



writing in
science
teacher's guide

Editors:
Brian A. Jerome Ph.D.
Stephanie Zak Jerome

Assistant Editors:
Louise Marrier
Josh Hummel

a message from our company . . .

Visual Learning is a Vermont-based, family owned company specializing in the creation of science programs. As former classroom science teachers, we have designed our programs to meet the needs and interests of both students and teachers. Our mission is to help educators and students meet educational goals while experiencing the thrill of science!

viewing clearances

The video and accompanying teacher's guide are for instructional use only. In showing these programs, no admission charges are to be incurred. The programs are to be utilized in face-to-face classroom instructional settings, library settings, or similar instructional settings.

Duplication rights are available, but must be negotiated with visual learning systems.

Television, cable, or satellite rights are also available, but must be negotiated with visual learning systems.

Closed circuit rights are available, and are defined as the use of the program beyond a single classroom but within a single campus. Institutions wishing to utilize the program in multiple campuses must purchase the multiple campus version of the program, available at a slightly higher fee.

Video streaming rights are available and must be negotiated with visual learning systems.

Discounts may be granted to institutions interested in purchasing programs in large quantities. These discounts may be negotiated with visual learning systems.

use and copyright

The purchase of this video program entitles the user the right to reproduce or duplicate, in whole or in part, this teacher's guide and the black line master handouts for the purpose of teaching in conjunction with this video, *Writing in Science*. The right is restricted only for use with this video program. Any reproduction or duplication, in whole or in part, of this guide and student masters for any purpose other than for use with this video program is prohibited.

The video and this teacher's guide are the exclusive property of the copyright holder. Copying, transmitting, or reproducing in any form, or by any means, without prior written permission from the copyright holder is prohibited (Title 17, U.S. Code Sections 501 and 506).

Copyright © 2014

ISBN 978-1-59234-920-3

teacher's guide



a message from our company	2
viewing clearances	2
use and copyright	2
student learning objectives	4
assessment	4
introducing the program	5
program viewing suggestions	5
literature connections	5
key vocabulary	6
video script	6
answer key to student assessments	9
answer key to student activities	9

student activities

what do you know now?	10
what have you learned?	11
video review	12
video quiz	12
vocabulary and writing	13
writing observations	14
writing explanations	15

student learning objectives

Upon viewing the video and completing the enclosed student activities, students will be able to do the following:

- 1 Understand that science vocabulary words have specific meanings in science.
- 2 Demonstrate how to find the meaning of a vocabulary word using a dictionary and glossary.
- 3 Explain that an observation describes how or why something happened.
- 4 Clearly write a scientific observation using appropriate vocabulary words and detail.
- 5 When given a science demonstration, write an explanation describing what happened.
- 6 Know that explanations often require additional research.
- 7 Describe research as the process of looking at different resources, or making observations to obtain information.
- 8 Use information gathered through research to write a scientific explanation.

assessment

what do you know now? (p. 10):

This preliminary assessment is an assessment tool designed to gain an understanding of students' preexisting knowledge. It can also be used as a benchmark upon which to assess student progress based on the objectives stated on the previous pages.

what have you learned? (p. 11):

This post assessment can be utilized as an assessment tool following student completion of the program and student activities. The results of this assessment can be compared against the results of the preliminary assessment to assess student progress.

video review (p. 12):

The video review can be used as an assessment tool or as a student activity. There are two sections. The first part contains questions displayed during the program. The second part consists of a five-question video quiz to be answered at the end of the video.

introducing the program

Before showing the program to students, write the following terms on the board: “boiling” and “melting”. Tell students that these are specific scientific terms referred to as science vocabulary. Ask students to list some other examples of science vocabulary. Explain that vocabulary is very important in science because it helps accurately describe and explain many things.

Next, ask students to observe a beaker of water as it boils. Tell students to carefully observe what is happening in the process of boiling. Then, have students write a sentence that describes their observations. Next, take an ice cube and place it on a table in front of the class. Have them write one sentence that describes what they observe in the process of melting. Explain that the sentences they just wrote are examples of writing in science. Tell students to place close attention to the video to learn more about writing in science.

program viewing suggestions

The student master “video review” is provided (p. 12) for distribution to students. You may choose to have your students complete this master while viewing the program or do so upon its conclusion.

The program is approximately 10 to 12 minutes in length and includes a five-question video quiz. Answers are not provided to the video quiz in the video, but are included in this guide on page 9. You may choose to grade student quizzes as an assessment tool or to review the answers in class.

The video is content-rich with numerous vocabulary words. For this reason you may want to periodically stop the video to review and discuss new terminology and concepts.

literature connections

Allen, Susan and Jane Lindaman. *Written Anything Good Lately?* Minneapolis: Millbrook Press, 2006.

Auch, Mary Jane and Herm Auch. *The Plot Chickens*. New York: Holiday House, 2010.

Holub, Joan. *Little Red Writing*. San Francisco: Chronicle Books, 2013.

Loewen, Nancy. *Just the Facts: Writing Your Own Research Report*. Mankato: Picture Window Books, 2010.

key vocabulary

science vocabulary
observation
explanation

research
scientific writing

video script

1

01 introduction

02 There are many different styles of writing that you may enjoy reading.
03 You may enjoy stories,...
04 ... or, perhaps you like reading texts from friends or relatives.
05 There are lots of different types of writing. Scientific writing is one type.
06 You may not have ever done any scientific writing, but you can learn.
07 What exactly is scientific writing?
08 What are some of the characteristics used?
09 And, how can you go about writing more scientifically?
10 During the next few minutes we're going to answer these questions, and others as we explore writing about science.

2

11 vocabulary and writing

you
compare

12 **Which sentence explains what's happening with the heated water in this beaker? The water is boiling. Or? The water is making bubbles.**

13 The word "boiling" best explains what's going on with the water.
14 Boiling is an example of a scientific vocabulary word.
15 **Science vocabulary** consists of words that have specific meaning in science.
16 When writing about science it's very important to use scientific vocabulary words because they provide a more detailed and accurate explanation.
17 If you're not sure of the meaning of a scientific vocabulary word or how to use it, you can look up the word in a dictionary or glossary for an explanation.
18 Sometimes spelling scientific vocabulary words can be tricky.
19 For example, do you know how to spell the word "squirrel"?
20 To find the spelling of a new vocabulary word, it's helpful to ask your science teacher,...
21 ... or use a book that describes the word.

3

22 observing and writing

23 Throughout the day we make many, many observations.

- 24 An **observation** is information we gather from the world around us using our senses.
- 25 Making observations and recording them is very important in science.

you observe

- 26 **What is this bird doing?**
- 27 This bird is looking for food with its beak.
- 28 This is an example of an observation.
- 29 In science it's common to write down observations. Observations are often written as descriptive sentences.
- 30 When writing, it's a good idea to use lots of detail and appropriate scientific vocabulary.
- 31 For example, to describe this flower you might write: This Siberian Iris has violet petals and is 35 centimeters tall.

4

32 **developing explanations**

- 33 An important part of science often involves going beyond writing observations to develop explanations.
- 34 An **explanation** describes how or why something happened.
- 35 For example, observe how these paper clips are attracted to this piece of metal.

you decide

- 36 **Explain why this happened.**
- 37 In science, explanations are based on information and facts.
- 38 Therefore, we would explain that the paper clips, that contain iron, were attracted to the metal because it's a magnet.
- 39 Objects containing iron are attracted to magnets.
- 40 Writing scientific explanations usually requires more information and lots of observations.
- 41 To develop explanations it is often necessary to do research to obtain information.
- 42 Let's take a look at what research involves.

5

43 **research and writing**

- 44 If you wanted to learn what a certain type of animal eats, how would you get this information?
- 45 One thing you could do is follow the animal around and observe what it eats.

you decide

- 46 **What's another way you could get this information?**
- 47 You could read about what the animal eats in books, magazines, encyclopedias, and online.
- 48 This is called research. **Research** is the process of looking at different resources or making observations to get information.

- 49 Research is very important in scientific writing. Why?
50 Scientific writing involves explaining the world around us. It uses facts, observations, and explanations obtained through research.
51 **Scientific writing** often involves describing information gathered by other people.
52 We live in the age of information. Never before has there been so much information available on so many science topics. This is truly wonderful

6**video review**

- 54 During the past few minutes we took a look at writing about science.
55 We began by learning about the importance of vocabulary in scientific writing.
56 Observations are also important in science.
57 We saw how writing about observations is a key task in science.
58 The importance of using appropriate vocabulary and details was highlighted.
59 Next, we learned what explanations are and how explanations are written.
60 Last, we discussed the general process and purpose of research in science.
61 This rounded out our exploration of writing about science.

7**video quiz**

- 63 Fill in the correct word to complete the sentence.
64 1. ____ words have specific meaning in science.
65 2. An ____ is information gathered with our senses.
66 3. This is an example of a ____ that describes an observation.
67 4. An ____ describes how and why.
68 5. ____ involves gathering information.

answer key to student assessments

what do you know now?

- 1 vocabulary words
- 2 accurate explanations
- 3 observation
- 4 the deer lowers its head to the grass and takes grass into its mouth
- 5 I like candy sometimes
- 6 sweet scent of a flower
- 7 explanation
- 8 we have day and night because Earth rotates on its axis
- 9 information
- 10 research

what have you learned? (p. 11)

- 1 explanation
- 2 the deer lowers its head to the grass and takes grass into its mouth
- 3 information
- 4 vocabulary words
- 5 research
- 6 we have day and night because Earth rotates on its axis
- 7 accurate explanations
- 8 I like candy sometimes
- 9 observation
- 10 sweet scent of a flower

video review (p. 12)

- 1 The water is boiling. The word “boiling” best explains what’s going on with the water.
- 2 The bird is looking for food with its beak.
- 3 The paper clips, that contain iron, were attracted to the metal because it’s a magnet.
- 4 You could read about what the animal eats in books, magazines, encyclopedias, and online.

video quiz (p. 12)

- 1 vocabulary
- 2 observation
- 3 sentence
- 4 explanation
- 5 research

answer key to student activities

vocabulary and writing (p. 13)

- 1 boiling
- 2 migrate
- 3 heart
- 4 revolve
- 5 electricity

writing observations (p. 14)

- 1 The beaker contains a hot liquid that is giving off steam.
- 2 The Canada Goose is flapping its wings.
- 3 The magnet has attracted several paper clips that are hanging from it.
- 4 The seed has a new root that is emerging from it.
- 5 The person is swinging a baseball bat at a baseball.

writing explanations (p. 15)

- 1 Nails are attracted to a magnet because they contain iron. Magnets attract metal objects that contain iron.
- 2 The water evaporated from the glass into the air. Evaporation is the process of a liquid changing to a gas.
- 3 The sun is not moving. Instead the Earth is rotating on its axis (spinning). As it rotates it moves away from the sun that stands still.

what do you know now?

Name: _____

Select the best answer for each of the following questions.

1 The terms “boiling” and “photosynthesis” are examples of what?

- story terms
- vocabulary words
- phrases
- poetry

2 Science vocabulary words help provide more what?

- money
- power
- accurate explanations
- confusion

3 Information gathered with our senses from the world around us is called a(n):

- observation
- drop
- sentence
- term

4 Which is the most accurate observation of a deer eating?

- the deer lowers its head to the grass and takes grass into its mouth
- the deer pulls leaves off trees with its trunk
- the deer swims into the ocean and catches fish
- the deer flies into the air and grabs insects

5 Which is not an observation?

- the ball is red
- the tree has leaves
- I like candy sometimes
- the dog barked

6 Which is an observation based on smell?

- colors of a building
- size of a car
- sound of traffic
- sweet scent of a flower

7 What describes how or why something happened?

- observation
- explanation
- vocabulary
- glossary

8 Which explains why we have day and night?

- we have day and night because Earth is square
- we have day and night always
- at night it is dark and in day it's light
- we have day and night because Earth rotates on its axis

9 Writing scientific explanations includes using good:

- information
- food
- water
- pencils

10 The process of getting information is referred to as what?

- movement
- biology
- research
- reading

what have you learned?

Name: _____

Select the best answer for each of the following questions.

1 What describes how or why something happened?

- observation
- explanation
- vocabulary
- glossary

2 Which is the most accurate observation of a deer eating?

- the deer lowers its head to the grass and takes grass into its mouth
- the deer pulls leaves off trees with its trunk
- the deer swims into the ocean and catches fish
- the deer flies into the air and grabs insects

3 Writing scientific explanations includes using good:

- information
- food
- water
- pencils

4 The terms “boiling” and “photosynthesis” are examples of what?

- story terms
- vocabulary words
- phrases
- poetry

5 The process of getting information is referred to as what?

- movement
- biology
- research
- reading

6 Which explains why we have day and night?

- we have day and night because Earth is square
- we have day and night always
- at night it is dark and in day it's light
- we have day and night because Earth rotates on its axis

7 Science vocabulary words help provide more what?

- money
- power
- accurate explanations
- confusion

8 Which is not an observation?

- the ball is red
- the tree has leaves
- I like candy sometimes
- the dog barked

9 Information gathered with our senses from the world around us is called a(n):

- observation
- drop
- sentence
- term

10 Which is an observation based on smell?

- colors of a building
- size of a car
- sound of traffic
- sweet scent of a flower

video review

Name: _____



You compare

Which sentence explains what's happening with the heated water in this beaker: The water is boiling. Or? The water is making bubbles.



You observe

What is this bird doing?



You decide

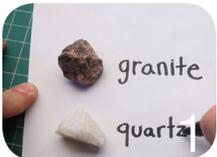
Explain why this happened.



You decide

What's another way you could get this information?

video quiz



_____ words have specific meaning in science.



An _____ is information gathered with our senses.



This is an example of a _____ that describes an observation.



An _____ describes how and why.

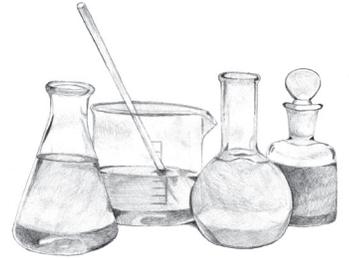


_____ involves gathering information.

vocabulary and writing

Name: _____

Science vocabulary consists of words that have specific meaning in science. When writing about science topics it's important to use correct science vocabulary. Using correct vocabulary provides a more detailed and accurate explanation.



Directions: Circle the best science vocabulary word to complete the sentences.

- 1** The heated water is boiling / bubbly.
- 2** Many birds migrate / move to warmer places in winter.
- 3** The ticker / heart pumps blood throughout the body.
- 4** Planets revolve / go around the sun.
- 5** Electricity / juice is found in lightning.

writing observations

Name: _____

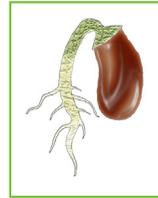
An observation is information we gather from the world around us using our senses. Making observations and recording them is very important in science. Observations are often written as descriptive sentences.

Directions: Write a descriptive sentence of what you observe in each image.

1



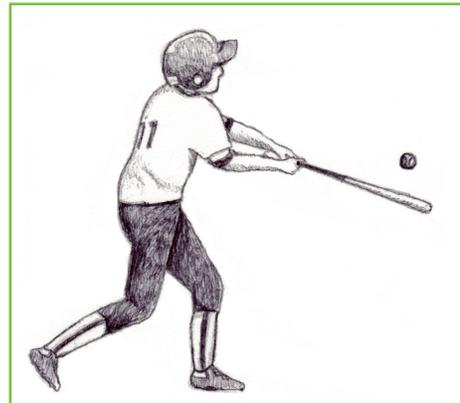
4



2



5



3



writing explanations

Name:	_____
-------	-------

An important part of science involves going beyond writing observations and writing explanations. An explanation describes how or why something happens.

Directions: Write a scientific explanation of each event. Use at least two complete sentences. Remember to use correct science vocabulary in your explanation.

1 You observe nails being attracted to a magnet. Explain why this occurred.

2 Over several days you noticed the water gradually disappeared from a glass left on the shelf. Explain what happened.

3 While watching a sunset, you observed the sun sinking below the horizon. Explain why this happened.
