Welcome!

While we wait for everyone to join...

1. **Go to the Google Slides provided** (link available in the chat)
   https://docs.google.com/presentation/d/1irTgX-VrBdEHHKv8GAzHJdwo9kMw2M_cBgQPKXcxtCA/edit?usp=sharing

2. **Answer the questions in the Google Slides.** There are no right or wrong answers. The goal is to help everyone start thinking about a few things:

   a. Slide 1: Describe why you are interested in STEM (Science, Technology, Engineering and/or Math) in 3 words or phrases.

   b. Slide 2: List 3 things you find most challenging about pursuing a degree in STEM

   c. Slide 3: List up to 3 things you hope to learn from this session

   d. Slide 4 (optional) Write your preferred email address in the table if you would like to receive an emailed copy of today’s presentation.
STEM Success Strategies from Real-World Engineers

Ashley Erickson
DVC Department of Engineering
Fall 2021
Objectives for today

By the end of today’s session, you should be able to...

1. Recognize common challenges faced by students and professionals in STEM fields

2. Apply 7 “Success Strategies” to help you succeed

3. Identify next steps you can take to be more successful in STEM

Please stay muted unless asking a question. You may also ask questions in the chat.
These slides will be made available to participants at the end of the session.
Quick Bio

• Bay Area Native

• Foodie and Fan of All Things Nerdy

• BS, MS, and PhD in Chemical Engineering from USC

• Background in Biosensors, Optics, Process Engineering, Manufacturing, Hardware

• 6 years engineering industry experience at Intel, Cisco, Startup

• Engineering assistant professor at DVC
Question for today:

How can we apply strategies from the real world to be more successful in STEM?  

First, let’s compare school and the real world.

Disclaimer: Today we will discuss a bunch of tools and strategies that work for many people. But you should also experiment to figure out what works best for you. Everyone is unique.
“School” vs. “Real World”
What differences do you see?

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<td>• Yourself, and your instructors</td>
<td>• Your manager.</td>
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<td></td>
<td>• Instructors generally care about you</td>
<td>• <strong>Often focused on results,</strong></td>
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Strategies useful in Industry can also apply to school and life in general:

• Not knowing, failure, fear, ambiguity and uncertainty are normal.
  – You need to know how to overcome these obstacles and learn from them.

• In the real world, people usually don’t hold your hand.
  – You must manage your own success and well being, and get help when needed.

• Your boss and team won’t accept “I failed” or “I don’t know” as an answer
  – Never say “I don’t know”. Find a solution or make a plan to move forward.

• You need to create your own definition of success and work toward it.
  – Knowing what you want and having a plan is key.

• There is more to life than work.
  – It’s important to also have life and meaning outside of work.
7 Success Strategies*

1. Imagine who you could be and work toward becoming that person
2. Seek mentors and positive groups.
3. Plan and manage your time
4. Get comfortable outside your comfort zone
5. Embrace a growth mindset
6. Apply trusted problem solving strategies
7. Enjoy the journey

*Gathered from Prof. Erickson’s personal experience and various references. See references listed throughout these slides and at end. Everyone is unique, so figure out what works best for you. What works for one person may not work for another.
1. Imagine who you could be and work toward becoming that person

To stay motivated, it’s helpful to have a sustaining meaning, goals, and a strong “why”. Think about the questions from the beginning of the session.

- Why STEM?

- How do you define success?
1. Imagine who you could be and work toward becoming that person

What kind of person do you need to become in order to achieve the success you want?

Make sure you have a strong “why” to sustain you through the challenges of STEM.
2. Seek mentors and positive groups

You are the average of the 5 people you spend the most time with.

Choose your 5 people carefully!

**Surround yourself with mentors, friends, classmates, family members, and others who can support and encourage you!**

Don’t be afraid to go to these people when you need help.
The importance of having mentors

Mentors can help you...

– Plan and pursue your goals
– Give you encouragement when you need it
– Tell you constructive, honest feedback
– Learn and grow your skills
– Connect you to other people and opportunities

Successful STEM professionals have mentors throughout their careers, and especially at the beginning!

FYI: DVC has mentoring programs available! Take advantage of them! Often, people are happy to share advice or meet with you.
3. Plan and manage your time

Planning and managing your time is key to success!

- **You should make and maintain a 5 year plan with**
  - Personal/family goals
  - Education/career goals
  - Adventure/fun goals
  - Giving back goals
- **Plan should include daily, weekly, monthly tasks you will do to help you achieve these goals.**
- **One potential template embedded here:**
  
  [PDF](#)

5YearPlanTemplate.pdf
More on goal setting

- We could spend an entire session on this. Short version: Use SMART goals
- Examples:
  - Every Sunday evening, I will set aside 30 minutes to make a daily plan for the week and schedule specific times to complete schoolwork, other obligations, and required tasks.
  - “Compare yourself to who you were yesterday, not to others today”

More on time management

Figure out what time management strategies work for you. Some ideas:

– Keep a daily routine (helps save willpower and improve efficiency)
– Learn to say no
– Optimize your study strategies (don’t read, do!)
– Maintain a to do-list and calendar
– Make a weekly plan ahead of each week
– Schedule fun and recovery time as well as work
– Set reasonable, realistic goals and leave some buffer
– Learn project management skills and break large projects into smaller tasks

Remember, 1 unit of college = 3+ hours of work per week. So a 4 unit class requires 12+ hours per week to be successful.
4. Get comfortable outside your comfort zone

In school, social media, and culture, we often see only the perfect, polished side of STEM, but this is not realistic!

EXPERIENCE IS THE NAME EVERYONE GIVES TO THEIR MISTAKES

OSCAR WILDE

Mistakes are embarrassing, when they happen, but years later, you have a collection of mistakes called EXPERIENCE...

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DIABLO VALLEY COLLEGE 23
4. Get comfortable outside your comfort zone

Uncertainty, discomfort, stress, and lack of confidence are real things we experience in STEM. It’s important to learn to succeed in these conditions.

- Confronted with failure? Identify what you can learn.
- Lacking confidence? Fake it. Others may be afraid too!
- Feeling anxious? Consider gratitude and mindfulness practices.
- Not sure what to do? Do some research, be resourceful. Don’t be afraid to ask for help.
- Feeling stressed or overwhelmed? Break tasks into manageable pieces. Make a plan. Vent to a trusted friend or mentor. Be kind to yourself.
5. Embrace a growth mindset

- **“Growth Mindset”** is the belief that you can cultivate and improve upon your abilities through practice and effort.

- **“Fixed Mindset”** dictates that a student’s ability is largely predetermined and unchangeable.

Stanford University Professor of Psychology, Carol Dweck
https://sites.dartmouth.edu/learning/2017/05/18/understanding-the-growth-mindset/
# Growth Mindset Examples

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<th>Growth Mindset</th>
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<td>How could I learn _______________?</td>
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<tr>
<td>I’m not good at this.</td>
<td>How can I improve at this?</td>
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<tr>
<td>That person is smarter than me.</td>
<td>What can I learn from that person?</td>
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<tr>
<td>Why do I keep messing up?</td>
<td>How can I learn from this?</td>
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<tr>
<td>I don’t have time.</td>
<td>How can I make time?</td>
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<tr>
<td>This is too difficult.</td>
<td>With practice, this will get easier.</td>
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<tr>
<td>I give up.</td>
<td>How can I find another way?</td>
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<tr>
<td>This class is terrible.</td>
<td>What can I learn from this class?</td>
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How do we develop a growth mindset?

1. Recognize fixed mindset thinking
   - Negative, limiting beliefs
   - Opposed to change and uncertainty
   - Prefer to avoid pain, risks
   - Belief that skills and intellect cannot change

2. Replace fixed mindset with growth mindset
   - Replace “I can’t ________________” with “How can I ________________”
   - Be open to new approaches and new ideas
   - Remember that skills and talents can be developed through effort and practice. We all start somewhere.

Stanford University Professor of Psychology, Carol Dweck
https://sites.dartmouth.edu/learning/2017/05/20/developing-a-growth-mindset/
Examples

Fixed mindset: “I am don’t know how to do this... I give up. I’ll leave this question blank... “

Growth mindset: “I don’t know this... yet. What do I know? How can I figure this out? Let me give this a try and also reach out to the instructor for help”
Examples

**Fixed mindset:** “Computer programming and electronics aren’t for me. They don’t make any sense.”

**Growth mindset:** “If I don’t try, I have already failed. With time and effort, I could succeed”
A favorite quote from Tony Robbins

From Awaken the Giant Within:

“Years ago, I found myself caught up in a pattern of frustration and anger. It seemed to have problems everywhere I turned. At that point, thinking positively was not high on my list of solutions. After all, I was being “intelligent”, and intelligent people don’t make things look positive when they aren’t. I had plenty of people around me who supported this idea (and they were equally frustrated with their lives, as well!).

In reality, at the time I was being incredibly negative and seeing things worse than they were. I was using my pessimism as a shield. It was my feeble attempt at protecting myself from the pain of failed expectations: I’d do anything to keep from being disappointed once again. But in adopting this pattern, this same barrier that kept me out of pain also kept me out of pleasure. It barred me from solutions and sealed me in a tomb of emotional death where one never experiences too much pain or too much pleasure, and where one continuously justifies one’s limited actions by stating they’re “just being realistic”.

In truth, life is a balance. If we allow ourselves to become the kind of people who refuse to see the weeds that are taking root in our gardens, our delusions will destroy us. Equally destructive, however, is what happens to those people who, out of fear, constantly imagine the garden overgrown and choked with weeds... We don’t have to feel negative about weeds. They’re part of life. We need to see them, acknowledge them, focus on the solution, and immediately do whatever it takes to eliminate them from our lives. Pretending they’re not there won’t make things better; neither will becoming inflamed with anger by their presence nor devastated by fear. Their continual attempt to be part of your garden is a fact of life. Simply remove them. And do it in an emotional state of playfulness or joy... because I can promise you one thing: there will be more “weeds” that continue to come up... They keep you vigorous, they keep you strong, they keep you vigilant in noticing what needs to be done to keep the garden of your life healthy and rich. We need to practice this same approach in weeding the gardens of our minds.”
Activity

• Let’s replace some of the STEM challenges we identified with a growth mindset phrase.
6. Apply trusted problem solving strategies

Next slides: some favorite problem solving tools

1. Tony Robbins: Problem Solving Process
2. 5 Whys
3. Structured Problem Solving
Tony Robbins’ Problem Solving Process

From Awaken the Giant Within

1. What is great about this problem?
2. What is not perfect yet?
3. What am I willing to no longer do in order to make things the way I want?
4. What am I willing to start doing in order to make things the way I want?
5. How can I have fun along the way?
5 Whys

Keep asking why 5 times or until you identify the underlying cause of a problem.
5 Whys Example

- Why were test scores and homework grades low?
  - Student didn’t understand material
- Why didn’t student understand material?
  - Student didn’t ask for help
- Why didn’t student ask for help?
  - Student didn’t come to class
- Why didn’t student come to class?
  - Student can’t wake up that early
- Why can’t student wake up that early?
  - Student goes to sleep late
- Why did student go to sleep late?
  - Student had to work and then finish lots of homework
- Why did student have to work and finish lots of homework?
  - Student is taking 24 units of classes
- Why is student taking so many classes?
  - Student thought they could fit everything into their schedule
- Why did the student think they could fit all that into their schedule?
  - Student needs to work on time management and planning skills
Structured Problem Solving

1. Write a clear problem statement.
2. Make a table listing possible root causes and data/information you know.
3. Gather more data to narrow down all possible root causes and find a solution.

Example problem statement: A student received 50% score on the exam and wants to improve grades in engineering class.

<table>
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<th>Possible Root cause</th>
<th>Evidence for</th>
<th>Evidence against</th>
<th>Conclusion/next steps</th>
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<td>Not enough time spent studying</td>
<td>Low test scores</td>
<td>Time was available to study</td>
<td>Not likely to be root cause</td>
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</table>
| Poor study habits | Low test scores  
Student did not complete any practice problems | Time was available to study | Possible root cause |
| Not understanding material covered in class | Low test scores  
Poor class attendance | | Possible root cause |
| Expectations not well communicated | | Emails sent out to all students  
Other students doing fine | Not likely to be root cause. |
| Poor time management | Low test scores | Time was available to study | |
Practice / Activity

Time permitting: Solve a problem using one of the strategies.
7. Enjoy the Journey

Some points to consider:

• Willpower is finite.
• Find healthy, positive ways to recharge.
• Find ways to give back, help others
• Manage your work to fun ratio
• Gratitude is the antidote to anxiety
• Usually careers are not the fundamental purpose in life. Most people find meaning in family, relationships, giving back, and experiences outside of work.
Key takeaways for today

• Be kind to yourself. STEM is challenging. You don’t have to be alone in your journey.

• Think about what tools you can apply to increase your success in STEM. Find and do what works for you.

• DVC has many resources available to help with the topics we discussed. Use them. The Math and Engineering Center is a good starting point.

• Questions: aerickson@dvc.edu

• These slides will be made available to participants at the end of the session.
Some References

Growth mindset and Mindfulness

• *Search Inside Yourself* by Chade-Meng Tan
• Stanford University Professor of Psychology, Carol Dweck
  https://sites.dartmouth.edu/learning/2017/05/20/developing-a-growth-mindset/
• *Reform Your Inner Mean Girl: 7 Steps to Stop Bullying Yourself and Start Loving Yourself* by Amy Ahlers (recommended especially for female students)

Goal setting, success, problem solving, career

• *Awaken the Giant Within* by Tony Robbins
• *12 Rules for Life* by Jordan Peterson
• *The Miracle Morning* by Hal Elrod
• *Create or Hate: Successful People Make Things* by Dan Norris
• *What color is your parachute?* By Richard N Bolles
Bonus: for undecided students

• From ENGIN-110, lecture 2 (based on engineering functions, but applicable to STEM in general)
What engineering functions interest you most?

Consider the following:

• Do you want to be a people manager or individual contributor?
• Do you want to do research?
• Do you want to work independently or with teams?
• Do you prefer building things or crunching data?
• Do you want to sit in an office or work in a lab/factory?
• How introverted or extraverted are you?
• Do you like working with customers?
• Do you like a fast-paced environment or prefer a slower pace?
• How independently do you prefer to work?
• How much work-life balance do you want? Ability to work from home?
• Do you want to do a lot of business travel?
• How much ambiguity and uncertainty do you like? Do you like powering through the unknown or following a set path?
My advice to those who are unsure

• It’s ok to not have everything figured out! Try different things and see what you like best.
• Your needs, preferences, and interests may change over time.
• Worst case, choose a broader major which encompasses many skills and areas you are interested in, and get more focused as you go.
• Engineering opens doors. Having an engineering degree can make many opportunities to do different things.
• It is ok to change functions! I have worked in research, design, development, management and education roles.
Ikigai: Japanese view on Career

- Ideal job is at intersection

https://medium.com/ideas-into-action/ikigai-the-perfect-career-diagnostic-3de932834be7