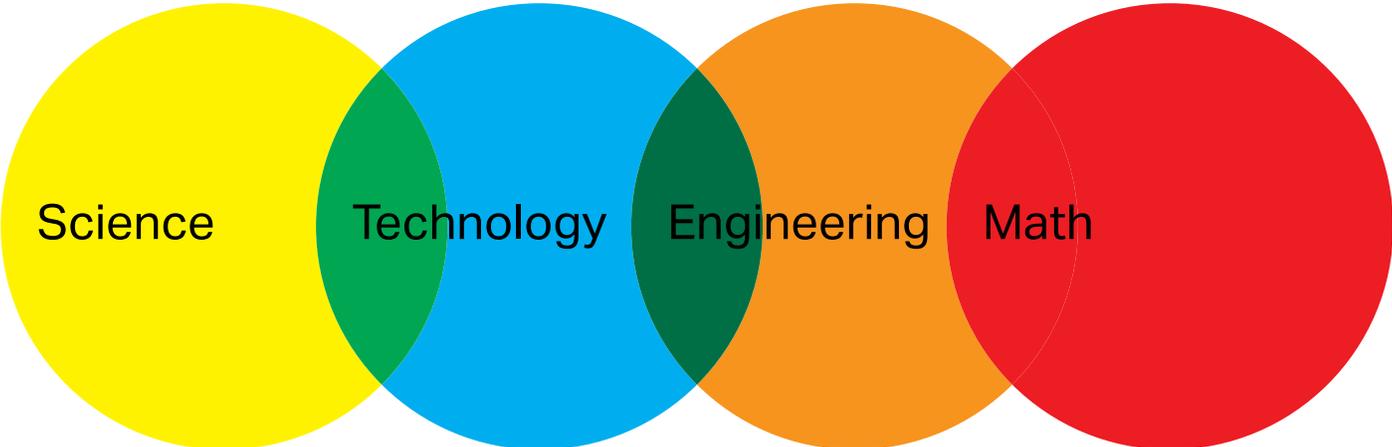




It's Your Future



A.1

It's Your Future

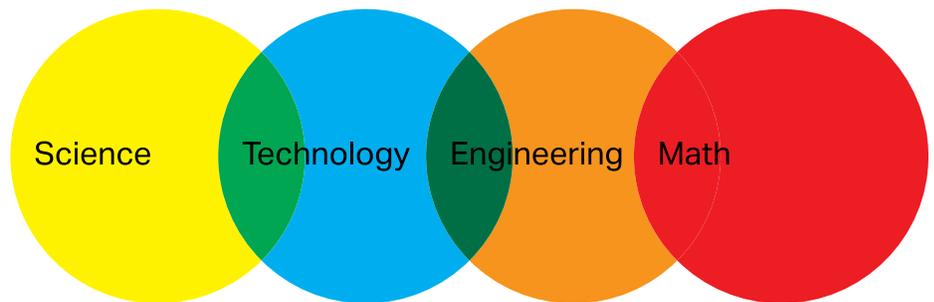
Unit Overview:

The world needs the students of today to become the scientists, engineers, and problem solving leaders of tomorrow. Science constantly presents us with new breakthroughs and challenges, creating greater opportunities for problem solving through technology.

The solutions to such problems could help change the world, and technology-based problem solvers will be the people to make it all possible. The VEX IQ platform and curriculum provide a fun and engaging vehicle to begin the journey toward becoming the type of problem solver our world needs the most. No matter what you see in your future, the VEX IQ platform and curriculum can help you build the kinds of skills expected of a 21st century innovator.

Unit Content:

- What is STEM?
- What is Engineering?
- What is Robotics?



Unit Activities:

-  Matching Exercise
-  Idea Book Exercise



Note: Separate copies and/or printouts of activities may be used for student work. Please see your teacher BEFORE writing in this guide. Visit www.vexiq.com/curriculum to download and print PDFs of all exercises!

A.2

What is STEM?

STEM combines science, technology, engineering, and mathematics education to form an engaging field of study. The VEX IQ platform is a great way for students to explore STEM hands-on while learning.

A.3

What Is Engineering?



Engineering is all about using practical & scientific knowledge to create solutions for identified problems. Engineers use math and science to create most of the products, buildings and structures we see every day. Engineers often use an engineering notebook to help them think about and solve problems. You will have the chance to use "Idea Book" pages alongside activities that help you to think like an engineer!

There are Five Basic Types of Engineering:

Chemical engineering – Using physical and biological sciences to convert raw materials or chemicals into more useful forms for the purpose of solving a problem.

Civil engineering - Using design, construction, and maintenance of physically and naturally built environments to solve a problem. Environmental and structural engineers are two examples.

Electrical engineering – Using electricity, electronics, and electromagnetism to solve a problem.

A.3 cont.

Mechanical engineering – Using design, construction, and mechanical power to create machines and mechanical systems that solve a problem.

Specialized engineering fields – These engineering fields use two or more types of engineering together to form a brand new kind of engineering. Biomedical and robotics engineers are two examples.

A.4

What is Robotics?

Robotics is the type of specialized engineering that deals with the design, construction, operation, and application of robots.

A **Robot** is any man-made machine that can perform work or other actions normally performed by humans.

Robots can be operated by remote control (known as **teleoperated robots**), automatically by themselves (known as **autonomous robots**), or a combination of teleoperated and autonomous operation (known as **hybrid robots**). Robots have become more popular over time because they are able to perform very repetitive tasks or very dangerous tasks in the place of humans.



Robotic assembly lines can build cars, computers, and other things that you use in everyday life.



Police robots can investigate risky situations while human officers control them from a safe distance.



Service robots can clean your floor, mow the lawn, or assist those with disabilities.



Deep sea robots crawl on the ocean's floor, discovering new life that thrives nearly six miles under water.



It's Your Future Matching Exercise

Student Name(s): _____

Teacher/Class: _____ Date: _____

Instructions:

Match terms from the word bank to the correct definition by writing terms on the correct line. Each term is only used once.

Word Bank:

Autonomous Robots

Chemical Engineering

Civil Engineering

Electrical Engineering

Engineering

Hybrid Robots

Mechanical Engineering

Robot

Robotics

Specialized Engineering

STEM

Teleoperated Robots

_____ combines science, technology, engineering, and mathematics education to form an engaging field of study.

_____ is using practical & scientific knowledge to create solutions for identified problems.

_____ uses physical and biological sciences to convert raw materials or chemicals into more useful forms for the purpose of solving a problem.

_____ uses design, construction, and maintenance of physically and naturally built environments to solve a problem.

_____ uses electricity, electronics, and electromagnetism to solve a problem.

_____ uses design, construction, and mechanical power to create machines and mechanical systems that solve a problem.

_____ fields use two or more types of engineering together to form a brand new kind of engineering.

_____ is the specialized type of engineering that deals with the design, construction, operation, and application of robots.

A _____ is any man-made machine that can perform work or other actions normally performed by humans.

Robots operated by remote control are called _____.

Robots operated automatically by themselves are called _____.

Robots that have both teleoperated and autonomous features are called _____.

It's Your Future Idea Book Exercise

Student Name(s): _____

Teacher/Class: _____ Date: _____

Instructions:

Imagine a robot that could solve a problem that you know about.
Draw a picture of what that robot might look like and give it a name in the box below.



Instructions:

Write about what your robot would be able to do and what problem it would solve. Write about how it would work and what type of control it would have (autonomous, teleoperated, or hybrid).
