

Name: _____

Date: _____



Reading Strategies (SQ3R)



Commonly, we read a science textbook as if we were watching a movie—we just sit there and expect to take it all in. Actually, reading a science book is more like playing a video game. You have to interact with it! This skill sheet will teach you active strategies that will improve your reading and study skills. Remember—just like in video game playing—the more you practice these strategies, the more skilled you will become.

The SQ3R active reading method was developed in 1941 by Francis Robinson to help his students get the most out of their textbooks. Using the SQ3R method will help you interact with your text, so that you understand and remember what you read. “SQ3R” stands for:

- Survey
- Question
- Read
- Recite
- Review

Your student text has many features to help you organize your reading. These features are highlighted on pages 2 through 25 of Chapter 1: Studying Life. Open your text to those pages so that you can see the features for yourself.

Survey the chapter first.

- Skim the *introduction* on the first page of every chapter. Notice the *key questions*. The key questions are thought provoking and will engage you in the chapter. See if you can answer these questions after you have read the entire chapter.
- You will find *vocabulary* words in the blue box with the definition on the right side of the page. Vocabulary words will be scattered throughout the chapter. Write down any vocabulary words that are unfamiliar to you to help you recognize them later.
- Next, skim the chapter to get an overview. Notice the *section numbers and titles*. These divide the chapter into major topics. The *subheadings* in each section outline important points. Vocabulary words are highlighted in bold. Tables, charts, and figures summarize important information throughout each section.
- Read the *section review* questions at the end of each section. The questions help you identify what you are expected to know when you finish your reading. You will also find *Challenge* or *Solve It!* boxes with the section review. These boxes provide you with an interesting way to learn more about information in the section.
- At the end of each chapter, you will find a reading called the *Chapter Connection* and the *Chapter Activity*. Connection readings are like magazine articles with interesting science facts. These articles always end with a set of engaging questions for you to answer to test your reading comprehension. The chapter activity is a hands-on project that you can do in school or at home. The activity will help you learn more about the information in the chapter.
- Carefully read the *Chapter Assessment* at the end of the chapter to see what kinds of questions you will need to be able to answer. Notice that it is divided into four subtitles, Vocabulary, Concepts, Math and Writing Skills, and Chapter Project. The questions are listed by chapter section. The chapter project provides you with an additional way of practicing or learning information.

Question what you see. Turn headings into questions.

- Look at each of the section headings and subheadings, found at the tops of pages in your text. Change each heading to a question by using words such as who, what, when, where, why, and how. For example, **Section 1.1: Measurements** could become *What is measurement?* The subheading **Measurement and units** could become *How are measurement and units related?* Write down each question and try to answer it. Doing this will help you pinpoint what you already know and what you need to learn as you read.

Read and look for answers to the questions you wrote.

- Pay special attention to the *sidenotes* in the left margin of each page. For example, under the subheading **Length and area**, the sidenotes are **measuring length and measuring area**. These phrases and short sentences are designed to guide you to the main idea of each paragraph. Also, note any large print with important science information in blue bold type. Here's an example: **1 milliliter (mL) = 1 cubic centimeter (cm³)** on page 7 of your text.
- Slow your reading pace when you come to a difficult paragraph. Read difficult paragraphs out loud. Copy a confusing sentence onto paper. These methods force you to slow down and allow you time to think about what the author is saying.

Recite concepts out loud.

- This step may seem strange at first, because you are asked to talk to yourself! But studies show that saying concepts out loud can actually help you to record them in your long-term memory.
- At the end of each section, stop reading. Ask yourself each of the questions you wrote in step two on the previous page. Answer each question out loud, in your own words. Imagine that you are explaining the concept to someone who hasn't read the text.
- You may find it helpful to write down your answers. By using your senses of seeing, hearing, and touch (when you write) as you learn, you create more memory paths in your brain.

Review it all.

- Once you have finished the entire chapter, go back and answer all of the questions that you wrote for each section. If you can't remember the answer, go back and reread that portion of the text. Recite and write the answer again.
- Next, reread the key questions at the beginning of the chapter. Can you answer these?
- Complete the section reviews and different parts of the chapter assessment at the end of the chapter. Use the glossary and index at the back of the book to help you locate specific definitions.

PRACTICE

The SQ3R method may seem time-consuming, but it works! With practice, you will learn to recognize the important concepts quickly.

Active reading helps you learn and remember what you have read, so you will have less to re-learn as you study for quizzes and tests.

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Scientific Method



The scientific method helps you find answers to your questions about the world. It starts with a question and your answer to the question based on your observations. This “answer” is called your hypothesis. The next step is to test your hypothesis by creating experiments that can be repeated by other people in other places. If your experiment is repeated many times with the same results and conclusions, this information becomes part of the scientific knowledge we have about the world.

Steps to the Scientific Method
1. Make observations or research something.
2. Ask a question or state a problem.
3. State a hypothesis.
4. Test the hypothesis with an experiment.
5. Draw conclusions based on the test.

- Read the following story. You will use this story to practice using the scientific method.
- *Eddie gives his mother a bunch of roses for Mother’s Day. She fills a vase with water, trims the ends of the flower stems, and arranges the roses in the vase. Then she remembers that she heard from a friend that putting an aspirin in the water helps the flowers stay fresh longer. She goes to the medicine cabinet to look for aspirin.*
- *Eddie’s sister Kela comes into the kitchen and sees the flowers. She said she heard putting a few drops of bleach in the water helps keep the flowers fresh. She thinks it is because the bleach kills the bacteria in the water.*
- *Eddie thinks it seems strange that aspirin or bleach would be better than plain water. He asks his mother if they can do an experiment to find out whether the aspirin or bleach will make the flowers last longer. She thinks it is a good idea and finds some smaller vases to hold the flowers.*
- Now, answer the following questions about the process they used to reach their conclusion.

PRACTICE

Make observations or research something

1. What are the observations that Eddie has made?

Ask a question or state a problem

2. What question does Eddie want to answer during the experiment?

State a hypothesis

3. What hypothesis would Eddie’s mother make based on the information she heard from a friend?
4. What hypothesis would Kela make?

5. What hypothesis would Eddie make?

Test the hypothesis with an experiment

Eddie, Kela, and their mother divide the flowers into three bunches of four flowers each. They mix the flowers so the bunches are as identical as possible. They put water in the vases. Into one vase, they add an aspirin, wait for it to dissolve, mix the water, and add the flowers. Into another vase, they add three drops of bleach, mix the water, and add the flowers. The flowers are put into plain water in the third vase.

6. What two things about the water should be the same for all three vases?

The three vases are placed near a window on the kitchen counter. They decide to change the water every evening, adding new aspirin and bleach to the water each day. Each day they will also compare the condition of the flowers.

7. List two factors that should be kept the same for all three vases during the experiment. Don't use factors you listed in the previous question.

8. What sort of data should they record each day to compare the flowers?

Draw conclusions based on the test

One week later, they look over their data and compare the flowers. The flowers with the aspirin in the water have lost a total of seven petals and have many brown spots. The flowers with the bleach in the water have lost a total of two petals and have hardly any brown spots. The flowers in the plain water have lost four petals and have a medium amount of brown spots.

9. Based on the data, what should Eddie, Kela, and their mother conclude about the experiment?
10. In this experiment, the water was changed each day. Do you think the results would have been different if the same water had been left in the vases all week?
11. State a different question you could answer about the freshness of flowers that uses some or all of the same materials.