

WHAT'S YOUR SUPERPOWER?

Teacher's Guide to the CapABLE Curriculum

**STEM edition includes
teaching guide and five
day student workbook!**



Created by Vivian O'Neal

Illustrations by Camron Knowlin, Claire Laporte, Ariel (Ace) Brown

Meet the CapABLE Crew!

Meet Cami!



Cami is the creator of the CapABLE Crew! Cami has an emotional disability and has a therapy dog that helps to comfort her. Her super cuddly dog, Casper, helps Cami feel better when she deals with her disability. Cami's superpower is her voice! She uses her voice to stand up for her friends and for what is right.

Meet Josiah!

Josiah is a high-spirited, high tech genius! He drives everywhere really fast in his speedy power wheelchair. Josiah's superpower is his brain! He uses his super smarts when he makes things with his 3D printer. Josiah makes cool gadgets for his wheelchair and other helpful tools for his friends to use.



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Meet Charlie!

Charlie is an athletic superstar! He runs in marathons and lift weights. He walks around feeling strong and confident with his prosthetic leg that Josiah made a one-of-a-kind cover for using his 3D printer. Charlie's superpower is his determination. He doesn't allow his disability to keep him from playing the sports he loves!

Meet Samantha!

Samantha is a quiet, kind-hearted member of the CapABLE Crew! She wears special glasses that help her see. Samantha's superpower is her ability to be observant, or quickly notice things. Samantha notices all the wonderful things about her friends and uses her power of observation to encourage them.



Day 1

STEM in the Everyday: Science, Technology, Engineering, and Math

The students will identify ways in which science, technology, engineering, and math (STEM) is integrated in their everyday lives including in their future potential career paths.

TEACHER SUMMARY

Getting Started

1. Introduce workbook
2. Read character descriptions

Story: STEM in the Everyday

3. Read the story

Activity: STEM in your everyday life

4. Read and follow the instructions

Critical Thinking: Discussion Questions

5. Read and answer discussion questions

Problem Solver: Designing an accessible playground

6. Read through the project introduction and discuss
7. Wrap up; what did we learn?

MATERIALS AND PREP

Materials:

- Scratch paper

Prep:

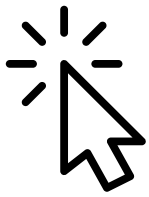
- N/A

Day One: STEM in the Everyday

Science, Technology, Engineering, and Math

Read the following story.

Science, technology, engineering, and math (STEM), are essential to our ability to function as a society. STEM can be used in large projects such as the creation of rockets and an astronaut's ability to walk on the moon. However, it still plays a vital role in simple, everyday tasks that make a big difference such as baking, playing sports, cleaning, shopping, or driving. Sometimes it is difficult to understand STEM and we think that it is not important to us or we don't use it very often, but it's actually the opposite. Once you begin to pay attention, STEM is everywhere! STEM is especially useful within technology, such as creating gadgets that help people accomplish things. For example, computers help us to research things we want to know about. Did you know that these gadgets can also help people with disabilities become more independent? This type of technology is called assistive technology. Hearing aids assist those with hearing loss, power wheelchairs can help individuals who cannot walk be able to get around quickly, and there are even devices that help those who are nonverbal speak to others! Knowledge of STEM equips students like you with the skills needed to succeed and adapt to an ever changing technological world. STEM is intended to lead to innovation necessary to sustain our economy. This innovation and science literacy depends on a solid knowledge base in the STEM areas. Science is everywhere! It impacts all living things on earth and the more we know about it, the more we can understand the world!



ACTIVITY

STEM in Your Everyday Life!

Sometimes STEM is part of your life and you don't even notice it. Tomorrow, as you go throughout your day, be mindful of the science, technology, engineering, and math that is happening around you. It could be the science of gravity as your feet hit the floor first thing in the morning or the math you used to measure while you cook dinner. Make a list of these things as you notice them and bring it to school the next day to share with the class!



CRITICAL THINKING

There are so many different cool careers that you can pursue if you are interested in STEM. Brainstorm different jobs in each area and write them down. For example, under "Math" you might want to be a math teacher, or a construction worker.

Science:

Technology:

Engineering:

Math:



PROBLEM SOLVER

Design an accessible playground!

Just like we talked about earlier, sometimes STEM is part of our lives and we don't even realize it. Another thing that we may not realize about STEM is that it can also solve many problems we see in our world today.

For example, there may be someone who has a physical disability that has trouble reaching certain items in their pantry. This person could have a tool made that allows them to reach higher and get that item independently. That's STEM!

Think about when cars were first made. People wanted a better, quicker way to get to different places, so they made cars. That's STEM!

Throughout this workbook, you will use each element of STEM, science, technology, engineering, and math, to design an accessible playground.

Use this exercise to really think outside the box and be creative. Think about your own school playground; if someone who uses a wheelchair wanted to swing at recess, would they be able to? Is there proper equipment? What about a student who was born without any hands. Are there activities available on the playground that they can participate in?

Use these types of questions to help you throughout the "Problem Solver" activities as you're designing your playground.

Day 2

Science; the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment.

The students will understand the purpose of and science behind emotional support animals as well as recognize serotonin and dopamine chemicals and how they impact mental health.

TEACHER SUMMARY

Getting Started

1. Review day one

Story: Science

2. Read the story

Activity: Expressing Gratitude

3. Read and follow the instructions

Critical Thinking: Discussion Questions

4. Read and answer discussion questions

Problem Solver: Blueprints

5. Read through the instructions and discuss
6. Wrap up; what did we learn?

MATERIALS AND PREP

Materials:

- Scratch paper
- Graph Paper

Prep:

- N/A

Day Two: Science

The intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment.

Read the following story.

Cami loves her dog, Casper. As a matter of fact, he is her very best friend. He calms her down when she feels stressed and is always there for her when she feels lonely. Casper is an emotional support animal (ESA) -- or an animal that offers companionship and other benefits to individuals with a form of disability. Cami is very anxious and sometimes her emotions get the best of her in certain situations. School stress, being in large groups, or a really loud or overwhelming environment can make Cami feel nervous. Her dog helps to ease her nerves and bring her comfort. Sometimes the kids at school want to pet Casper or get distracted by him, but when they're out in public, Casper is technically "working." Some students do not understand that there is actually science behind having an emotional support animal! Casper is "working" when they are in public because he's supporting Cami in certain situations that feel overwhelming. If other children are petting him, it could confuse him on who his owner is and disrupt his ability to do his "job." Science actually supports that ESAs increase chemicals called serotonin and dopamine, promoting calm feelings and relaxation. When her friends understand that Casper is an emotional support animal, they begin to treat him more like just another student that walks around with Cami. This helps them not get distracted by him or try to play with him during class -- he usually sits or lays quietly at Cami's feet and walks beside her throughout the day. Understanding the science behind an ESA helps the students to be more aware of students with emotional disabilities and respect animals that help those individuals.





ACTIVITY

Expressing gratitude

Remember those words we talked about in the story, serotonin and dopamine? Research shows that expressing gratitude can increase these chemicals in your brain, promoting calm feelings and relaxation. You can start your own gratitude journal by writing three things you are thankful for everyday. Today, take out a sheet of paper and write the first three things that you are thankful for. Continue adding to the list each day.



CRITICAL THINKING

Read and answer the following questions.

Science and mental health go hand in hand. Research shows that the overuse of social media and a high screen time can have damaging, long-lasting effects on students like you. Understanding the science behind these effects can help you create habits that encourage positive mental health, like Cami talked about in the story.

- 1) There are plenty of other scientific ways to alleviate anxiety, such as positive thinking. What are some affirmations that you can repeat to yourself to help you stay positive?

- 2) Why is it important to limit the amount of time you spend on your cell phone? How can you set boundaries for yourself when it comes to using your cell phone or iPad?

- 3) Social media is another thing that can lead to negative mental health in young children. It can be a good thing, but too much of it can be harmful. Why do you think that is? How can you set boundaries for yourself when it comes to using social media?



PROBLEM SOLVER

Science

The first step in creating and designing any new type of space is to start with a layout. Think about what your playground looks like - how big is it? What is it shaped like?

Scientists often use blueprints when conducting experiments. A blueprint is a blue piece of paper with a white technical drawing that lays out the space of whatever the scientist is working on.

Today, you will create your own version of a blueprint using graph paper. Start with the outline of the playground so you know the shape and can make sure all of your playground equipment will fit and there is still space to run around.

Draw where you want certain items to go in the space, such as the swing set or the monkey bars.

Hang on to your blueprint because we will use it again in later lessons.

Day 3

Technology; the branch of knowledge dealing with engineering or applied sciences; machinery and equipment developed from the application of scientific knowledge.

The students will recognize the unique ways technology impacts and assists in everyday tasks as well as understand the evolution of technology and the ways in which it is implemented into their lives.

TEACHER SUMMARY

Getting Started

1. Review day one and two

Story: Technology

2. Read the story

Activity: Smart Home Technology

3. Read and follow the instructions

Critical Thinking: Discussion Questions

4. Read and answer discussion questions

Problem Solver: Designing playground equipment

5. Read through the instructions and discuss
6. Wrap up; what did we learn?

MATERIALS AND PREP

Materials:

- Graph paper

Prep:

- N/A

Day Three: Technology

The branch of knowledge dealing with engineering or applied sciences; machinery and equipment developed from the application of scientific knowledge.

Read the following story.

Josiah is one of the smartest kids in his class. He is on the robotics team at school and is always using technology to design and create solutions to problems, especially using his 3D printer. One day, Josiah notices that one of his friends, Jaquelyn, seems really frustrated. Jaquelyn is hard of hearing and uses a hearing aid to help her listen. “What’s wrong, Jaquelyn? You seem upset.” Josiah asks. “I get so upset because even though I have a hearing aid and sit in the front of the class, I still can’t understand what some of my teachers are saying. Then I fall behind on the lesson because I don’t know what’s going on.” Jaquelyn responds. “I wish there was something else that could drown out the other noise so that I could hear the teacher better.” she continued. Josiah perked up.

“Jaquelyn, there actually is a special type of technology that does just that!” Josiah responded excitedly. “It’s called a frequency modulated system, or FM system. It allows students to listen to lessons while tuning out other noise. The systems are small and can interact with your hearing aid by making the teacher’s voice louder!” Jaqueline immediately thanked Josiah for telling her about this type of technology and talked to her teacher about it. Now, not only can Jaqueline hear better in class and keep up with the other students, but she can tell other kids with hearing aids about how FM technology helped her listen better in the classroom.





ACTIVITY

Smart Home Technology

Have you ever heard of a smart home? It may sound like a house that can do multiplication or speak in different languages -- but it's really just a home that uses "smart home technology," or home amenities that use communication technology, enabled by either automation or remote control. Some smart homes include technology that allows the homeowner to change the temperature or lighting using an app on their phone, or a coffee pot that can be scheduled the night before to turn on at exactly 8am. the next day.

Research different forms of smart home technology and use graph paper to sketch out and design your dream "smart room." Make sure to include exactly what kinds of technology you use throughout the room and how it works.



CRITICAL THINKING

Read and answer the following questions.

- 1) How can we use technology to solve problems? List three examples.
- 2) How do you use technology in your everyday life?
- 3) Think of how far technology has evolved over the past decade. What do you think technology will look like ten years from now? Provide an example of technology from long ago and an example from today that you use.
- 4) If you were going to design a new app, what would it be? Explain what the app does, how it works, and why you chose to create it.



PROBLEM SOLVER

Technology

Use the space below to brainstorm and design three pieces of playground equipment using three different types of technology. You can be as creative and inventive as you would like, as long as the equipment is a clear solution to an accessibility problem on the playground.

Day 4

Engineering; the branch of science and technology concerned with the design, building, and use of engines, machines, and structures.

The students will learn and understand the different uses for 3D printers as well as learn about and execute the engineering design process in their activity.

TEACHER SUMMARY

Getting Started

1. Review days one through three

Story: Engineering

2. Read the story

Activity: If you had a 3D printer, what would you make?

3. Read and follow the instructions

Critical Thinking: Discussion Questions

4. Read and answer discussion questions

Problem Solver: Designing the playground structure

5. Read through the instructions and discuss
6. Wrap up; what did we learn?

MATERIALS AND PREP

Materials:

- Scratch paper
- Graph paper from day two

Prep:

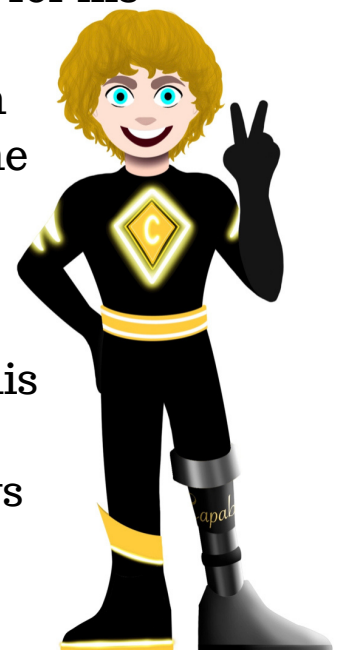
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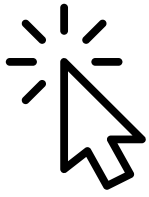
Day Four: Engineering

The branch of science and technology concerned with the design, building, and use of engines, machines, and structures.

Read the following story.

It's homecoming week at school for the CapABLE Crew and everyone is so excited to dress up - especially Charlie. Charlie uses a prosthetic leg, or a special leg that helps him walk. On Character Day, Charlie decides that he doesn't just want to pick a character that already exists, he wants to create his own character! He decides he would like to be a superhero whose prosthetic leg gives him special powers. Superman uses his cape to fly, Batman drives really fast in the Bat Mobile and maneuvers his way over the rooftops of Gotham, and Spiderman uses his web to jump across lofty buildings. Charlie wants to be able to run remarkably fast as part of his superpowers. He knows he has to find a signature costume like all the other superheroes, and he knows just who to ask. Using his 3D printer, Charlie's friend Josiah has made a lot of cool gadgets for his wheelchair that fit the theme of each day, and even some for his friends too. Charlie decides to ask Josiah at lunch if he could make him a cover to place over the rod of his prosthetic leg using his 3D printer that would signify his speed. Josiah loves this idea, and says he will get to work right away! When Character Day finally arrives, Charlie is so excited to show off his one-of-a-kind prosthetic leg. When students ask him how he was able to get such a unique costume, he says he could not have done it without Josiah and his coding and 3D printing skills!





ACTIVITY

If you had a 3D printer, what would you make?

Think of a small, common problem you experience on a regular basis. It could be trouble opening a jar when the lid is too tight or if you're in a wheelchair, not being able to reach door handles to open and close them. On a scratch piece of paper, design a gadget that would solve the problem. Write a short paragraph that describes the problem, exactly how your gadget works, and how it would solve the problem. Make sure to give it a name and share it with your classmates when everyone has completed the activity!



CRITICAL THINKING

Read and answer the following questions.

- 1) How would YOU define engineering? Don't copy the definition provided, but instead put it in your own words as you understand it.
- 2) How is 3D printing specifically considered engineering?
- 3) List three ways you use engineering in your everyday life.
- 4) The engineering design process is five steps that engineers use to design something that solves a problem: Ask, Imagine, Plan, Create, and Improve. Using your creation in today's activity, create an engineering design process by writing out each of the five steps based on the product you designed.



PROBLEM SOLVER

Engineering

As you read on page 12, the engineering part of STEM refers to the building process and use of engines, machines, and structures.

Since you now have a blueprint and equipment, decide what type of materials you can use to promote accessibility.

If there are signs outside indicating directions, are there also braille options for students that are blind? Does there need to be a type of outdoor flooring installed in order to make it easier for students with wheelchairs or prosthetic legs to not get stuck in the mud when it rains?

Use the back side of your graph paper from the "Science" day Problem Solver activity to design the structure of your playground. Be creative!



Math; the abstract science of number, quantity, and space.

The students will recognize math from a real-world perspective and identify how they implement it in their everyday lives.

TEACHER SUMMARY

Getting Started

1. Review days one through four

Story: Math

2. Read the story

Activity: Real-world math problems

3. Read and follow the instructions

Critical Thinking: Discussion Questions

4. Read and answer discussion questions

Problem Solver: Creating a budget

5. Read through the instructions and discuss
6. Wrap up; what did we learn?

MATERIALS AND PREP

Materials:

- Scratch paper

Prep:

- N/A

Day Five: Mathematics

The abstract science of number, quantity, and space.

Read the following story.

CapABLE Cami has always been really good at math. She can do multiplication, division, fractions, anything! She loves being given a problem that she has to figure out. Cami's good friend Samantha, however, does NOT like math. She has always struggled in the subject no matter how much she practices. She makes good grades in all her other classes, but math class always seems to stump her. One day, the class received their scores back from their last test. Samantha's heart raced as the teacher walked towards her with her paper - she was so nervous about this one. Samantha turned over the paper and saw it was covered in red marks from the teacher's pen - she got a D. Samantha sighed with disappointment. "I'll never be able to do math! I'm not even going to use it in real life, so why should I have to learn it?" Samantha said in a frustrated tone. Her friend Cami spoke up - "Of course you use it in real life! We use it everyday. I love math Samantha, how about I tutor you?" As frustrated as Samantha was, she decided to give understanding this subject one more shot with the help of her best friend. Cami told her friend all about how we use math in everyday life - in baking, saving or spending money, and playing sports or music! Samantha couldn't believe she didn't realize how much she actually used math. She was finally starting to understand and even made a B+ on her next test! Samantha started to get excited about finding new ways to use math in her everyday life.





ACTIVITY

Real-World Math Problems

Math is all around us. Just like Cami showed Samantha, math can be found in everyday life - baking, saving or spending money, and playing sports or music. In the space below, use the math lessons you have learned in class and create your own real-world math problem, then explain how it is used in everyday life and how you solve it.



CRITICAL THINKING

Read through the list below. Under each topic, write down how math can be used within each activity.

Exercising:

Interior design:

Sports:

Creating a budget:

Construction or architecture:



PROBLEM SOLVER

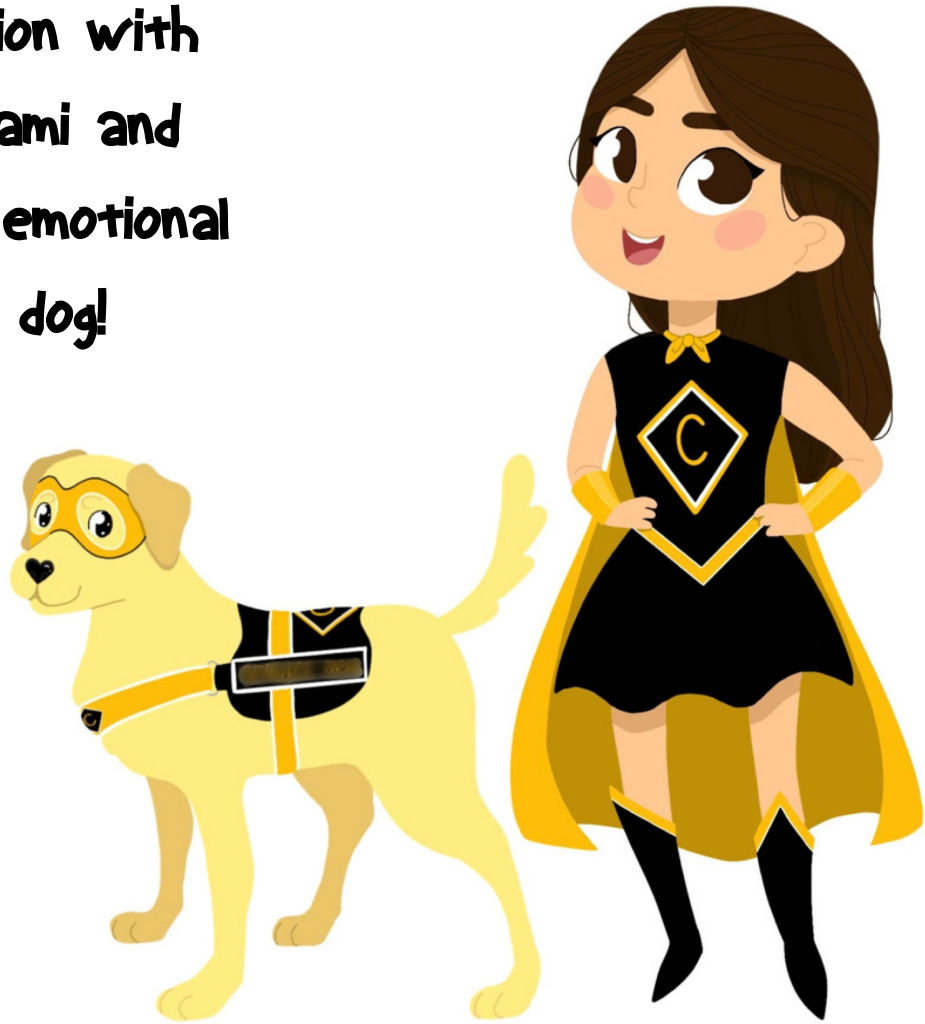
Math

Now that you have your playground design layout, accessible equipment, and a solid structure, it's time to bring your playground to life! In order to do that, you must budget for the cost of this makeover. Using your math skills, create a budget in the space below that lays out the price of all your equipment, the installation, etc. See if you can find creative ways to save money.

WHAT'S YOUR SUPERPOWER?

My Guide to CapABLE

STEM edition with
CapABLE Cami and
Casper the emotional
support dog!



My name is _____

Created by Vivian O'Neal

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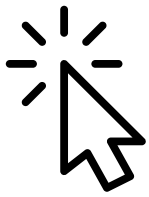


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Science:

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Math:



PROBLEM SOLVER

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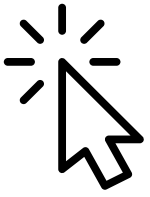
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Day Three: Technology

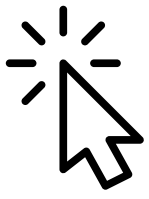
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ACTIVITY

Smart Home Technology

Have you ever heard of a smart home? It may sound like a house that can do multiplication or speak in different languages -- but it's really just a home that uses "smart home technology," or home amenities that use communication technology, enabled by either automation or remote control. Some smart homes include technology that allows the homeowner to change the temperature or lighting using an app on their phone, or a coffee pot that can be scheduled the night before to turn on at exactly 8am. the next day.

Research different forms of smart home technology and use graph paper to sketch out and design your dream "smart room." Make sure to include exactly what kinds of technology you use throughout the room and how it works.



CRITICAL THINKING

Read and answer the following questions.

- 1) How can we use technology to solve problems? List three examples.
- 2) How do you use technology in your everyday life?
- 3) Think of how far technology has evolved over the past decade. What do you think technology will look like ten years from now? Provide an example of technology from long ago and an example from today that you use.
- 4) If you were going to design a new app, what would it be? Explain what the app does, how it works, and why you chose to create it.



PROBLEM SOLVER

Technology

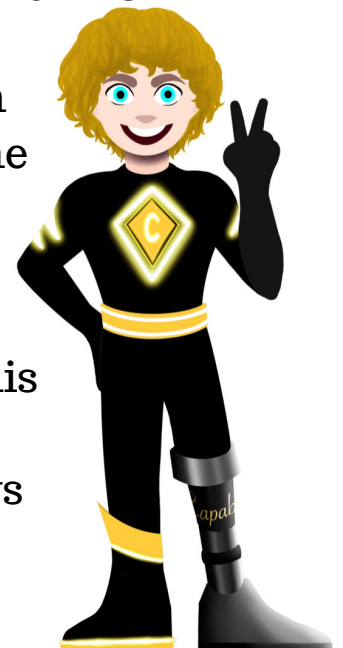
Use the space below to brainstorm and design three pieces of playground equipment using three different types of technology. You can be as creative and inventive as you would like, as long as the equipment is a clear solution to an accessibility problem on the playground.

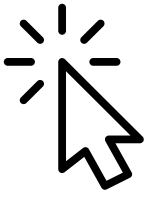
Day Four: Engineering

The branch of science and technology concerned with the design, building, and use of engines, machines, and structures.

Read the following story.

It's homecoming week at school for the CapABLE Crew and everyone is so excited to dress up - especially Charlie. Charlie uses a prosthetic leg, or a special leg that helps him walk. On Character Day, Charlie decides that he doesn't just want to pick a character that already exists, he wants to create his own character! He decides he would like to be a superhero whose prosthetic leg gives him special powers. Superman uses his cape to fly, Batman drives really fast in the Bat Mobile and maneuvers his way over the rooftops of Gotham, and Spiderman uses his web to jump across lofty buildings. Charlie wants to be able to run remarkably fast as part of his superpowers. He knows he has to find a signature costume like all the other superheroes, and he knows just who to ask. Using his 3D printer, Charlie's friend Josiah has made a lot of cool gadgets for his wheelchair that fit the theme of each day, and even some for his friends too. Charlie decides to ask Josiah at lunch if he could make him a cover to place over the rod of his prosthetic leg using his 3D printer that would signify his speed. Josiah loves this idea, and says he will get to work right away! When Character Day finally arrives, Charlie is so excited to show off his one-of-a-kind prosthetic leg. When students ask him how he was able to get such a unique costume, he says he could not have done it without Josiah and his coding and 3D printing skills!





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If you had a 3D printer, what would you make?

Think of a small, common problem you experience on a regular basis. It could be trouble opening a jar when the lid is too tight or if you're in a wheelchair, not being able to reach door handles to open and close them. On a scratch piece of paper, design a gadget that would solve the problem. Write a short paragraph that describes the problem, exactly how your gadget works, and how it would solve the problem. Make sure to give it a name and share it with your classmates when everyone has completed the activity!



CRITICAL THINKING

Read and answer the following questions.

- 1) How would YOU define engineering? Don't copy the definition provided, but instead put it in your own words as you understand it.
- 2) How is 3D printing specifically considered engineering?
- 3) List three ways you use engineering in your everyday life.
- 4) The engineering design process is five steps that engineers use to design something that solves a problem: Ask, Imagine, Plan, Create, and Improve. Using your creation in today's activity, create an engineering design process by writing out each of the five steps based on the product you designed.



PROBLEM SOLVER

Engineering

As you read on page 12, the engineering part of STEM refers to the building process and use of engines, machines, and structures.

Since you now have a blueprint and equipment, decide what type of materials you can use to promote accessibility.

If there are signs outside indicating directions, are there also braille options for students that are blind? Does there need to be a type of outdoor flooring installed in order to make it easier for students with wheelchairs or prosthetic legs to not get stuck in the mud when it rains?

Use the back side of your graph paper from the "Science" day Problem Solver activity to design the structure of your playground. Be creative!

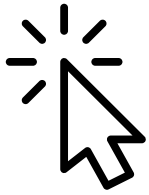
Day Five: Mathematics

The abstract science of number, quantity, and space.

Read the following story.

CapABLE Cami has always been really good at math. She can do multiplication, division, fractions, anything! She loves being given a problem that she has to figure out. Cami's good friend Samantha, however, does NOT like math. She has always struggled in the subject no matter how much she practices. She makes good grades in all her other classes, but math class always seems to stump her. One day, the class received their scores back from their last test. Samantha's heart raced as the teacher walked towards her with her paper - she was so nervous about this one. Samantha turned over the paper and saw it was covered in red marks from the teacher's pen - she got a D. Samantha sighed with disappointment. "I'll never be able to do math! I'm not even going to use it in real life, so why should I have to learn it?" Samantha said in a frustrated tone. Her friend Cami spoke up - "Of course you use it in real life! We use it everyday. I love math Samantha, how about I tutor you?" As frustrated as Samantha was, she decided to give understanding this subject one more shot with the help of her best friend. Cami told her friend all about how we use math in everyday life - in baking, saving or spending money, and playing sports or music! Samantha couldn't believe she didn't realize how much she actually used math. She was finally starting to understand and even made a B+ on her next test! Samantha started to get excited about finding new ways to use math in her everyday life.





ACTIVITY

Real-World Math Problems

Math is all around us. Just like Cami showed Samantha, math can be found in everyday life - baking, saving or spending money, and playing sports or music. In the space below, use the math lessons you have learned in class and create your own real-world math problem, then explain how it is used in everyday life and how you solve it.



CRITICAL THINKING

Read through the list below. Under each topic, write down how math can be used within each activity.

Exercising:

Interior design:

Sports:

Creating a budget:

Construction or architecture:



PROBLEM SOLVER

Math

Now that you have your playground design layout, accessible equipment, and a solid structure, it's time to bring your playground to life! In order to do that, you must budget for the cost of this makeover. Using your math skills, create a budget in the space below that lays out the price of all your equipment, the installation, etc. See if you can find creative ways to save money.