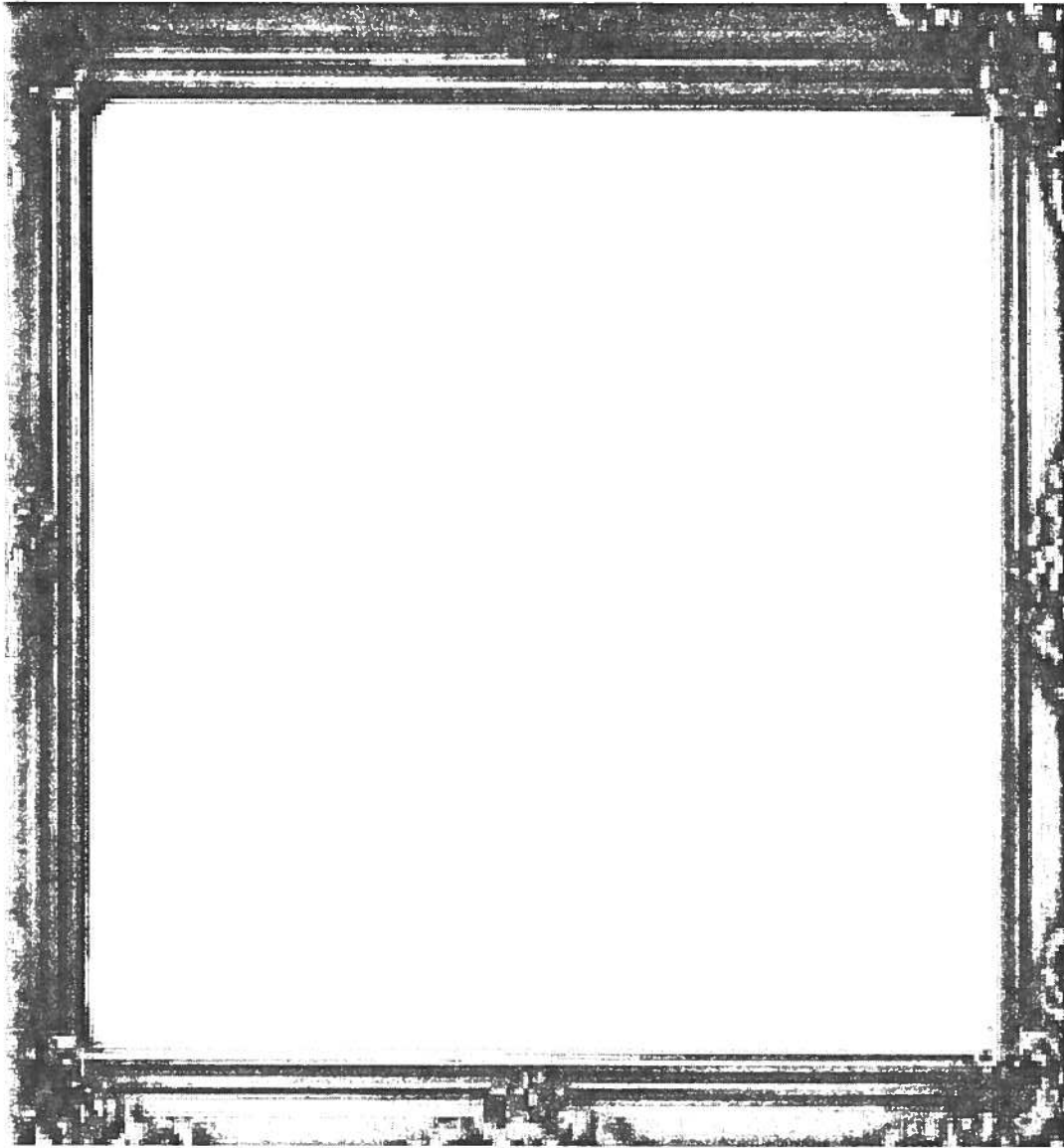
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SCIENCE

# What does a scientist look like?

Draw your scientist in the frame. Be sure to include the setting in which they work and the tool that they use. On the lines below, write about your scientist. What does your scientist study? What are they researching or doing?



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## Text Book Scavenger Hunt

1. In what chapter will we learn how animals adapt?  
\_\_\_\_\_
2. In what chapter will we learn how environments change? \_\_\_\_\_
3. Go to chapter 8 and answer the following questions:
  - a. How many vocabulary words are there? \_\_\_\_\_
  - b. Skim through the chapter headings and make an inference as to the main idea of the chapter. What do you think the main idea is? \_\_\_\_\_  
\_\_\_\_\_
  - c. What is the first vocabulary word introduced within the chapter? \_\_\_\_\_
  - d. What is the title of the sidebar on page 240?  
\_\_\_\_\_
4. Go to the Glossary and define the following words  
Force= \_\_\_\_\_  
Energy= \_\_\_\_\_
5. Go to the index and write down all of the page numbers where I can find information on the following items:
  - a. Polar Ice Caps \_\_\_\_\_
  - b. Oceans \_\_\_\_\_
6. Which chapter are you most excited about reading?  
\_\_\_\_\_

# Being A Scientist Doesn't Mean You Have To Have a Lab Coat!

## *Interactive Notes*

1. Charles Drew was an excellent \_\_\_\_\_ but decided to become a \_\_\_\_\_. He studied a lot about \_\_\_\_\_ and \_\_\_\_\_, which is the part of blood that makes it liquid. All of his research led to him opening the first \_\_\_\_\_ because he found that blood and plasma could be stored. The American Red Cross was created by Dr. Drew.
3. Ellen Ochoa was the first \_\_\_\_\_ woman in space - she started going into space in \_\_\_\_\_. Since then, she has spent over \_\_\_\_\_ hours in space!
4. George Washington Carver was originally born into \_\_\_\_\_ but he managed to rise above this, go onto college and receive two degrees in \_\_\_\_\_. He did a lot of work in agriculture and discovered that by introducing \_\_\_\_\_ and \_\_\_\_\_ to southern crops, they restored the nitrogen level in the soil, making it healthier. He is famous for finding over \_\_\_\_\_ uses for peanuts!
5. Rebecca Cole was the \_\_\_\_\_ black woman to graduate from medical school - she worked with Elizabeth \_\_\_\_\_ in helping to teach hygiene and childcare to families in \_\_\_\_\_ neighborhoods.
6. Elizabeth Blackwell was the \_\_\_\_\_ woman to graduate from medical school in \_\_\_\_\_. She got in very luckily because the Geneva Medical College thought she was joking and went along with it! They let her in but weren't too happy when they found out she was serious and wanted to go to medical school. After graduating and working as a doctor for many years, she founded the London School of \_\_\_\_\_.
7. Rosalind Franklin was a physical \_\_\_\_\_. She was working in England with a partner and through their work, they discovered the \_\_\_\_\_ shape of \_\_\_\_\_. Her hard work went on to be used by \_\_\_\_\_ and \_\_\_\_\_ in the discovery of \_\_\_\_\_ but they didn't give her any credit for her work until the 1990's!

# Science Process Skills

Observe!

Predict!

Investigate & Experiment  
Form

Collect Data!

Communicate

Classify!

Estimate!

Infer!

Inter



Observe: If you were a scientist and you came into this room wanting to learn about “fourth graders,” what observations might you make?

Classify: What does it mean to classify things? Why would a scientist want to classify all of the things s/he observes? How could we classify the students in this class? How about all of the “things” in the classroom?

Estimate and measure: What might a scientist need to measure to learn about fourth graders? When would estimation be accurate enough, or make more sense than exact measurement? (height of the 4<sup>th</sup> graders, number of desks in the room)

Infer: Looking around the room at everyone’s clothing, what might a scientist infer about 4<sup>th</sup> graders? Would s/he come to any conclusions about the way 4<sup>th</sup> graders dress? What details led to that inference?

Predict: Before the scientist came into our room, what might s/he have predicted? Take what you already know about students, or kids, and use that information to make predictions about 4<sup>th</sup> graders.

Form questions/hypotheses: Is there any 4<sup>th</sup> grade behavior a scientist who has never been in our classroom might not understand? Make a hypothesis based on that question—“If...then...”

What kind of food do 4<sup>th</sup> graders like? Predict they will like oreos better than apples. If I put both oreos and apples on the table, then the students will eat the oreos.

Collect data: What data might be important to collect in when testing that hypothesis? Is there any other data that the scientist might want to record during his/her observations?

Interpret data: Having the data isn’t enough to draw conclusions. Scientists need to interpret the data and find a pattern in it. Part of interpreting data is organizing it in charts or tables. Why might a scientist put data in a chart?

Investigate and experiment: Testing the hypothesis!

Identify and control variables: variables—different foods you put out, stay the same—same fourth graders, same time of day, same number of items

Communicate: Why might a scientist want to communicate his/her findings? How might he/she go about that? What forms of communication might s/he use?



## Science Role Play Safety Scenarios

### Group 1

You and your classmates are looking at slides under a microscope during your science class. One of you accidentally knocks a box of slides onto the floor and there is broken glass everywhere. What should you do? How could you have prevented this?



### Group 3

Your teacher is giving instructions for a science experiment about using light bulbs, but instead of paying close attention, you and your classmates are talking to each other about your weekends. Because you didn't hear the instructions, you accidentally connect the light bulb to the wires incorrectly and you get a shock. What should you do? How could you have prevented this?

### Group 4

Your science group is planting seeds at your desks. You're mixing fertilizer with the soil to test how well the plants grow. When the bell rings, you all go back to your seats, but you don't carefully clean the fertilizer off the desks. Another classmate sits at that desk during snack time and sets his/her food on the desk where the fertilizer was before eating it. What could happen? How could you have prevented this?

# Scientists and Their Tools



Scientists: \_\_\_\_\_

Station 1: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 2: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 3: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 4: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 5: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 6: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 7: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 8: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 9: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 10: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 11: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 12: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 13: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 14: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 15: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 16: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 17: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 18: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 19: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

Station 20: Name of tool: \_\_\_\_\_

What could we use this tool for as a scientist?

- \_\_\_\_\_
- \_\_\_\_\_

# Science Laboratory Equipm

Draw a line from each picture in the middle to its matching definition on the left and its name on the right.

1. A small circular dish in which you can drop materials

2. A wide glass cup used for mixing, measuring, and boiling

3. A light outer garment worn to protect clothing while working in a laboratory

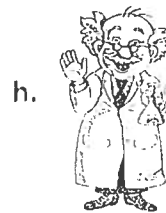
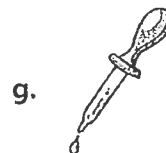
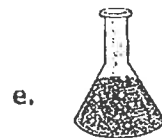
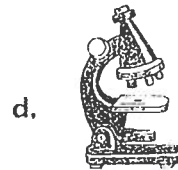
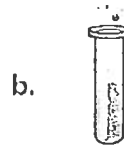
4. A long, thin tube used for holding liquids or powders

5. A glass tube with a rubber top that you press to draw in liquid and release it one drop at a time

6. A tool that uses a lens to magnify tiny substances

7. Large spectacles that have special lenses to prevent eye injury

8. A glass measuring tool that has a wide base and a narrow neck



I. eye dropper

II. goggles

III. beaker

IV. lab coat

V. flask

VI. test tube

VII. Petri dish

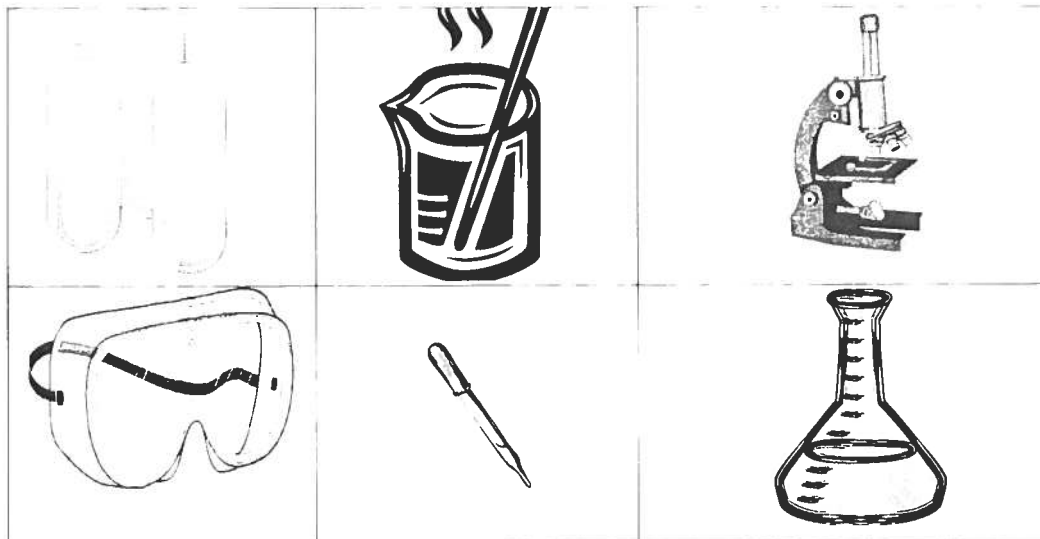
VIII. microscope



Name \_\_\_\_\_ # \_\_\_\_\_

### Lab Equipment/Safety Review

Match the word to the picture. Write the number in each box.



1. Goggles

2. Test Tube

3. Microscope

4. Eye Dropper

5. Beaker

6. Flask

Fill in the blanks with the correct words.

7. If your experiment involves any kind of liquid or hazardous materials you should always wear

\_\_\_\_\_.

8. Before you start any experiment you should always

\_\_\_\_\_.

## True or False

\_\_\_\_\_9. It is ok to smell things during an experiment because it can't hurt to take a sniff.

\_\_\_\_\_10. It is important to stay seated during an experiment.

\_\_\_\_\_11. It doesn't matter which direction to point test tubes and jars when you open them.

## Circle the correct answer.

12. When you are told to observe something with your nose, you should { sniff, waft } carefully.

13. While doing an experiment, you should always read the { procedure, observations } carefully.

14. By using goggles you can protect your { sense of sight, sense of smell } from anything that might harm you.

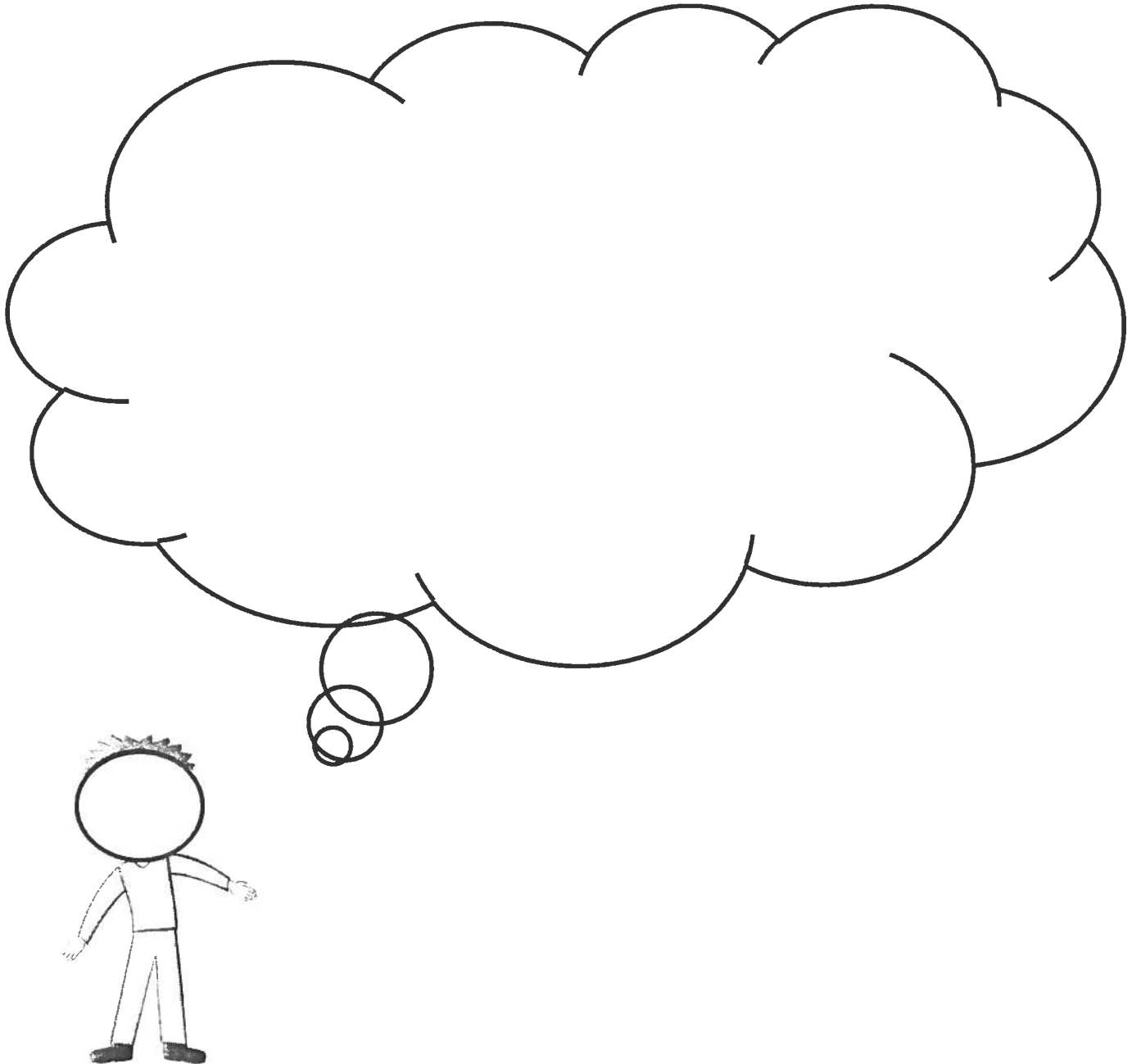
## Write a short answer for this question

You should never have gum or food in the science lab because

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# Introduction to Science

- Draw a face on the scientist below indicating how you felt during the activities. (Was it fun, hard, confusing, interesting?)
- What are the key ideas you learned about science, science safety, and what tools a scientist uses in his research?



# THE SCIENTIFIC METHOD

How do scientists do what they do?

Well, **YOU** know because you're a scientist, too!

**Observation** is an important part--  
in fact it's the part at the very start.

For it's observation that causes you to wonder why  
earthworms do what they do and clouds form in the sky.

Your **hypothesis** is a "best guess" based on what you know  
about how things work--now you're ready to go!

**Experimentation** lets you test the hypothesis you've made--  
to see if your best guess can make the grade.

And because **variation** is found in nature everywhere,  
**repeated trials** should be done, and done with care.

And don't forget to decide what **variables** you'll test.

**You** change the **independent variables**, but not the rest.

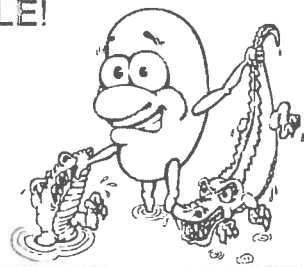
Recording your **data** is very important, too;

so you can **analyze** the results and others can repeat what you  
do.

When you've summarized your results and your experiment is  
done,

you'll have more information about nature and you'll have had  
some fun.

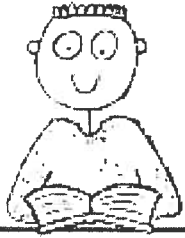
So, now you know that the **scientific method** is really cool,  
and that scientists don't just measure--they **RULE!**



# The Scientific Method

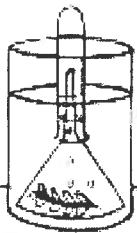


1. Ask a Question



2. Research your Topic

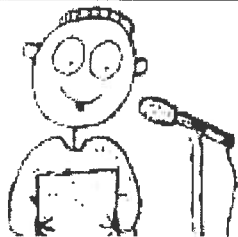
3. State your Hypothesis



4. Test your Hypothesis

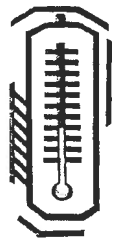


5. Analyze your Data



6. Report your Results

# Got Heat?



1. **Ask a Question:** What are we trying to find out?

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2. **State Your Hypothesis:** What is a possible answer to your question?

If \_\_\_\_\_

Then \_\_\_\_\_

3. **Identify and Control Variables:**

What variable will be changed on purpose when we do this experiment?

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What must *not* change when we do this experiment?

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4. **Test Your Hypothesis**

5. **Collect and Record Your Data:** What happened in the experiment? Take notes on description, measurement, etc.

6. **Interpret Your Data:** Organize your data into the table below. Are there any other ways of organizing the data?

Container	Beginning temperature	Temperature at 5 min.	Temperature at 10 min.
Jar without covering (control)			
Jar with felt covering			
Jar with paper covering			
Jar with foil covering			
Jar with plastic wrap			

7. **State Your Conclusion:** What did we determine from this experiment?

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8. **Go Further:** What else might we want to investigate?

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## The Great Banana Experiment

1. **Ask a Question:** What are we trying to find out?

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2. **State Your Hypothesis:** What is a possible answer to your question?

If \_\_\_\_\_,

Then \_\_\_\_\_.

3. **Identify and Control Variables:**

What variable will be changed on purpose when we do this experiment?

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What must *not* change when we do this experiment?

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4. **Test Your Hypothesis**

5. **Collect and Record Your Data:** What happened in the experiment? Take notes on description, measurement, etc.



6. **Interpret Your Data:** Organize your data into the table below. Are there any other ways of organizing the data?

Banana	3 days	6 days	9 days
Banana on counter (control)			

7. **State Your Conclusion:** What did we determine from this experiment?

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8. **Go Further:** What else might we want to investigate?

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Date: \_\_\_\_\_

Name: \_\_\_\_\_

Class: \_\_\_\_\_

**1 What's the difference between a hypothesis and a theory?**

- A** "Theory" is another word for "fact;" "hypothesis" is another word for "guess"
- B** Hypotheses can't be proven; theories can
- C** Theories have been confirmed through tests; hypotheses haven't
- D** Theories contain many hypotheses; a hypothesis only contains one theory

**2 Place the following steps in sequence: A) Recognizing a problem; B) Testing a hypothesis; C) Drawing inferences**

- A** A, C, B
- B** A, B, C
- C** B, C, A
- D** C, B, A

**3 In the phrase, "The scientific method is an analytic process for determining why things happen," what's the best synonym for "analytic?"**

- A** Probable
- B** Amazing
- C** Incoherent
- D** Logical

**4 What must you do before you make a hypothesis?**

- A** Run an experiment
- B** Make observations
- C** Form a theory
- D** Draw conclusions

**5 If you were running an experiment to determine the temperature at which beans sprout the fastest, what would be the variable?**

- A** The number of beans you plant
- B** The height of the sprouts you grow
- C** The amount of water you give the beans
- D** The temperature at which each bean is kept

**6 You should run an experiment several times to make sure your results are consistent. In the preceding phrase, what does "consistent" mean?**

- A** Obvious
- B** Perfect
- C** Unchanging
- D** Testable

**7 What might cause a theory to change over time?**

- A** New laws passed by the government
- B** New but untestable ideas
- C** Changes in public opinion
- D** The discovery of new evidence

**8 Evolution is one example of a theory. From what you know about the scientific method, what can you conclude about this biological theory?**

- A** It's been tested many times
- B** Scientists don't need to test it anymore
- C** No one is allowed to test whether it's true or not
- D** There is very little evidence to support it

**9 Which of the following is a testable hypothesis?**

- A** Roses are more beautiful than violets
- B** A plant needs at least five hours of sunlight per day to grow
- C** Ice cream is delicious
- D** Humans will someday land on Mars

**10 What happens if you test a hypothesis multiple times and the data doesn't support your prediction?**

- A** Change the data to support your prediction
- B** Run the experiment again until you get the results you're looking for
- C** Conclude that your hypothesis cannot be proven
- D** Re-think your hypothesis

# Scientific Method Sheet

What are you learning about? \_\_\_\_\_



Ask a question: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Research your topic: \_\_\_\_\_

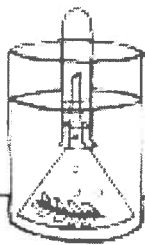
\_\_\_\_\_

\_\_\_\_\_

State your hypothesis: \_\_\_\_\_

\_\_\_\_\_

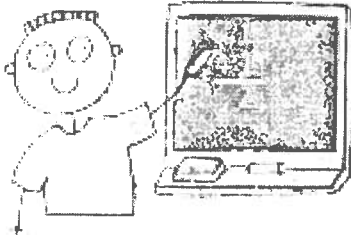
\_\_\_\_\_



Test your hypothesis: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Analyze your data: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Report your results: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name \_\_\_\_\_

# \_\_\_\_\_

## Scientific Method Quiz

**Directions:** Put the numbers 1-6 on the lines to put the following steps of the Scientific Method in order.

\_\_\_\_\_ Hypothesis

\_\_\_\_\_ Observations

\_\_\_\_\_ Procedure

\_\_\_\_\_ Conclusion

\_\_\_\_\_ Problem

\_\_\_\_\_ Materials



**Directions:** Circle the answer of the best response and draw a star next to number nine.

7) Which word explains what a **hypothesis** is?

- a) Results
- b) Prediction
- c) Data
- d) Procedure

8) All of the following are true about a **conclusion** except:

- a) it is the last step of the Scientific Process
- b) it is the end determination of an experiment
- c) it explains the materials used
- d) it is based on your observations and data

9) **Observations** are:

- a) a list of the materials needed to complete an experiment
- b) data including 5 senses
- c) step by step directions
- d) summary of what you learned

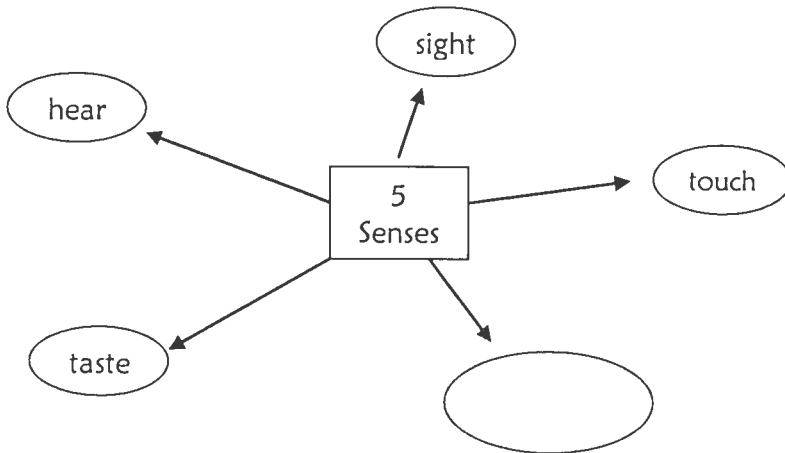
10) Which step in the Scientific Method tells the scientific tools that are needed to complete the experiment?

- a) Materials
- b) Hypothesis
- c) Problem
- d) Conclusion

11) Which step of the Scientific Process asks a question that you are trying to find out with your experiment?

- a) Hypothesis
- b) Problem
- c) Conclusion
- d) Observations

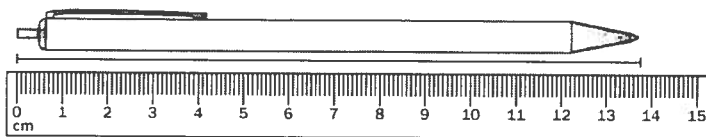
12) Write a word in the empty circle below.



13) What is the volume of the graduated cylinder shown?

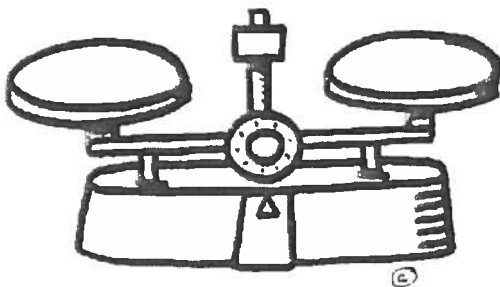
\_\_\_\_\_ mL

14) What is the length of the pen, to the nearest centimeter?



\_\_\_\_\_ cm

15) What is the mass of the carrot?



\_\_\_\_\_ g

# Scientific Method

- Draw a face on the scientist below indicating how you felt during the activities. (Was it fun, hard, confusing, interesting?)
- Choose one of the science experiments you completed in class and write a short reflection using words from the scientific method.



