



Queen Elizabeth

Tutoring Academy

Study Handbook

Study Strategies
by a
Harvard
Student

- How to build long term academic success
- How to achieve school-life balance and defeat stress
- How to tackle multiple choice questions in a test
- How to avoid careless mistakes in a test
- How to build academic success, step by step

by Yun C.



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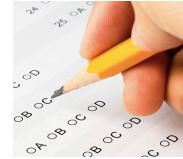
Queen Elizabeth
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**BUILDING ACADEMIC
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STUDY HANDBOOK

Study strategies by a Harvard student



Success leaves clues. How do the best students achieve academically?

What is their secret for success? How do they study? How do they write tests? How do they manage their time? It is our belief that if our students learn from the best, and model the best strategies and habits, they too can improve and achieve their academic potential.

Queen Elizabeth Academy has invited Yun Chu, an MD-PhD candidate from Harvard University to share her insights. For the past two years, Yun has been helping QEA students achieve their potential and reach their academic goals. The information in this booklet is also derived from Queen Elizabeth experience: we have worked with over 1000 high school students, many of whom were admitted to top universities with scholarships ranging from \$2,000 to \$23,000.

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Building Academic Success, Step by Step



by Yun C.
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Achieving good grades and accomplishing your goals in high school takes hard work; the ability to work consistently is attainable only with structured schedules and well thought out study habits. What exactly is a ‘habit? A study habit is an acquired behaviour pattern regularly followed until your need to study, read, or finish homework becomes almost involuntary. Developing good study habits early in the school year means that you will soon be completing schoolwork without having to consciously compel yourself to work. Doing class assignments on a daily or weekly basis will become routine and studying will no longer feel like a chore or a burden.

How can you alter your daily schedule and develop consistent study habits? Note that we are talking about ‘adapting’ your current habits to form a set of improved study skills. Everyone studies in different ways, works at different paces, and sets different goals – but some habits are better than others. To begin to build consistent habits, follow the steps on the right.

When you make the conscious decision to develop good study habits, you will change how you perform academically because your mindset will be focused on the goal of achieving academic success. Instead of thinking, “I wish I could succeed in school,” you will now be focused on the goal of “succeeding.” You will go from being a passive student to becoming a proactive individual who is firmly set on academic success. Making this decision to develop consistent study habits will be the source of your motivation.

Building Consistent Study Habits

“Consistent habits” are exactly what they sound like — actions that need to be completed on a scheduled basis. A typical study pattern I have identified in past students is their desire to finish their homework right after school finishes and before dinnertime. However, they usually become easily distracted by video games, friends, or TV, and begin to see homework and studying as a tiresome chore.

Building Academic Success Step by Step



1. **Make a quality decision to change your study habits.**
2. **Develop and follow your newly adapted study habits.**



3. **Set boundaries to protect your new habits.**
4. **Set daily academic goals and review them.**



This is because they are not practicing their study habits; once you set a goal of studying during a specific time period, stick to it; soon it will feel like part of a natural daily routine.

Once you have set up consistent study habits, you must respect those habits by setting boundaries to protect your new routine. For example, boundaries for after-school studying include not turning on the TV, turning off your phone so you are not tempted to chat, or physically putting away the video games. Boundaries allow you to keep the distractions out of your sight so that you can focus on studying and completing homework.

Set Academic Goals and Review Them Everyday

Academic dreams may not come true, but academic goals do! Set academic goals every night before you go to bed by writing them down in a list and posting them in a place where you can see them in the morning.

These goals are analogous to an academic ‘to-do’ list, but it is important to make your list as specific and detailed as possible. For instance, instead of writing down “Finish the biology homework due Thursday,” try to break it down by writing step-by-step instructions on your list. As an example, you could write:

1. *Read Biology Chapter 7, pages 556-568*
2. *Review class notes taken during class for the lecture related to this homework.*
3. *Read the homework assignment, do Problems 1-5*
4. *Take a short break.*
5. *Do Problems 6-10.*

On the right is another example of how to write specific step-by-step academic goals. What would you write instead of “Study for 5 hours tomorrow after school” ? An example for breaking this down in your to-do list could be:

Set Daily Goals and Review Them Every day

1. Get home from school at 3pm, and eat a light snack.
2. Take out Chemistry textbook: Read Chapter 4, pages 45-58 until 4pm.
3. Review notes taken in Chemistry class from the past two weeks.
4. Re-read last two Chemistry homework assignments which will be tested on this exam.
5. Try to re-do problems from these two homeworks for practice until 6pm.
6. Take a short break.
7. Read “Othello” for English class, pages 78-96 until 7pm.
8. Go back and take notes on the characters in “Othello” for tomorrow’s pop quiz.
9. Finish at 8pm, eat dinner with family.

By breaking down your original goal to “finish the biology homework due Thursday,” you have created a feasible step-by-step flowchart of how to complete your assignment.

Writing down a list of your academic goals each night has several advantages. Firstly, the list will require you to think about the exact sequence of actions you will need to complete in order to accomplish your goal. Secondly, listing them each night will allow you to reflect on what needs to be completed in the days to come. Thirdly, writing a detailed step-by-step list of how to accomplish a goal will help you to mentally prepare yourself for completing that goal later on. Finally, having a specific list in your hand the next day will allow you to view your goal as something readily achievable.

Seeing the words “Finish biology homework by Thursday” may seem like a daunting task and a chore to finish, but seeing a list of easily accomplishable tasks will be manageable and motivating.



How to Increase Test Performance



by Yun C.

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One of the most common questions students

ask is, “How can I increase my test performance?” Every student encounters several tests during a school year, and this can be a source of continuous stress. Test performance reflects your content knowledge and concept knowledge of a topic and topics studied through the year.

In this article, I will introduce you to the top 3 strategies for how to enhance your test performance.

Strategy #1: How to Manage Time During a Test

When the timer starts on a test, begin by carefully reading the test instructions. For example, if the test prompt asks you to “Answer with 3 examples,” you must pace yourself to answer with THREE examples (not two, not four, but exactly THREE). Do not misread or misinterpret the test instructions because this will cost you points on the test.

Time management during a test is crucial. Increase your test performance by dividing your time up. Take 60 seconds at the beginning of each test to make a plan of how long you will spend on each part of the test. Then make sure you stick to it! Students who do well on tests always know how they are going to approach a test, and how to portion out their time so that they don't run out.

Here's how to structure your time for the entire test:

1. Start by looking to see what parts of the test carries the most number of points, and how long you're going to need to get those points. For example, if you write 3 essays and 30 short answer questions in two hours, you don't want to spend ages on a difficult short question at the expense of the essays. Spend 20 seconds looking at the point distribution in the test.
2. Before a test, try out a few different approaches to answering questions on practice tests, and see which plan of action works best for you.
3. Be sure to leave some time at the end of the test to come back to unanswered questions or check over other questions.

Here's a simple 3-step summary for remembering how to allot time on testing. I call this the “Triple A Method: Allow-Allocate-Allot” :

1. **Allow** sufficient time at the beginning to read through the test, decide which questions you're going to answer first, and how you're going to approach them.
2. **Allocate** time for each question based on the number of points it's worth.
3. **Allot** time at the end to check your work and fill in the gaps.
For one week before the test, try to practice writing quickly. If you don't practice writing essays before a test, you may be (unpleasantly) surprised at how difficult it is to write quickly and legibly. Messy handwriting can annoy the person grading your test, and you don't want to undersell your knowledge and thinking by not finishing your answers because you write slowly. Choose a specific type of pen or pencil that you know you can write comfortably and quickly with. Then the week before the test, write out an old test quickly and neatly.



Strategy #2: How to Tackle Difficult Questions That You Cannot Answer on the First Try

There is nothing more nerve wracking than encountering a test question that you don't immediately know the answer to—or even where to begin! To tackle the most difficult questions, begin by re-reading the question carefully. In multiple choice questions, you will have to select an answer from a range of choices. Before you leap in, take a deep breath and read the question very carefully. What is the test really asking you to answer? Do not skim-read, and do not dismiss an answer choice before thinking about it for a few seconds.

Some people like to launch directly into the hard stuff, to get to a question that's most difficult so that they can get it out of the way. However, this can be a huge mistake. If you get stuck, then you'll be wasting the majority of time on that one question, and if you decide not to answer it first after all, you will be worried about it throughout the remainder of the test.

When you encounter a difficult question that you don't know the answer to, translate the question into your own words. Attack unfamiliar words or phrases by sounding them out, or breaking them into familiar parts with meanings you know. Look at the surrounding words and sentences for clues to the meaning of the work. Use your general knowledge. For instance, ask yourself, "What do I already know about ___?" You may be surprised that by rephrasing questions into your own words, you will actually be able to understand what the question asks—and then you may know the answer! Here's my step-by-step method for tackling the most difficult test problems:

1. Understand the problem: Determine what you are supposed to find or answer. What is the unknown? Consider drawing a sketch or flow chart to sort out the test question. Also, note and underline each part of the question. Some questions may seem difficult because there are several parts. Answering each part separately will make it seem easier and more manageable, and will also ensure that you don't leave anything unanswered for which you will lose points.
2. Find a way to solve for what is unknown: Write down everything that is given or known. Write down all the relevant formulas that you know (if it's a physics or math question)

and all the facts that you know (if it's a science question).

3. Carry out the procedures you have devised: For numerical problems, estimate an answer first. This will help you check your work later. Neat, careful work steps keep you from making mistakes, and will easily allow you to find them when you do make errors.

4. Check your final answer: Does your numerical answer make sense? If the number seems too large or too small, chances are that you make a mistake in calculations. If it's an essay question, ask yourself: "Does my essay answer all the parts of the question promptly?" Summarize your essay in a final sentence or two—this will tie your points together. For math and physics questions, circle your final answer so that it's easy to find.

Strategy #3: How to Calm Yourself and Overcome Test Panic

What should you do if disaster strikes? This is every student's worst nightmare, but we are here to help you plan ahead and work through it! If you go totally blank and realize that you've answered the wrong number of questions, or discover that you've misread the question, do NOT panic.

1. Quickly write down what you have done in your test space, so that the test grader can see what has happened, and you may earn at least partial credit for the work you did do. Then, use the remaining time to write a new, or alternative answer in short bullet points. Get in as much information as you can, because you want to show the grader that you've realized the problem and tried to correct your error. Show them that you actually know your stuff.
2. Decide the order in which you will answer the questions. You can calm down by answering the ones you feel most confident about. This will also help you "ease" into the test and overcome your anxiety.
3. Try a focus exercise: Take a breath in and straighten your back. Look straight ahead at something inanimate (such as the clock) and focus your mind on the positive thought, "I CAN DO this test" as you breathe out. If your concentration wanders or if you begin to feel panicky again, try the focusing exercise again, or try one of the additional techniques:



A. Thought-stopping method: When we become anxious, we begin to have negative thoughts (“I can’t answer anything!” or “I’ve forgotten everything!”). If this happens, halt the spiralling thoughts by mentally shouting “STOP!” or picture a road STOP sign. Once you have literally stopped your negative thoughts, continue planning your test, or practice a relaxation technique above.

B. Bridging objects method: It may help to carry or wear something with positive associations with another person or place. For example, wear your favourite red shirt on test day. Seeing your shirt will be comforting in its own right, and will exert a calming effect.

C. Self-talk method: Try to consciously replace negative thoughts with positive thinking. Purposely turn a negative thought such as “I’m going to fail” into an encouraging and motivating thought like “This is just anxiety, it can’t harm me.”

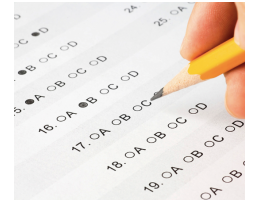
Stress management is crucial while studying for a test and especially important during the test!

You may find, as you read through this article, that you are already routinely practicing some of these skills. There may be other strategies that you’re not practicing as regularly. It is encouraged that you identify one or two of the new skills and incorporate it into your test taking strategies.

How to Tackle Multiple Choice Tests



by Yun C.
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Taking a test composed of multiple choice questions may seem easy, but often these questions are tricky because of their wording, and you may get stuck on more than one answer choice. Studying for a multiple choice exam requires a special method of preparation and thinking. To overcome struggles with taking a multiple choice test, follow these strategies:

Strategy 1: Understand the Question

Multiple choice questions ask students to recognize ONE correct answer among a set of options or ‘answer choices.’ This means that you will need to rule out several wrong answer choices called ‘distractors.’ You can only arrive at the correct answer choice if you UNDERSTAND what the question is asking. Each part of a multiple choice question has a name:

Stem: Refers to the description you first read. This is often a short narrative that gives you background information.

Lead in: The actual question itself. Usually, it is one sentence.

Answer Choice: An answer hidden among other answers.

Carefully read the information given in the Stem, and do not be careless about understanding what the Lead-in is asking of you.

Multiple choice questions tend to focus on details, and you cannot remember many details effectively in short-term memory from cramming. Learn a little detailed information each day and allow plenty of time for repeated reviews. This way, you will build a foundation of information for more reliable long-term memory recall.



Strategy 2: Pick Before Peeking

Do not look at the answer choices first! Sometimes test strategies will tell you to read the answer choices first, followed by the question so that you can have a better sense of where the question is directing you. This can be a huge mistake for two reasons: Firstly, you waste time reading the answer choices, because you will have to reread them once more after reading the question Stem. Secondly, you may get confused right away if you do not understand something in the answer choices.

It's a good idea to cover the answer options with a piece of paper, and try to answer the question by yourself first. Next, read the stem and answer it with each answer choice. Which one seems true and likely? The ones that are not likely will read poorly together. Give each option the "true-false test."

Remember, answer options that are false facts by themselves will automatically be incorrect. Only after making sure that answers match the question asked can you proceed to weed out the incorrect answer, and arrive at the correct choice!

Strategy 3: Identify Key Words in the Question Stem, Lead-in, and Answer Choices

Circle or underline key words to narrow down the question's meaning. The correct answer will match every part of the stem, so pay special attention to negatives ('none', 'not', 'neither'), superlatives ('most', 'best'), and qualifiers ('usually', 'often', 'generally' 'may'). Answer choices that contain absolutes ('always', 'never', 'every') are often wrong, as they need to be an indisputable fact. Be alert for grammatical inconsistencies between the stem and the answer choices. Those that don't "fit together" will clearly be incorrect.

Strategy 4: Strategic Weeding

If two alternatives seem correct, compare them for differences, and refer to the stem to find your best answer. If the answer you thought would be true isn't listed and the alternatives don't jump out at you, start by eliminating the obviously wrong choices. Next, try to narrow your selection down to "partner choices," meaning two answer choices that are either opposites or are nearly identical with the exception of a few words. One of these alternatives will often be the correct one.

Here is an example of how to use all of these Strategies to help answer a multiple choice question:

Strategy #1: Understand that this question asks about asthma and how to diagnose it

Strategy #2: Highlight key words (in red) in the Stem about asthma and the patient's health history.

Strategy #3: Think about what tests you would want for asthma before looking at the answer choices!

Strategy #4:

- Weed out the outliers in the multiple choices. Superlatives like "always," "highly" and "will not" sound definitive and are likely wrong.
- Read each answer choice with the Stem. Both D and E are similar, but only D sounds correct because it also mentions a type of 'challenge' test, similar to the Stem.

Question Stem: A 42-year-old man with a family history of asthma presents in pulmonary clinic with a 4-month history of cough and wheezing while he is at work. He is a janitor at a health club, and he is primarily responsible for pool maintenance. He quit smoking 8 years ago. He reports a dry cough during the week, but by the end of his weekends off, his cough has somewhat improved. A methacholine challenge test is positive. Which of the following is true about diagnostic tests to confirm the diagnosis?

Answer Choices:

- A. Specific serum IgE antibody assays are always the first-line test to diagnose asthma
- B. Specific skin prick testing will not work to test allergies that can trigger asthma
- C. Exhaled nitric oxide measurement is highly specific and sensitive to test for asthma exacerbations
- D. Specific substance inhalation challenge helps to assess airway responsiveness in asthma patients
- E. Induced sputum eosinophil analysis is costly and expensive and should not be chosen to test patients

Annotations:

- This is called the question "Stem"
- This is called the question "Lead-in"



4 Habits of Highly Successful Students



by Yun C.

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Developing effective study habits is a key step to achieving academic success because it is what you do consistently, rather than occasionally, that makes a difference. Once you set a goal, or implement a habit, it is important to be disciplined. It takes effort. Once the momentum begins to build, it becomes easier and you will be driven to achieve more!

Here are 4 common habits of successful students:

1. Set and Stick to a Schedule With an End in Mind

The main cause of wasted study time is not knowing exactly what to study and when to pursue that subject. To be able to study efficiently and effectively, you must set a goal: ask yourself, “What is my aim today? What do I want to accomplish by the end of today?” Anyone can set and follow a schedule, but those who don’t succeed have no idea where to begin studying. These students waste time by jumping back and forth between materials, or get distracted by something else half way.

You can avoid these pitfalls by first measuring your time—how much time do you have available to devote completely to studying school work? List out your other duties, such as full-time or part-time jobs, classes, extracurricular activities, vacation, etc. Writing your involvement down will allow you to observe the amount of time you can actually devote to studying without interruption. Once you have a calendar, create a study schedule by beginning with the end in mind. This means that you want to imagine and write down exactly what you want to get done before you start. Be specific. Do you want to finish reading 15 pages of your calculus textbook and make notes and

complete questions 1–12? Or research for 5 sources for your English essay, and complete 7 pages of point form notes on the topic? start organizing your time by filling in all the days you will not be studying due to vacation, meetings, jobs, or prior commitments. Then fill in the rest of the calendar based on the topics you want to cover all the way up to the test day. Be as specific as you can when filling in your schedule so that you know exactly what to study on which day.

2. Track Your Progress

Tracking your progress is your best form of self-feedback, and it will give you a realistic sense of how well (or how badly) you are doing.

For each practice section you do, write down how many questions you got correct/wrong. This trick will help you to immediately identify your strengths and weaknesses, and analyze your error patterns: for instance, your strength may be performing arithmetic rapidly, but tracking your progress may reveal that word problems in trigonometry are your problem area.

Remember, every mistake that you make during practice is one that you can avoid on your real tests or exams. You can achieve this goal by reviewing your answers and locating the point where you made an error; reflect on your thought process, revise it and try again.



3. Take Control of Time Management

Your most valuable tool when studying for your tests and exams is the ability to control your time. For each of your study sessions, only you can tell yourself what to study and motivate yourself to achieve goals.

You can make the path to successful time management easier by first finding a good place to study—make sure that it is quiet and away from distractions. Also, try to find a location that is easy to commute to. You lose valuable time if you have to drive an hour to another library when there is a conference room down the hall.

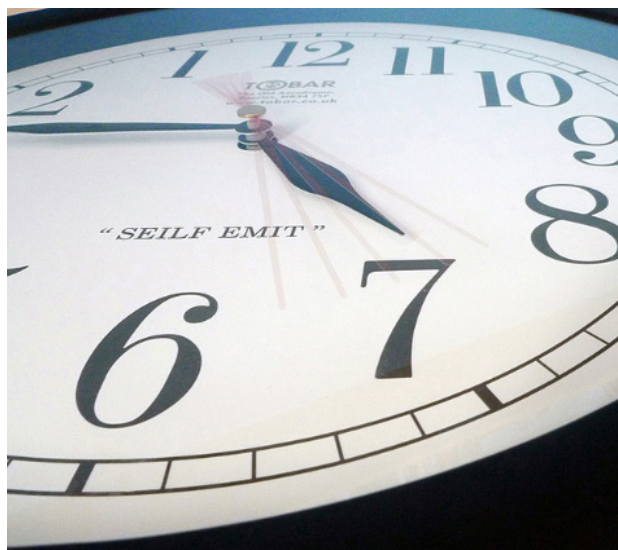
Stay motivated! Be sure to set specific study breaks so that you don't burn yourself out. Taking breaks will help you to refuel (eat a snack!), to rethink (reflect on the answers you got wrong), and to reflect (track your current progress for this week). Studying can be done anywhere and anytime. I bring flashcards with me and review them while waiting for the bus, or I read a passage or review a section while waiting for a lab experiment to finish. These are all valuable opportunities to get some studying done.

4. Find Discipline and Motivation

The most difficult part of studying for tests and exams is motivation and managing stress. Learning to remain calm when you hit an obstacle, such as not understanding how to apply a physics equation right away, will help you on tests by allowing you to still think clearly.

There are several things I've learned that will help you to face obstacles:

First, have a support system for yourself. This can include family members, friends, tutors, or even your study buddies! These individuals can be your moral support and the source of inspiration when you hit a low point and don't lose motivation to study. When you have a bad study day or feel like you are not getting anything productive done, go talk to them in person.



Chances are that they will help you figure out what is wrong, and may even help you re-arrange your study schedule so that you can better retain study material.

Secondly, have an outlet for your stress. By 'outlet,' I mean that you should have a hobby or activity outside of just studying that you can pursue to relax. Try reading a good novel, going for a walk, gardening or cooking. Having an outlet will help you relieve stress and make you more disciplined about studying when you return to your books.



How to Build Long-Term Academic Success



by Yun C.
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Your university years may seem a long time away, but what you learn and do now will directly affect your long-term academic success. Most students in high school learn to focus on short-term goals—they aim to study and succeed on quizzes and exams, sports, and homework. These involve focusing on the materials taught in class, then reviewing notes, and finally taking a test. However, there is a great need for high school students to learn the importance of long-term academic success and how to achieve it. Students are at a crucial developmental stage where what they learn and act upon will directly influence how they respond to challenges in university. This type of education will prove vital for transitioning to university and doing well after high school.

Implement the following study habits and learn how to set achievable goals. What you do here will carry over to university, and will make your chances of long-term academic success more realistic and feasible! Let me share with you the key strategies for long-term academic success:

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Strategy 1: Set Up a “Road Map” of Goals

In order to know where you want to go and what you want to achieve, you can begin by writing out a “Road Map” of your long-term goals. The key to success is to be as specific as possible. Writing your goals down is the first step towards commitment for long-term academic success.

What are your long-term goals? Set goals based on something that is very important to you. To assist you in writing out a “Road Map,” complete the attached **“Build Your Academic Road Map”** as a personal plan-of-action focusing on your long-term academic goals. This is a template to help you solidify your academic plans for after high school.

Here is some additional advice for filling out a “Road Map”: After stating your goals in writing, keep them where you can see them to help remind and motivate you. Discuss your goals with others, including family members, friends, and counsellors because talking about your goals will help you focus on how to achieve them. Focus on your personal performance throughout the “Road Map” rather than strictly outcomes. The “end goal” or outcome can be affected by circumstances that are beyond your control,



but the performance for achieving long-term academic goals is entirely dependent on habits you can control. This way, you will be less likely to be discouraged in the face of obstacles that appear while traveling through your “Road Map.”

Strategy 2: Break Down the Methods for Reaching Your “Road Map” Goals

It is important to know HOW you will reach your long-term goals. Try answering these questions (and write your answers down!):

- i. **Who:** Who is involved?
- ii. **What:** What do I want to accomplish?
- iii. **Where:** Where can you accomplish them?
- iv. **When:** Establish a time frame
- v. **Which:** Identify requirements and constraints
- vi. **Why:** Specific reasons, purposes, or benefits of accomplishing your goal.

Make sure your goal is measurable, meaning that you have concrete criteria for measuring progress towards the attainment of each goal you set. When you are able to directly measure your progress, you stay on track and are more likely to reach your goals and meet deadlines. These points are crucial for achieving academic success in university if you need to finish classwork, write papers, complete projects, and prepare presentations on time. In addition, being able to measure your goals will allow you to experience the exhilaration of achievement when you reach your goal, and that feeling will continue to motivate you to achieve more.

To reach your long-term goal, break it down into intermediate range goals, and then specific short-term goals. This will allow you to focus and accomplish step by step to become academically successful in the long run, even after high school. Here is an example of how to breakdown your goals, and thus the methods for achieving each set of goals:

Long-term Goals	Your Answer
Where do you see yourself in 5-10 years?	
What kind of work would you like to do?	
Describe the career you will have.	
Why is choosing this goal important to you?	
What relationship do your classes (high school or university) have to reaching your goal?	

Now, because it’s difficult sometimes to see beyond a few years, take the above long-term goals and break them down into smaller questions:

Intermediate-Range Goals	Your Answer
What do you need to accomplish in the next 1-3 years to reach your long term goals?	
What classes do you need to take to achieve your long term goals?	
What topics would you like to explore to stay motivated and interested?	
Who can help you today to achieve your goals? Who can you ask for help later?	
What kind of information would be helpful to you to make your goals easier to attain?	



Finally, take your intermediate-range goals and break them into short-term academic goals for this school semester:

Short-term Goals	Your Answer
What is one specific goal for a class grade? (i.e. "I will get an A in English 101")	
What plans do you have for studying to reach your goal? (i.e. I will study 2 hrs every day from 7-9 pm")	
Where can you go for help to achieve your goal? ("I will go to the Writing and Reading workshop for help in writing essays")	
Who can you reach out to for help? ("I will study with my friend Sarah on weekends, and ask my tutor for help in Math.")	
How will you stay organized in studying? ("I will construct content maps to understand hard topics while studying.")	

The above are all examples of how to take long-term academic goals and break them down into smaller morsels that you can work on without stress.

Strategy 3: Learn to Prioritize Your Long-Term Goals to Make Success More Likely

Remember to state your goals using positive language. For example, "I will not do anything else but study in the afternoon" sounds dampening. Be more motivational by rephrasing it as "I will study every afternoon for 2 hours before doing other tasks." Set goals based on what is important to you academically. For example, if you want to go to medical school, set goals of studying biology and chemistry in college, and begin by doing well in those classes in high school where you learn the fundamental information.

To help, I will teach you how to translate a "Learning Goal" into "Objectives" that you can accomplish and therefore able to prioritize step-by-step.

This example is for learning about types of energy in physics class:

Learning Goal	Objective
"I will learn the types of Energy, including Gravitational Potential Energy and Elastic Energy, for Physics class."	<p style="text-align: center;">Translates to</p> <ol style="list-style-type: none"> 1. I will be able to explain the difference between gravitational potential energy and elastic potential energy. 2. I will be able to solve word problems relating to gravitational energy and elastic energy. 3. I will be able to analyze the gravitational potential energy of objects at different heights. 4. I will be able to analyze the elastic energy of springs with different spring constants.

Conclusion: The above 3 strategies are to help you begin to achieve long-term academic success. What you do now and how you think will impact the future likelihood of attaining success. Be sure to use the example above for designing your own academic "Road Map." Good Luck!



How to Avoid Careless Mistakes on Tests



by Yun C.

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After hours of careful studying, you can comprehend all the math and science concepts and complete all of your homework problems with no issues. However, sometimes you keep repeating careless mistakes. These careless mistakes can be the source of immense frustration after all of your hard work at home. How can you avoid these mistakes? The most common answer you will hear is to reserve time at the end of tests to recheck your work. In this article, I will share several additional strategies to help you avoid making careless mistakes on math and science tests.

1. Do Not Skip Too Many Steps at Once on a Test

Math and science questions can be complex when they are composed using multiple parts. For math, the answer for one part of the question is often used for equations later in the same problem, so if you make one small mistake early on it will affect the outcome for the rest of the question.

Therefore, for math problems, do not be tempted to skip too many steps at once. Even if you can perform the shorter math calculation steps in your head, you should still write all of the steps down. Doing the steps mentally without writing each step down may lead to accidental mistakes. Also, mental calculations are not always accurate, and writing them down on paper as you work will allow you to see if you actually made the correct calculation.

2. Check All Calculations and Then Reverse-Check Them

You are probably often told to recheck your work in math and science for accuracy. For an additional strategy, after arriving at an answer to a math problem, try plugging your

answer back into the equation. If the equation works out, then you have the correct answer. If not, then you may have made a mistake somewhere. Many students skip this “reverse-check” method especially when they are rushed for time. However, this is a key step because reverse-checking is actually faster than going through and re-working the problem all over again when you are rechecking an answer.

Therefore, next try to “reverse-check” before you “re-check”!

$$\begin{aligned} \int \sin(ax + b) \cdot dx &= -\frac{1}{a} \cos(ax + b) + c \\ \int 1 + \tan^2(ax + b) &= \frac{1}{a} \tan(ax + b) + c \\ \int 1 + \tan^2 x \cdot dx &= \int \frac{1}{\cos^2 x} \cdot dx = \tan x + c \\ \int u'(1 + \tan^2 u) &= \int \frac{u'}{\cos^2 u} \cdot dx = \tan u + c \\ \int \frac{u'}{1 + u^2} &= \text{Arc tan } u + c \\ \int \frac{u'}{\sqrt{1 - u^2}} &= \text{Arc sin } u + c \\ \int \sqrt{x} \cdot dx &= \frac{2}{3} x \sqrt{x} + c \end{aligned}$$

3. Use the Same Units While Working Through Problems

Math and science problems are sometimes tricky because the question will give numbers with different units. This is a potential huge stumbling block! It is important to be aware of the units presented in the questions, especially when you are required to convert units back and forth. Begin by carefully reading the question—read it more than once to be clear on the units presented in the problem. After noting the units, the next step is to convert all of the units to the same type before performing calculations. You will often encounter this issue not only on math problems, but also for physics and biology questions.



Note that sometimes the question will ask for an answer to be in a specific unit. Do not make the careless mistake of giving your answer in the wrong unit, even if you got the correct number!

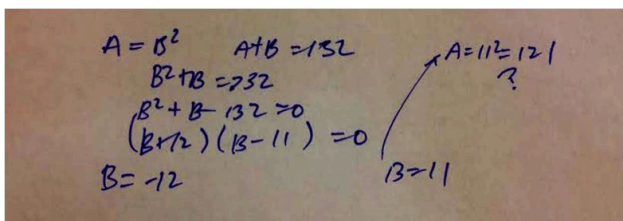
4. Keep Your Calculations and Work Organized

Students are always under a time limit, whether it's taking a test or working towards a deadline. You need to work fast to finish up all the assignments and questions, but at the same time, it is important not to overlook accuracy.

Managing time means not spending the entire time solving one math problem because you get stuck. To make the best use of your time, try to keep all of your work on paper neat and systematic. This strategy will allow you to spend less time checking on equations because you can quickly find your calculations. It will also prevent you from accidentally copying a different or wrong numerical answer if the math problem as multiple parts.

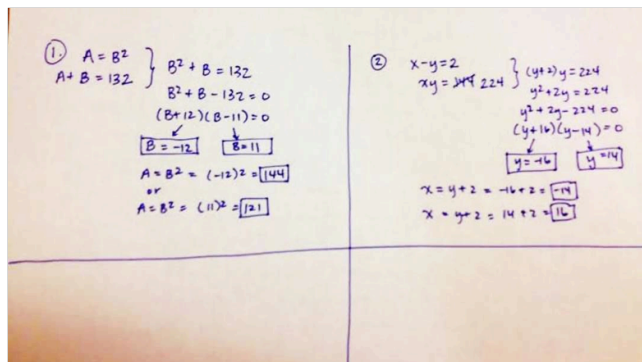
Often, you have to use the answer from the first part for the rest of the problem. If you copy the incorrect answer from an earlier part, you risk fumbling the rest of the math problem. Therefore, overcome the possibility of making these careless mistakes by keeping your work organized.

To achieve this strategy, you will need constant practice. Start doing this in your daily homework routine, and soon you'll be able to write legibly faster. Here is an example of messy work:



As you can see, the calculations are disorganized, and you will misread numbers, mess up signs and so on. Scrawling your calculations everywhere will lead to careless mistakes.

Instead, try working through each question in its own segregated space on a sheet of paper, such as the example below:



Your work is easy to find when you want to check your solutions. Your answers are also boxed so that the reviewer can easily locate them. One of the biggest benefits of organizing calculations is that this habit will make you subconsciously more organized in other areas of your test taking. You will make fewer errors copying equations over from the test and fewer mistakes recording your answers.

Conclusion: Being “careless” means that you are “not giving enough attention and thought to what you are doing.” These strategies are aimed at helping you pay more attention to your performance, so that you can minimize the number of errors on tests.



How to Find School-Life Balance and Defeat Stress



by Yun C.

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The most difficult part of high school is finding a healthy balance between a part-time job, sports, and extracurricular activities—all on top of doing well in school and studying. Finding a school-life balance will help to reduce stress and optimize your functioning. You wear many different hats as a student (worker, friend, classmate, etc), but you must learn to assess priorities. Here are three Life Strategies that can help you achieve your optimal school-life balance and decrease stress:

Life Strategy #1: Establish Priorities

Decide what is most important and what needs to be completed first. Remember that you do not have to complete everything on your to-do list overnight. Avoid the need to rush as the last minute by not procrastinating and planning your work and schedule one week ahead. Write out what needs to be done first and early in the week, and what can be completed later on. If you are focusing on a few key assignments or activities each night, you will no longer have to worry about all of them every evening. As a result, you will be able to better concentrate and do a better job on each project.

Learn to manage your time optimally. Time management is a key component to academic and professional success. Try using the example template titled "Make a Daily Schedule" to help you sort through your priorities. An easy way to prioritize is to think about what's urgent. If you have to write a history report but also need to practice an instrument for a concert, ask yourself which deadline is coming up first. If the report is due this week but the concert is next week, then you have a simple answer.

In addition, think about the consequences of NOT spending time on your top priorities. When you cannot decide whether an assignment is worth your time, ask yourself, "What would happen if I didn't do it?" Here's an example: Should you finish completing your math homework, or go out and watch a movie with friends?

The consequences of not doing your math work results in a failing grade on the project, your parents will be upset, and you will have to work harder to bring up your grade. The consequences of not watching the movie is that you will miss out on going to the theater, but you can always see the film on the weekend or on a night when you have less work. This comparison and thought process makes it pretty clear which of these two things should be prioritized.

Beware of the top time wasters! Activities such as watching TV and playing video games are known to suck out your time, so learn self-control to keep them to a minimum.

Life Strategy #2: Set Realistic Goals

Some people work extremely hard, yet they don't seem to get anywhere worthwhile or get anything done. The reason this happens is because these people did not spend enough time thinking about concrete goals. You cannot set out on a journey without a formal destination in mind. Goal setting is a powerful procedure for thinking about your future and for motivating yourself to accomplish your vision.

Strive to be a high achiever, not a perfectionist. Perfectionists can suffer from self-defeating thoughts and behaviours aimed at reaching unrealistically lofty goals. Studies have shown that perfectionist attitudes actually interfere with success by contributing to low self-esteem, anxiety, guilt, and lack of motivation. There is nothing wrong with striving to do the best that you can. The key difference is that you must know your limitations. Become a high achiever without being a perfectionist, and here are a few tips:



1. Set goals that are realistic and achievable—and be specific!
2. Enjoy the process of working towards your goals, not just the outcome.
3. Discuss your positive and negative thoughts.
4. View mistakes as opportunities for learning and growth.
5. Be willing to take feedback and improve yourself.

Begin by writing down your goals. Studies have shown that you are far more likely to achieve your goals if you write them down. Writing down goals also makes them real to us. Next, set short-term milestones. Goals that are far out of reach are easy to procrastinate on and delay. As always, be specific on what your short-term goals are. The more specific you are, the more motivated you will be as you get closer to achieving your goal. Measure your actions as well as progress. For example, if you want to complete a science project by a certain deadline, monitor your actions for getting that project done—have you read your science notes, done your research, and performed the experiments? Finally, start with just one goal in the beginning. A classic mistake is that people can be overzealous and try to set too many goals at once. Therefore, set one main goal at a time and then slowly add more goals as you get the first one under control.

Life Strategy #3: Take Good Care of Yourself

The biggest influence on you as a high school student is to learn the lesson of responsibility and balance. Be honest with your feelings. If you feel overwhelmed about your workload, see if there are a few things you can accomplish now and a few later. This will help decrease stress at the moment, and allow you to overcome frustration and anxiety.

An important lesson in life is to always approach a task with an open mind. You can only do so with a healthy body and clear thinking. Exercise and a healthy diet can go a long way to help relieve stress. Be aware of too much stress in your life. Stress is a normal physical response to events that make you feel nervous or upset your balance in some way. It can be both good and bad. On the positive side, stress can help you rise to meet challenges, and it is what keeps you on your toes during a presentation at school. But beyond a certain point, stress stops being helpful and starts causing major damage to your health, productivity, relationships, and quality of life.

Here are some signs of Stress Overload

- **Emotional symptoms:** Moodiness, irritability, short temper, and feeling overwhelmed. You may also get a sense of loneliness and isolation, depression or general unhappiness.
- **Cognitive symptoms:** Memory problems, poor concentration, poor judgment, anxious thoughts, and constant worrying.
- **Physical symptoms:** Aches and pains, nausea, dizziness, rapid heartbeat, and frequent colds.
- **Behavioural symptoms:** Eating more or less, sleeping too much or too little, isolating yourself from others, procrastinating or neglecting responsibilities, and developing nervous habits.

Rest assured – there are many ways to help relieve stress. Unchecked stress is damaging, and you actually have more control over your stress levels than you might think. You can learn to cope with stress in a healthy ways, but remember that everyone has a unique response to stress. There is no single method to relieve stress, but here are a few helpful ideas:

- Physical activity can greatly help manage stress. Exercising mindfully helps to get your circulation going and help your concentration.
- Engage socially with friends and family. Talk to a trusted person face to face. The simple act of looking at a familiar face can help reduce stress.
- Set aside time for yourself. Try meditation, yoga, or deep breathing exercises.
- Eat a healthy diet. Well-nourished bodies are better prepared to cope with stress. Start your day with breakfast, reduce your caffeine and sugar intake, and eat light snacks to keep your energy levels up.
- Get plenty of sleep. Feeling tired can add stress to your life, causing you to think irrationally and act irritably. Keep cool by getting a good night's rest.

Conclusion

As high school students, you may be under a lot of pressure from home responsibilities, school, extracurricular activities, and part-time jobs. When you feel stressed or overwhelmed, it is important to reach out and ask for help. You don't have to be perfect to be recognized for your achievements, so learn to set priorities to accomplish your most important goals. Try implementing these three Life Strategies into your life to help reduce stress and work to maintain school-life balance.

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Aisha G.

Teaches: SAT, Economics, English

Master Degree of Finance from University of London, and Bachelor of Arts from University of Pennsylvania.

James H.

Teaches: Adv Functions, G11 Math, Calculus

Certified Teacher of Ontario, major in Mathematics
3+ years of experience as teaching assistant in university

Stephanie E.

Teaches: G11 Math, Adv Functions

Certified Teacher of Ontario
Graduate from University of Toronto (OISE)

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