STUDYING SCIENCE

- Learning from Lectures
  - Taking Lecture Notes
  - Asking Questions

- Reading a Science Textbook
  - Using Mental Visualization
  - Learning New Terms

- Working Scientific Problems
  - The Value of Practice
  - Doing Unfamiliar Problems

- Working in the Laboratory
  - Answering Discussion Questions

- Using Study Guides
Science has been called the endless frontier, but for some students it seems just plain endless. There are endless lectures, endless textbook assignments, endless problems, endless labs. This chapter presents some techniques to help make science a little less intimidating and a little more exciting. It provides effective methods for

- Learning from Lectures
- Reading a Science Textbook
- Working Scientific Problems
- Working in the Laboratory
In every subject that you study, including science, you must learn new terminology, facts, and ideas; then you must develop the ability to apply them to solve various problems. Studying science, however, is different from studying other subjects. First, the terminology, facts, laws, and principles must be learned with extreme precision. Second, the problems are almost always quantitative, and most of the ideas are stated in quantitative (mathematical) terms.

A good example is the definition of work, which is learned early in the study of physics: The work \( W \) done by a force of magnitude \( F \) in moving a body through a distance \( d \) in the direction of the force is \( W = F \times d \). For a student who is unaccustomed to precise and quantitative terms, such a definition can be intimidating, for the following reasons:

1. The definition is precise, and it must be learned and used precisely. What might seem like a minor rewording could render the definition incorrect and thus useless.
2. The definition contains several parts, and the reasoning underlying each part must be understood if the definition as a whole is to be understood.
3. The definition is quantitative. It makes use of a formula to define work, and that formula may be used to calculate work under certain conditions.
4. The student must learn what those conditions are and how to take them into account when using the formula.
5. The scientific meaning of the word work is different from the meaning we're used to. Other common words also have special meanings in the sciences; in such cases, the everyday definitions can get in the way of remembering the scientific definitions.

The reason for this degree of precision is that the sciences deal with actual, measurable things. If these things are not described or computed precisely, they will not be described or computed correctly.

You need to learn the precise terminology, facts, and ideas when you study a science. But you should not try to learn a science as if it were a collection of isolated facts. That would be an almost impossible task, and the isolated facts would have little meaning for you. The way to learn science is to fit facts and principles together into groups, or clusters, in your memory. Within each science, facts and principles are related to one another to a much greater extent than in nonscientific subjects, so clustering should be easier.

Actually, much of science is concerned with finding and explaining the relationships among various facts, concepts, and theories. Even our precise definition of work is really a relationship; it is given as a formula because the relation is a precise one. Your textbook and teachers will point out many more. Your job is to use these relationships to cluster the factors and ideas in your mind.
As you learn in this way, your knowledge of a few facts in a cluster will easily extend to new facts and ideas that you want to include in the same cluster. You will find yourself becoming more and more comfortable with science and its precision. You may begin to ask yourself questions about how new ideas fit in with old ones, about the patterns that you find in both old and new facts, or about why a principle that you learned in one science course seems so much like a principle you learned in another. Then you really will be learning science.

Learning from Lectures

Your objective is to learn the facts and their interrelationships, and your ears and eyes must be alert to both. Take full, legible notes during lectures, paying particular attention to explanatory diagrams. Don’t hesitate to ask questions if you cannot grasp a point after reviewing your lecture notes and reading your text.

Taking Lecture Notes

You should take science lecture notes and study them in the manner described in Chapters 10 and 11.

Taking Notes on Ideas

Do not try to take down the lecture word for word. If you do, the words will get in the way of the ideas. The objective of taking notes is to have a record of the main ideas so that you can study them later for deeper understanding, for review, and for examinations.

Being Systematic

Use the Cornell System for taking notes. The format is shown in Figure B.1. Write your notes in the right-hand column. Then, as soon as possible after each lecture, put your notes in order by filling in missing steps in the arguments, by correcting errors, and by relating these new notes with the previous lecture’s notes. Label each idea on the right with a question, placed in the narrow left-hand column.

Making Master Summary Sheets

Periodically (to prepare for tests or at regular intervals), reorganize your notes on separate sheets of paper by clustering the ideas and details under main topics and categories. By constructing summary sheets, you will be relating facts and ideas to one another and fixing them in your memory.
Asking Questions

If you have trouble relating concepts, solving assigned problems, or completing lab experiments satisfactorily, there may be gaps in your understanding. In such cases, you should ask questions.

Asking the Teacher at the Start of the Class

The start of the class is usually the best time to ask questions. Well-phrased questions about the previous lecture or the reading assignment can often be cleared up quickly. Moreover, something that presented difficulty for you probably did the same for other members of the class; your teacher may want to discuss the troublesome area during the lecture.

Never worry or feel embarrassed about being the only student who doesn’t understand something or about showing that you didn’t grasp a particular idea. If you do, you will be underestimating the teacher and yourself, misjudging the purpose of the course, and making it hard for the teacher to keep in touch with the class. Don’t, however, ask questions like “How do you do this problem?” Such a question may get you the answer to the problem, but it will do little to
increase your understanding. Much better questions are “Did I use the right strategy in attacking this problem? Are there other strategies that I could have used?” Such questions will get you useful information—ideas that you can apply to a broad range of material.

**Interrupting a Lecture**
Don’t be bashful; interrupt a lecture with a question if you need to. Often it is helpful for the whole class to have a lecture slowed down or brought to a halt for a while—especially if some point is obscure. But don’t interrupt too often, and make sure your question is important to you.

**Asking the Teacher Between Classes**
A good teacher’s interest in his or her subject and students continues between classes in spite of many other duties. Most teachers enjoy a discussion with an individual student. But remember one thing: Before asking for assistance, do (or at least try) the assignment and think about the problems for yourself. Private sessions with your teacher should only supplement your own work. The major part of learning must be done by you alone.

**Asking Other Students**
Discussions with other students can be a great help. Friends learning a subject together often share the same difficulties and can thus enlighten one another very effectively.

**Reading a Science Textbook**
In some ways, studying a science textbook is much the same as studying any other textbook. You should take notes using the Cornell System, review and recite them, and from time to time make master summary sheets.

Different sciences, however, call for different attacks and emphases in your reading. Generally, biology and geology place relatively heavy emphasis on key terms and definitions; physics and astronomy, on measurement and mathematics; biology and chemistry, on manipulation; and physics and chemistry, on visualization. Make sure you adapt your study methods accordingly. There are some special techniques that you should use to get the most out of your science textbook. For example, you should keep in mind that science texts are packed with information. You must read them sentence by sentence, making sure you understand each sentence before going on to the next one. Here are four more techniques.


**Using Mental Visualization**

James Clerk Maxwell (1831–1879), a Scottish mathematical physicist, recognized that different people, as they read and study science, mentally visualize or reconstruct concepts and ideas in their own personal ways. He believed that the concepts and ideas of science can be lifted out of a textbook and placed in one’s mind only by the process of mental visualization. Maxwell also believed that although people have different ways of visualizing, everyone does it to varying degrees.

Fortunately, most textbooks and articles in science are heavily illustrated with diagrams to aid the process of visualization. Learn to use the illustrations and text in such a way that they complement one another. When there is no diagram to illustrate a process or an idea, or if a given diagram doesn’t work for you, then make your own. This technique is discussed and illustrated in Chapter 8.

**Learning New Terms**

Your science textbooks contain many terms that are new to you. Because these terms stand for essential concepts, you must know precisely what they mean if you are to understand the subject matter. To help you pick out important new terms, textbooks usually emphasize them by means of italic or boldface type when they first occur. Such terms are specifically defined at that point or in a glossary at the end of the book. Give extra time and attention to the task of memorizing these terms and their definitions. Jot them down on index cards, and master each one as you would any new word.

**Learning the Language of Measurement**

Learning the language of scientific measurement is important. Most commonly used are the metric system and the Celsius and Fahrenheit temperature scales. Learn to think meaningfully about these quantities and measures.

You should know that the word *metric* comes from *meter*, which is the principal unit of length in this system. The metric system was developed by French scientists in 1799 and it is now used everywhere in the world for scientific work. Table B.1 compares some metric units with English units of measurement.

You will also want to know about the Celsius and Fahrenheit temperature scales. The thermometers for both look alike, have the same size tubes, and are filled with mercury that rises and falls to the same levels. But Celsius and Fahrenheit thermometers differ in the way their respective scales are graduated. On the Celsius thermometer, the point at which water freezes is marked...
0 (zero); on the Fahrenheit thermometer scale it is marked 32. And on the Celsius scale, the boiling point of water is 100; on the Fahrenheit scale, it is 212.

On the Celsius thermometer, there are 100 equal spaces or degrees between the freezing and boiling points of water. On the Fahrenheit thermometer, there are 180 degrees between the freezing and boiling points. To change Celsius readings to Fahrenheit readings, multiply the Celsius reading by \( \frac{9}{5} \) and then add 32. To change Fahrenheit readings to Celsius readings, subtract 32 from the Fahrenheit reading and then multiply by \( \frac{5}{9} \).

### Using Study Guides

Study guides accompany the textbooks for many science courses. One type of guide uses what is called a *programmed* approach. In this approach, a section of the guide containing sentence-completion questions corresponds to each section of the textbook. The questions help you evaluate what you’ve learned and what you still need to review. They also help you rehearse for examinations. In addition, there is a brief summary of each chapter and a list of chapter objectives. The value of the summary is self-evident. And the objectives constitute a ready-made self-test that you can use to make sure you’ve learned the important concepts in the chapter.

A second type of study guide contains, for each textbook chapter, the following items: an overview, chapter objectives, expanded chapter outline, student study objectives, vocabulary checklist, and self-tests. When using this type of guide, you should read the text chapter before attending the lecture on that chapter. Then, after the lecture, read the overview, objectives, and outline in the guide, and summarize the chapter in your own words. Check through the
Supplement: Specialized Skills

student study objectives, and write out any answers that are called for. Next, make sure you can define all the terms in the vocabulary checklist. Finally, take the self-tests to check that you have mastered the chapter. Use the study guide along with your notes when you review for an examination.

Working Scientific Problems

The Value of Practice

Never skip an assigned practice problem. The most successful way to solve a problem on a test is to remember how you solved a similar problem previously. When you first attempt a new kind of problem, it is natural to be hesitant, to make false starts, to be stumped temporarily—to waste time. But as you work other problems of the same kind, you learn to do them quickly and surely. Because each problem usually has a feature not present in previous ones, you gradually develop the ability to solve a wider and wider range of problems.

Complex problems are usually solved in a series of simple steps. If the steps are so familiar that you do them automatically, you can concentrate on how they fit together to produce a solution to the problem. Then you can proceed from start to finish without confusion. However, if each step is difficult for you, you'll be so involved in details that you won't find the right path to the solution.

In studying a science, therefore, you should do more than just the assigned problems. If your own textbook does not have many extras, look for problems in other books on the same subject, or try to make up appropriate problems for yourself. Making up good problems is hard, but it is an excellent exercise—particularly for two students who are studying together. If you do this, try to anticipate the sorts of problems your teacher will make up for your tests.

Doing Unfamiliar Types of Problems

If you do your assignments faithfully, you will come across new and unfamiliar problems in your homework. Try to approach such problems in this way:

1. Don’t start doing problems until you have studied your lecture and textbook notes.
2. Make a list of what is given in the problem and what is to be found.
3. Try to develop a chain of logical steps leading either forward from the known quantities to the unknown you have to find, or backward from the un-
known to the given quantities. If necessary, work from both ends to the middle until you find a logical connection.

4. Express these logical steps in the form of equations.
5. Combine the equations and solve them for the unknown.
6. Check your answer by determining whether it is reasonable in magnitude. If you are unsure, substitute the answer into the original relations and see whether it fits consistently.

Answering Discussion Questions

Discussion questions appear occasionally in quizzes and examinations. Before you answer one, try to understand the purpose and point of view of the person asking the question. Learn to put yourself mentally in his or her place. Ask yourself how the question is related to subjects that were recently discussed in class or in your reading assignments and what principles it is intended to illustrate. If you can visualize the question within your clusters of facts and ideas, you’ll be able to determine how you want to answer it. All that remains is to express your answer clearly, using the technical words accurately.

You need practice to become skillful in answering discussion questions. You can develop this skill by taking part in discussions with your friends, by participating in classroom discussions, and by paying careful attention to your writing skills. Usually your difficulties will be not in grammar but in vocabulary, in logic, and in ordering the steps in an argument.

Working in the Laboratory

Here are seven hints for laboratory work:

1. Do not trust your memory. Write down everything you think may be pertinent. Some things that you observe in the laboratory may seem so memorable at the time that you see no point in writing them down. But memory fades; if you do not write up an experiment completely when you perform it, you may not be able to recall important items. Figures B.2 and B.3 show the types of items that you should note immediately.

2. Make a permanent record of your observations. Keep a full record of your calculations, observations, and results in a special notebook. Don’t ever write anything down on separate scraps of paper—not even your arithmetical calculations. If you make mistakes, cross them out and go on from there, but keep everything as part of your complete record. Start your record of each experiment or laboratory session on a new page, headed with the
Figure B.2
Diagram of a Loading-Jig Apparatus, as Part of a Laboratory Report

Supplement: Specialized Skills

Experiment #3053 - Strain Measurements
October 27

The purpose of this experiment is to determine stress sustained by a rectangular bar by means of wire resistance strain gauges. Six of these gauges are taped onto different positions on the bar, then strain readings taken, during both loading and unloading processes, and the results converted to stress by using appropriate equations.
Figure B.3
A Page from a Record Book, Showing Raw Data Gathered Directly from Measurements Made by Instruments

Experiment 3057 - October 27

Measurement of displacement, velocity and acceleration

EQUIPMENT: (a) Linear Variable Differential Transformer; (b) an Oscilloscope; (c) an accelerometer; (d) an Analyzer - Recorder; (e) a Vibrating Table.

<table>
<thead>
<tr>
<th>FREQ. (Hz)</th>
<th>DISPLACEMENT</th>
<th>VELOCITY</th>
<th>ACCELERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Micro (mm)</td>
<td>VIB. MTR. 97 m/s</td>
<td>V. M. 9300 (m/sec²)</td>
</tr>
<tr>
<td>1.6176</td>
<td>1.568</td>
<td>29.2 m/sec</td>
<td></td>
</tr>
<tr>
<td>1.358</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Micro (mm)</td>
<td>VIB. MTR. 98 m/s</td>
<td>V. M. 5700 (m/sec²)</td>
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<tr>
<td>1.421</td>
<td>1.375</td>
<td>21.9 m/sec</td>
<td></td>
</tr>
<tr>
<td>1.375</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Micro (mm)</td>
<td>VIB. MTR. 94.7 m/s</td>
<td>V. M. 2950 (m/sec²)</td>
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<tr>
<td>1.609</td>
<td>1.569</td>
<td>14.9 m/sec</td>
<td></td>
</tr>
<tr>
<td>1.569</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Micro (mm)</td>
<td>VIB. MTR. 102 m/s</td>
<td>V. M. 1020 (m/sec²)</td>
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<tr>
<td>1.607</td>
<td>1.569</td>
<td>6.9 m/sec</td>
<td></td>
</tr>
<tr>
<td>1.569</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
date. This will give you a permanent log of all your data and your thinking for every problem on which you have worked—the raw materials for your final report.

3. **Organize the recorded data.** Arrange the data so that they will be clear and fully labeled for later reference. The few extra minutes you spend to make neat and orderly records during the lab period will save you time that might otherwise have to be spent deciphering sloppy notes (see Figure B.3).

4. **Do not trust yourself or the apparatus too much.** It is unwise to record a lot of untested numbers, dismantle the apparatus, and leave the laboratory before knowing whether your data are of any use. It is much better to do at least an approximate analysis (including rough graphs) of the data while they are being taken. Such a check will give you a chance to detect anything that is going wrong in time to do something about it—such as readjusting the apparatus, checking or repeating an observation, or asking your instructor for assistance.

5. **Baby the apparatus.** Poor performance in a laboratory is often due to carelessness, but it may also be the result of an uncooperative attitude. Don’t be too ready to say the apparatus doesn’t work or to believe it is limited in capability. Treat the apparatus tenderly, and coax out of it all the accuracy it can produce. Make note of its limitations, and watch it like a hawk for signs of strange behavior. No real equipment is quite like the ideal version pictured in a textbook or laboratory manual; each piece of apparatus has an individual “personality.”

6. **Keep the purpose of the experiment in mind.** This can save you much wasted effort and keep you from overlooking the main point of the lab work.

7. **Write up your reports clearly, legibly, and concisely, in the proper form.** The writing style should be impersonal; in technical reports it is customary to use the passive voice (see Figure B.4). A laboratory report usually contains some or all of the following items:

- **Purpose (object):** A statement explaining what the problem is
- **Theory:** The background for the problem and the justification for your method of attack
- **Apparatus (equipment, materials):** A listing and brief description of the essential apparatus, often including a sketch of the apparatus
- **Procedure:** A step-by-step report of what you did
- **Results:** A step-by-step record of your observations
- **Conclusion:** A summary of your findings and an assessment of their accuracy, showing how your results succeed or fail in resolving the problem

Above all, in writing a report, remember that your purpose is to make your findings understandable to a reader. Make full use of your writing skills.
Figure B.4
Sample Lab Report

**Experiment 34**

A. **PURPOSE:** To observe the increase in birefringence of nylon by increasing the orientation of fibers through stretching, despite the thinning of the nylon by necking.

B. **PROCEDURE**
   (a) A narrow strip of thin transparent nylon sheet, stretched in some spots and not stretched in others, was observed between crossed polarizers with low magnification.
   (b) About 1 mm diameter as-extruded nylon monofilament was stretched and the necking observed.
   (c) Textile-grade nylon fiber was observed as-extruded and stretched. The diameters and polarization colors of each region of the fiber were noted.

C. **RESULTS**
   (a) [Diagram showing unstretched and stretched nylon with polarization colors: 1st order white, 3rd order red and green.]
   (b) Nylon monofilament necked abruptly, rather than breaking, when pulled:

   (c) 16 mm objective, 1 eyepiece micrometer division = 16.0 μ

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Converted diameter</th>
<th>Retardation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstretched</td>
<td>4.3 div.</td>
<td>68.8 μ</td>
</tr>
<tr>
<td>Stretched</td>
<td>1.9 div.</td>
<td>30.4 μ</td>
</tr>
</tbody>
</table>

**Birefringence**

<table>
<thead>
<tr>
<th></th>
<th>Unstretched</th>
<th>Stretched</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retardation</td>
<td>0.003</td>
<td>0.059</td>
</tr>
</tbody>
</table>

D. **CONCLUSIONS**

Unstretched nylon fiber exhibited a 1st order white polarization color, i.e., showed very low birefringence. The birefringence was calculated to be about 0.003.
When pulled in tension, the nylon fiber necked abruptly. The stretched portion of the sample showed 3rd order and higher polarization colors, despite decreased thickness. This was due to a marked increase in birefringence, to about 0.059, resulting from the parallel orientation of fibers effected by stretching. Without polarizers, the nylon fiber appeared slightly greyed or opaqued where stretched. Orienting the polymer fibers leads to a decrease in clarity. Also, the stretching results in mechanical discontinuities which would tend to scatter the light.
There are two differences. First, the terms, facts, and principles must be learned precisely. Second, the facts and problems are quantitative in nature.

Learning in clusters is a matter of finding the relations among various pieces of information and then grouping the information in your mind according to those relations. It makes remembering much easier.

Concentrate on the ideas that are being presented, rather than on the words themselves. Use the Cornell System, which allows you to take, review, recite, and consolidate your notes more easily. Convert your notes into master summary sheets.

The best time is at the beginning of the lecture. The instructor may make use of your question during the lecture.

The best way is to remember how you solved a similar problem before and to do the same things again. Recall requires experience, and the only way you can get experience is with plenty of practice. Work out all the assigned problems, and then look for more problems to work on.

Be logical and systematic. First, figure out just what you need to find. Then try to plot a logical course from the given quantities to the unknown quantities, or vice versa. Once you have plotted this course, convert the steps into equations and solve them.

Figure out what sort of answer each question requires. Then try to connect the question with your clusters of learned facts and principles. Once you’ve made the connection, write out your answer in clear, precise language.

The objective is to make sure you have all the information or data you need, in a logical and legible form, to communicate your lab results clearly and precisely.

**SUMMARY**

**How is learning science different from learning other subjects?**

**What is meant by learning in clusters?**

**How can I improve my note taking in science lectures?**

**What’s the best time to ask a question in class?**

**What’s the best way to solve a test problem?**

**How should I handle a type of problem that I’ve never faced before?**

**What’s the key to answering discussion questions?**

**What is the objective of the seven hints for doing lab work?**

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**H ave You Missed Something?**

**Sentence Completion**  Complete the following sentences with one of the three words or phrases listed below each sentence.

1. The reason for the insistence on precision is that the sciences deal with ____________________________.
   - creative ideas  measurable things  the frontiers of knowledge

2. Science textbooks are packed with information, so read them ____________________________.
   - for scientific principles  sentence by sentence  for major ideas
3. In working on experiments in the laboratory, it is important to record __________________________ .
   only the major findings     even the minutest steps
   only the steps leading toward proving a principle

MATCHING

In each blank space in the left column, write the letter preceding the phrase in the right column that matches the left item best.

- 1. Clustering
- 2. Precision
- 3. Questioning
- 4. Metric system
- 5. Writing skills
- 6. Maxwell

   a. Is used for scientific measurement
   b. Realized that people mentally visualize abstract concepts
   c. Is characteristic of the sciences.
   d. Are needed to do good lab reports
   e. Helps to fill gaps in understanding
   f. Involves placing facts and ideas into groups and categories

TRUE-FALSE

Write T beside the true statements and F beside the false statements.

- 1. Complex problems are often made up of simple parts.
- 2. No real practice is needed to answer a discussion question.
- 3. A science should be studied as if it were made up of isolated facts.
- 4. A quantitative principle is one that is stated in mathematical terms.
- 5. Your lab equipment is always right and should be trusted.

MULTIPLE CHOICE

Choose the word or phrase that completes each sentence most accurately, and circle the letter that precedes it.

1. The secret of solving science problems is

   a. practice.
   b. genius.
   c. questioning.
   d. creativity.
2. Your science lecture notes should focus less on words and more on
   a. specific data.
   b. facts.
   c. ideas.
   d. formulas.
3. Science is different from many other subjects in that most of the ideas are stated
   a. quantitatively.
   b. repeatedly.
   c. obscurely.
   d. qualitatively.
4. Much of science deals with explaining
   a. isolated facts.
   b. weights and measures.
   c. relationships.
   d. controversial theories.
5. New terms in a science course should be
   a. simplified, if possible.
   b. mastered, as with any new words.
   c. taken only from lectures, not readings.
   d. kept in a separate vocabulary notebook.

**SHORT ANSWER**

Supply a brief answer for each of the following items.

1. Single out a particular science and explain how its orientation and emphases differ from those of other sciences.
2. When and how should you ask questions in a science course?
3. In answering discussion questions, where do the difficulties normally appear?
4. How should you use a laboratory apparatus?
**VOCABULARY BUILDING**

Make a light check mark (√) alongside one of the three words (choices) that most nearly expresses the meaning of the italicized word in the phrases that are in the left-hand column.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. extreme precision</td>
<td>randomness</td>
<td>accuracy</td>
</tr>
<tr>
<td>2. can be intimidating</td>
<td>suggestive</td>
<td>reassuring</td>
</tr>
<tr>
<td>3. precise terminology</td>
<td>nomenclature</td>
<td>finality</td>
</tr>
<tr>
<td>4. in manipulating</td>
<td>handling</td>
<td>scattering</td>
</tr>
<tr>
<td>5. write concisely</td>
<td>descriptively</td>
<td>succinctly</td>
</tr>
<tr>
<td>6. appeared opaque</td>
<td>translucent</td>
<td>transparent</td>
</tr>
<tr>
<td>7. have been stymied</td>
<td>blocked</td>
<td>organized</td>
</tr>
<tr>
<td>8. to wrest control</td>
<td>seize</td>
<td>give</td>
</tr>
<tr>
<td>9. number of allegations</td>
<td>denials</td>
<td>parables</td>
</tr>
<tr>
<td>10. predatory behavior</td>
<td>predictable</td>
<td>compassionate</td>
</tr>
<tr>
<td>11. increase its scrutiny</td>
<td>examination</td>
<td>disregard</td>
</tr>
<tr>
<td>12. his diminutive sidekick</td>
<td>unintelligent</td>
<td>enormous</td>
</tr>
<tr>
<td>13. a powerful taboo</td>
<td>prohibition</td>
<td>endorsement</td>
</tr>
<tr>
<td>14. weigh the credibility</td>
<td>dubiousness</td>
<td>plausibility</td>
</tr>
<tr>
<td>15. its ultimate goal</td>
<td>private</td>
<td>first</td>
</tr>
<tr>
<td>16. acrimonious argument</td>
<td>bitter</td>
<td>lively</td>
</tr>
<tr>
<td>17. diametrically opposed</td>
<td>logically</td>
<td>circuitously</td>
</tr>
<tr>
<td>18. an opportunistic suitor</td>
<td>wealthy</td>
<td>unlucky</td>
</tr>
<tr>
<td>19. unsolicited offer</td>
<td>unasked for</td>
<td>sought after</td>
</tr>
<tr>
<td>20. a candid memorandum</td>
<td>diplomatic</td>
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