

STUDY-SMART STUDENT TOOLKIT



THE GIFT OF CURIOSITY

Do you ever think about why some subjects interest you? Or why questions pop into your head out of nowhere?

In order to develop intellectually, you have to be curious. Having a curious mind helps your brain to grow healthy and strong, and it also helps you to live longer. Why? Because God designed you to learn. And the vast universe He created gives you something fascinating to learn about.

God created science. He created history. He created mathematics. He created music and language and color and order—all that is around us and in us. These are all the handiwork of God.

His Word tells us this is all part of His marvelous plan to show you what He is like.

For since the creation of the world God's invisible qualities—his eternal power and divine nature—have been clearly seen, being understood from what has been made...(Romans 1:–20, NIV ©1984)

Even though we cannot see God, when we study His creation, we learn a lot about who God is and how He loves us.

Consider your brain, for example. It's an amazing gift from God. Think about how much you have changed already since you were born. How did that happen? God preprogrammed you to grow physically, but He also designed you to grow by learning. Your body grows as it receives the food it needs, and your mind grows as it takes in information from the outside world and transforms that into learning by thinking about it.

This is called *development*. It takes more than twenty years for humans to fully develop physically. But it will take the rest of your life to fully develop your brain through learning.

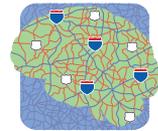
God made you to learn. Isn't that a big clue that He wants you to learn? That's why it's never too early to decide to become a lifelong learner. Not only will that decision keep you searching to know more about the God who created you, but it will also keep you healthy and growing.



HOW TO BUILD A BRAIN

So let's talk about what scientists have discovered about how your mind works. Learning about *learning* is just as important as learning about your school subjects. In fact, learning about learning will help you learn what you study in school much better, and you can use this information to help build your brain. Then learning new material in the future will be faster and deeper.

1. Get organized: Think about how well God has organized the universe—the planets fixed in their orbits, the sun that rises and sets every day, the laws of physics and chemistry that never fail. The study of science demonstrates that God is a God of order. Your mind is also designed for order. We now know that experts organize what they know much differently than novice learners. They build a superhighway system that enables them to zip around their minds at lightning-fast speeds to retrieve the information they need.



You can help your mind get ready to organize what you learn this year by organizing your physical space. Believe it or not, cleaning your room can help you think better. Try it.

The mind-building benefit of organizing is in *deciding* how you will organize things. Make this a puzzle to solve. What is the best way for you to organize your learning space for speed and efficiency?

First decide where you will complete your schoolwork. It should be a space you can call your own. (Tell your parents you are starting a new exercise program for your mind.)

Then get ready to organize your materials. Decide where you will keep your textbooks and put



them there every day. Choose a way to organize them (for example, alphabetically, by size, by subjects). Get a container that will hold all your learning tools (calculator, pencils, protractor, ruler, etc.).

Now make sure you have enough light—natural sunlight is best. Recent research shows sunlight and being outside in nature improve learning.

Next you need to decide how you will organize each subject. You should have a study notebook for each subject with dividers and pockets. The way you organize material inside your study notebook should be a visual reminder of how each subject is categorized. If you are using a textbook, look at the table of contents. The names of the units and chapters might be a good way to divide up the sections of your study notebook. Or you might want to organize your work by types of activities, such as tests, daily homework, reading notes. This decision is up to you—deciding how to organize your notebook is a good exercise in learning how to organize what you learn in your mind.



2. Manage your time: In addition to organizing the physical space where you learn, you need to organize your time for speed and efficiency. Everything you learn about in school can be divided into two large categories: skills and content. Skill areas include mathematics and language arts; content areas include history, literature, and science. Skills require regular practice. But the content areas can be studied in large blocks of time once or twice a week. Keep this in mind when you make a work schedule. Include a time slot on your schedule not only for when you have class but also for when you will review or study the subject on your own.

You should have a time for review and self-directed study every week for every subject. Waiting until the last minute to study for a test runs counter to how God has designed you to learn. You need to study material in bite-size chunks, then rest; study, then rest again. Your mind actually does most of its work processing what you learn at night while you are sleeping. That's one reason you need more sleep when you enter adolescence. You are growing physically, and your brain is going through a dramatic growth spurt. Sleeping is an essential part of the process.



3. Break a sweat: sweat In the same way that you cannot increase your muscle mass without strenuous exercise, you cannot build up your mind without a rigorous intellectual workout. The best exercise program pushes you only a bit beyond your level of endurance; likewise, your academic studies should be just a little beyond your understanding. You know you are learning if you are willing to wrestle through your confusion and search for answers to the questions that pop into your mind.

Asking for help is an important strategy that expert learners use, but you shouldn't head in that direction only. Expert learners have many other strategies in their toolkit, and we will find out more about each of these on the next pages.

THE ROAD TO INDEPENDENT LEARNING

Now that you have organized your learning space, set your schedule, and adopted an exercise program of academic rigor for your mind, let's talk about what expert learners do to learn:



Twenty Power Tools of Learning

1. Analyze it!
2. Classify it!
3. Compare it!
4. Contrast it!
5. Connect it!
6. Define it!
7. Discuss it!
8. Elaborate it!
9. Evaluate it!
10. Exemplify it!
11. Graph it!
12. Illustrate it!
13. Investigate it!
14. Model it!
15. Name it!
16. Organize it!
17. Question it!
18. Repeat it!
19. Transform it!
20. Use it!



What is missing from this list is memorizing. Memorizing is not a power tool of learning. It doesn't help you store what you have learned in your brain for later use. You can recall only 2% of what you learn through memorization, but up to 97% of what you learn using these power tools (and you will have memorized the information in the process). That's because these strategies help you break a sweat when you are learning. Thinking at a deeper level moves what you are studying from short-term to long-term memory, where you can retrieve the information at will.

Here's an illustration (that's number 12 on the list): Let's say you're starting a unit on trees in science class. Here is how to use the power tools for deep learning about trees.



1. Analyze it! When you analyze, you break the whole down into its individual parts and show how those parts work together. To use analysis in your study of trees, draw a **diagram** and label all the parts of a tree. Indicate what parts of the tree are above ground and what parts are below ground, as well as what parts are inside the tree and what parts are on the outside. Now, investigate how the parts of the tree work together to cause the tree to grow. Draw a **flowchart** to demonstrate this. (Now you'll be able to remember how trees grow for the rest of your life.)



2. Classify it! Scientists create classification systems called taxonomies. You can create your own taxonomy for any subject you study. As you read, put the information you are learning into groups and then subgroups that share similarities. To learn about trees through classification, you might make a **chart** that groups species of trees by their shared features. For example, your chart might first group the types of trees that are conifers or deciduous together. Next you might classify both types of trees by the regions of the United States where they can be found. Finally, within each of these classes of trees, you can form subclasses based upon the types of leaves, needles, or flowers found on each kind of tree.



3. Compare it! When you compare, you **list** the similarities between two or more items. For example, let's compare maple trees to oak trees. How are they alike? Well, they are both deciduous, losing their leaves in the fall. They also both have simple, lobed leaves. Some types of maples and oaks can reach more than 100 feet tall. How many more shared features can you find?



4. Contrast it! When you contrast, you list the differences between two or more items. Let's make another list of ways that maple and oak trees are different. For example, maple wood is light and more porous with a fine grain; oak wood is darker and denser with a prominent grain. The fruit of a maple is classified as a samara (winged); the fruit of an oak is an acorn (nut). Oak trees belong to the genus *Quercus* and maple trees to the genus *Acer*. How many more differences can you find?



5. Connect it! There are many ways to connect your unit on trees with what you are learning in other science units and even other subjects. Here's one idea: find out how trees connect with U.S. history. You might investigate Johnny Appleseed, Arbor Day, the Dust Bowl, and the cherry blossom trees in Washington, D.C., as a start. How many connections can you make?



6. Define it! To use this strategy, see how many different definitions of a tree you can find. And how many parts of speech can “tree” be? What are some popular idioms about trees? For example, what do we mean when we say “Money doesn't grow on trees” or “He's barking up the wrong tree”? Finally, decide what is the most precise definition you can find that identifies the type of plant we call a tree and nothing else.



7. Discuss it! This one is easy—how long can you talk about trees? Declare one of your school days “Talk about Trees” Day and see how much information you can gather from talking about trees with everyone you meet that day. Listen to what others know about trees as well. Adding their knowledge to your own will deepen your understanding of trees.



8. Elaborate it! When we elaborate, we add detail. So what do you already know about trees? You know trees have leaves or needles, right? To elaborate, find out everything you can about leaves and needles. See if you can become an expert not just on trees but on the subcategory of tree leaves. Do this with every aspect of trees you have already learned.



9. Evaluate it! Once you have a deep understanding of a subject, you are qualified to be a decision-maker about it. Let's apply this to your expertise on trees. Which tree is the best tree to plant in your backyard once you consider the climate where you live, the quality of your soil, and the depth of your water table? When you can make recommendations or draw conclusions based upon reason, then you are evaluating knowledge, and that reflects the deepest level of thinking.



10. Exemplify it! To exemplify means to give examples. Go back to number 2—your classification system for trees. Elaborate your chart by adding examples of specific types of trees in each group and subgroup you came up with. Include pictures of these trees and presto—you have your own field guide.



11. Graph it! Graphing is organizing knowledge visually. You might draw a diagram of a tree or chart differences in height according to species. These visual representations are called graphic organizers. Charts, graphs, timelines, maps, diagrams, and flowcharts are all examples of graphic organizers. They are much more effective study tools than taking notes.



12. Illustrate it! Right now we are illustrating how to use the twenty power tools by applying each one to an example about trees. Illustrations are concrete examples applied to the larger category (in this case, the power tools of learning). You can also illustrate by drawing pictures instead of using words to represent what you are learning. Spend a day in the woods sketching a grove of trees. What can you learn by carefully studying what you see?



13. Investigate it! Be a sleuth about trees. From how many different angles can you examine trees? What animals live in which trees? How can you tell the age of a tree? Where is the oldest tree in the world? What legends and fables do different cultures have about trees?



14. Model it! Plan a project! Any 3-D representation of trees or parts of trees falls under this category. Label the parts of your model so it can be used as a learning aid for a younger sibling or your friends.



15. Name it! It's very important to learn the academic language for any subject you wish to become an expert in. The fancy name for this is nomenclature. For your study of trees, investigate the terms and scientific names that tree scientists—or to be more precise, *dendrologists*—use.



16. Organize it! At this point you have a lot of knowledge about trees. Imagine you are going to write a book about trees. What topics would you cover? Lay out a hypothetical table of contents to figure out how to best organize what you have learned. Now use this system to file your notes about trees in your science notebook.



17. Question it! Fan the flames of your curiosity by frequently thinking of questions and then searching for the answers. Can you think of 100 questions to ask about trees?



18. Repeat it! Just as a regular exercise program is the only way to build muscle strength, practice is the only way to increase your brain strength incrementally. Use some of these strategies again and again.



19. Transform it! This strategy taps our creative juices. What new ideas can you come up with using your knowledge of trees? I might try creating characters for a story out of some of the drawings I've made of different types of trees.



20. Use it! Now that you have become something of an expert on trees, how can you use your knowledge for good? For instance, you might plant a tree in your backyard as a permanent reminder of this unit of study. You might get involved in soil conservation or visit a furniture store and see how many types of wood you can identify. Have fun thinking of ways to apply what you have learned.