

Schulich Trailblazers

Exploring Engineering

Activity book for children ages 6 – 12

Fall 2024



What can you do as an engineer?

Circle all the pictures that you think show engineering in action:





Correct answers: All of them! All these photos are of Schulich students in Schulich labs.

Engineers can do many things, including...

Work with chemicals



Perform measurements and calculations

Program new technologies



Analyze how things move



Bring components together

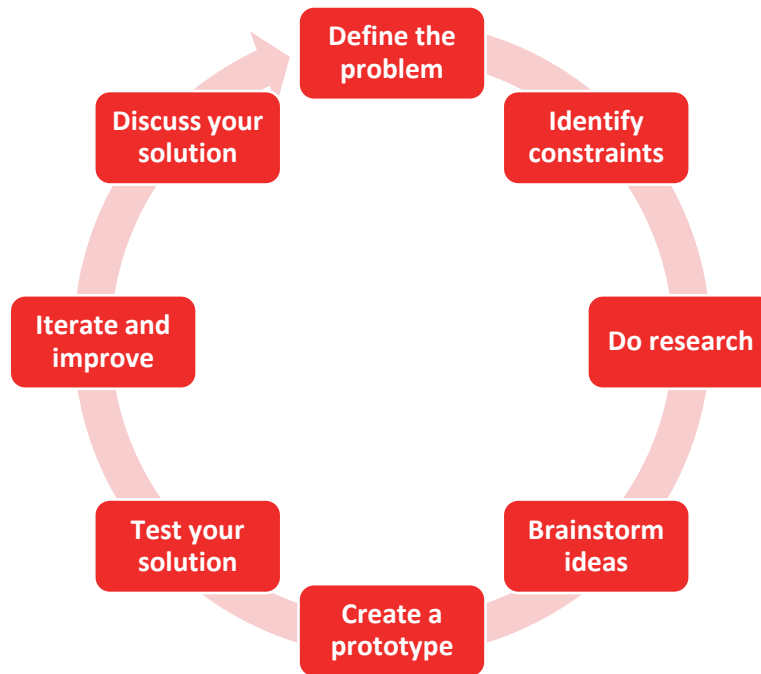


Examine structures



Engineering Design Process

Engineers are problem solvers. To solve a problem, engineers use a method called the engineering design process.



Word Help!

Process: A process is a set of steps that you follow to achieve a certain goal.

Iterate: To 'iterate' basically means to try what we did again and again! When we talk about iterating within engineering, we go back to the previous step in the design process and either improve (make our design better) or scrap our first design entirely and come up with something brand new.



The different engineering majors offered at Schulich:

Biomedical Engineering

Biomedical engineers use biology and medicine along with their creativity to make new technologies to help people in a variety of ways, including making medicine, assistive technology and medical equipment for people and hospitals.

Chemical and Petroleum Engineering

Chemical engineers use chemistry, physics, math and biology to design, manufacture and produce a variety of different products.

Civil Engineering

Civil engineers use their skills to design and maintain safe and efficient infrastructure which includes our buildings, bridges, roads and even playgrounds!

Electrical Engineering

Electrical engineers use physics and math to work with all things dealing in electricity. From iPads and smart watches to satellites and EVs, electrical engineers can be found in several areas!

Energy Engineering

Energy engineers deal with the development, collection, and distribution of energy sources that we use to power our homes, cars, streetlights, etc.

Word Help!

Major: In university, there are many different subjects that you can study. When you study a certain subject in university, it is called your ‘major.’ When you finish your major, you’ll get a degree that tells others you are an expert in that area!

Engineering Physics

Engineering physicists apply their knowledge of physics, electrical, and mechanical engineering in high-tech services such as space physics, quantum information and medical imaging.

Geomatics Engineering

Geomatics engineers use their navigation, spatial reasoning and math skills to analyze, model and interpret data from drones, satellites and GPS systems into understandable pictures and instructions for everyday users.

Mechanical and Manufacturing Engineering

Mechanical engineers use the laws of physics to create and work on moving machines and inventions, including cars, robots, and rocket ships.

Software Engineering

Software engineers use design, math, and creativity to develop new technologies such as smart devices, computer programs, and artificial intelligence.

Sustainable Systems Engineering

Sustainable systems engineers use a systems approach to make technology and energy more sustainable and environmentally friendly.



Creativity in Engineering: Drawing (optional contest)

Creativity and engineering go hand-in-hand. We need creative individuals in engineering who think 'outside of the box' to come up with something new to help society!

Let's put your creativity to the test!

In the space provided below, draw your favourite animal as a type of engineer:

A large, empty rectangular box with a thin red border, intended for drawing. It occupies the central portion of the page below the text.



Creativity in Engineering: Questions

What animal did you draw and what type of engineer are they?

Why did you choose this type of engineer?

If you were an engineer, what would be the first thing you would create?

What does creativity in engineering mean to you?

Optional drawing contest:

Would you like your drawing and responses featured in an upcoming Schulich Trailblazers newsletter and/or Schulich social media for a chance to win a small Schulich-themed prize?

Important note: Entering this contest requires your parent/guardian's permission and help. Please ask them to read the contest information and instructions found on the next page!



Creativity in Engineering Drawing Contest

Information and Criteria

Drawing submission information: Children 14 and under are encouraged (with an adult's help) to submit their drawing and responses to schulichdiversity@ucalgary.ca. We will do our best to display as many drawings as possible in our upcoming newsletters and/or Schulich social media, and you will be automatically considered for a small prize!

Submission criteria

To submit, a parent or legal guardian **must** complete the following steps below on their child's behalf:

- Title your email subject: Trailblazers Contest – Child's First Name
- Attach your child's drawing and responses as a PDF, JPEG, or PNG file or clearly label and type out your child's responses within the email.
 - Please ensure your child's picture and responses do not contain any identifying information (e.g. address, school, teacher's name, etc.)
- In your email message, you must include:
 - Your child's first name (or preferred initials/pseudonym)
 - Your child's age (for prize categories only)
 - Your phone number for prize contact
 - A typed-out statement which includes your full name and signature permitting the Schulich School of Engineering to use your child's first name (or preferred initials/pseudonym), and contest submission solely for youth outreach purposes which may include within our future Schulich Trailblazers activity books, newsletters, and our associated social media and webpages.

Due Date: December 31st, 2024: 6pm MST

Prize details: Several prizes will be offered and split proportionally between students in similar age ranges. Prizes may include but are not limited to: Schulich-themed clothing or other swag, school supplies, age-appropriate engineering-themed toys, engineering 'toolkits', etc.

Engineering Word Searches

Find and circle the words related to engineering. Easy and medium-level word searches have words placed horizontally and vertically. Hard and extreme-level words may also be found diagonally.

Easy-level word search

- ENGINEER
- BUILDING
- ENERGY
- CREATE
- DESIGN
- ROBOT
- THINK
- CIVIL

E	N	G	I	N	E	E	R
S	J	P	G	R	R	C	Q
T	O	Y	M	O	F	E	F
M	Z	F	A	B	Q	N	H
C	A	W	S	O	D	E	K
C	R	E	A	T	E	R	U
W	T	G	E	B	S	G	B
C	H	L	E	D	I	Y	O
C	I	V	I	L	G	J	W
Y	N	V	J	P	N	M	H
E	K	Z	X	Q	E	B	K
B	U	I	L	D	I	N	G

Medium-level word search

- MECHANICAL
- ELECTRICAL
- BIOMEDICAL
- GEOMATICS
- INVENTION
- COMPUTER
- INNOVATE
- CHEMICAL

R	N	V	P	F	O	D	K	W	F	O
H	S	L	Z	J	B	K	P	P	X	L
K	M	E	C	H	A	N	I	C	A	L
N	G	L	R	F	Y	F	M	F	I	I
O	P	E	B	B	R	G	Q	Q	N	U
I	O	C	S	I	F	E	G	F	N	H
J	C	T	G	O	H	O	F	W	O	M
D	H	R	U	M	Q	M	T	B	V	W
C	E	I	R	E	N	A	O	C	A	G
G	M	C	Q	D	A	T	P	Y	T	P
K	I	A	I	I	O	I	M	U	E	B
K	C	L	M	C	T	C	D	O	Z	L
O	A	E	X	A	D	S	Z	D	V	R
F	L	D	B	L	D	P	Z	Q	G	G
V	C	O	M	P	U	T	E	R	M	P
U	I	N	V	E	N	T	I	O	N	V
V	S	C	P	M	D	U	C	O	K	L
O	V	D	K	Q	H	Q	A	K	C	Q

Engineering Word Searches

Hard-level word search

- DESIGN PROCESS
- COMMUNICATION
- RESEARCHING
- SUSTAINABLE
- STRUCTURAL
- CREATIVITY
- AEROSPACE
- INVENTION
- ITERATING
- SOFTWARE

M	X	E	P	K	V	Z	V	E	I	R	I	J	A
U	D	P	H	S	R	O	E	N	U	S	N	T	S
W	E	E	E	S	Q	K	Y	L	F	R	V	P	E
C	W	L	S	X	U	U	T	K	T	E	E	E	O
R	V	G	Q	I	O	S	D	V	Y	I	N	L	D
E	P	T	R	E	G	I	F	S	H	M	T	M	N
A	C	O	M	M	U	N	I	C	A	T	I	O	N
T	J	O	O	R	B	T	P	W	L	Y	O	F	R
I	B	R	S	E	T	A	R	R	E	M	N	R	C
V	N	S	P	S	K	V	H	N	O	I	X	D	R
I	U	R	X	E	T	G	X	K	B	C	P	B	Q
T	N	U	N	A	B	R	K	G	U	D	E	G	I
Y	R	V	O	R	A	I	U	G	G	J	Y	S	T
F	H	X	X	C	G	T	B	C	L	P	Y	O	S
F	J	P	J	H	B	E	Y	F	T	O	L	F	C
Q	I	C	D	I	J	R	O	D	A	U	Y	T	J
F	S	A	H	N	A	A	G	C	N	M	R	W	J
U	T	F	W	G	V	T	S	D	D	K	V	A	G
Y	S	U	S	T	A	I	N	A	B	L	E	R	L
D	A	C	T	O	W	N	Z	K	G	D	T	E	P
Y	I	M	R	V	N	G	H	C	Y	R	T	B	C
M	A	E	R	O	S	P	A	C	E	Z	F	M	K
C	Y	Z	T	U	W	B	L	X	Q	U	D	C	Q

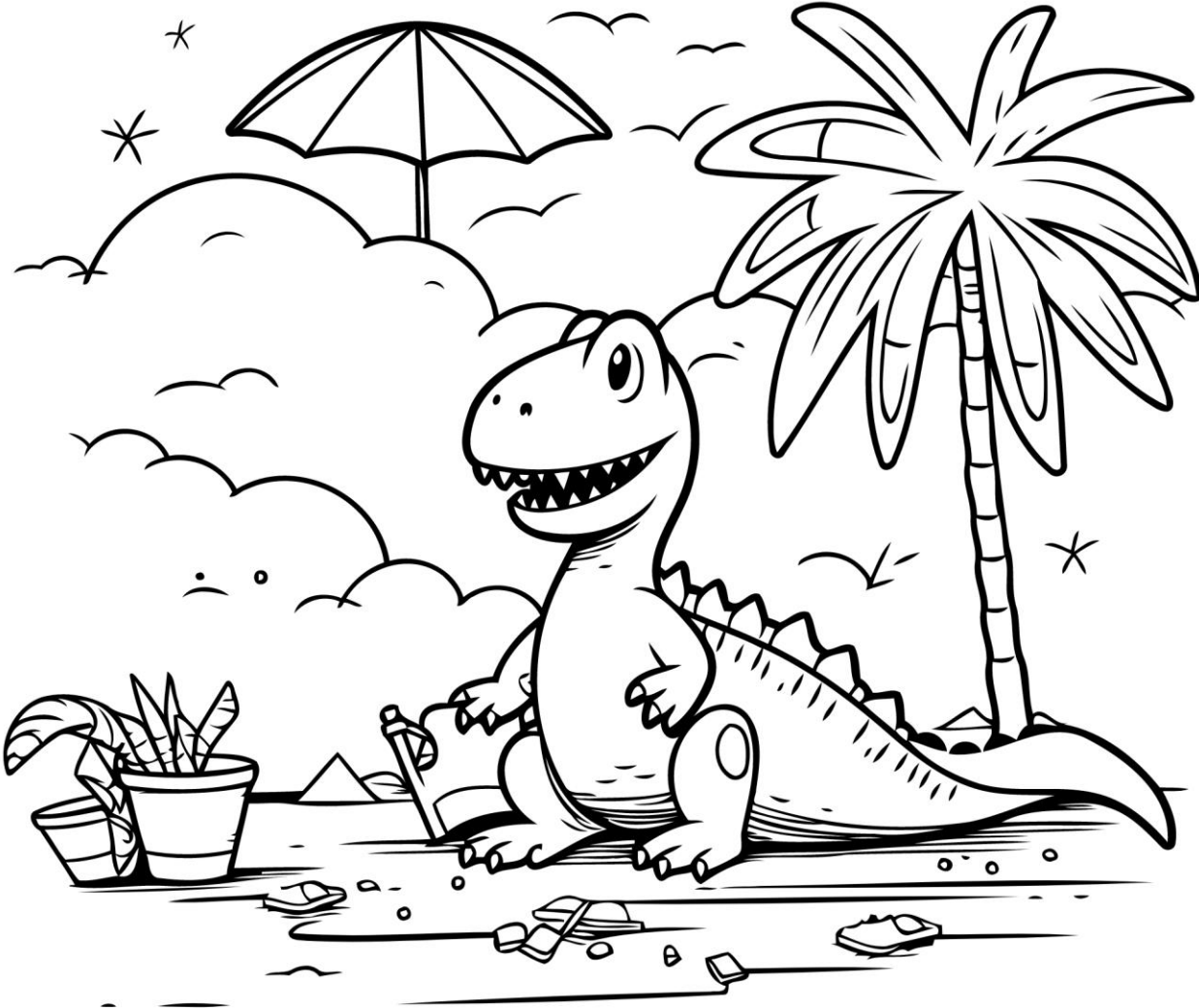
Extreme-level word search

- ENERGY AND ENVIRONMENT
- SUSTAINABLE SYSTEMS
- ENTREPRENEURSHIP
- INNOVATIVE DESIGN
- TRANSPORTATION
- MEDICAL IMAGING
- MANUFACTURING
- BRAINSTORMING
- MECHATRONICS
- ADAPTABILITY
- COMPUTER
- PHYSICS
- CAREER
- STUDY

E	J	A	Q	P	F	M	M	E	C	H	A	T	R	O	N	I	C	S	P
N	N	M	R	W	M	A	N	U	F	A	C	T	U	R	I	N	G	I	U
O	D	E	M	D	S	D	B	H	B	P	K	H	T	T	J	U	W	K	U
A	H	D	R	U	J	A	Y	R	E	U	B	N	Y	S	B	L	B	F	N
F	I	I	G	G	C	P	C	J	A	G	A	L	Q	L	E	J	D	I	A
T	N	C	B	W	Y	T	B	K	J	I	X	H	V	D	S	S	K	J	A
Y	N	A	J	B	C	A	U	J	V	F	N	U	E	Q	D	V	N	V	R
Y	O	L	Z	T	W	B	N	D	H	V	J	S	H	D	E	F	M	J	C
Z	V	I	V	E	V	I	F	D	C	X	W	U	T	F	N	D	P	U	V
L	A	M	M	P	I	L	V	H	E	R	X	S	M	O	T	X	H	D	L
Z	T	A	U	A	W	I	A	T	N	N	I	T	V	B	R	K	Y	U	L
Z	I	G	O	H	F	T	W	G	Z	X	V	A	N	Q	E	M	S	K	X
E	V	I	I	Z	G	Y	K	U	F	F	U	I	J	F	P	D	I	Q	H
Y	E	N	I	C	P	L	P	V	X	H	Y	N	R	U	R	O	C	N	X
C	D	G	L	N	A	I	O	I	S	B	S	A	G	O	E	Q	S	N	G
Z	E	X	D	D	T	R	B	C	J	J	Z	B	X	V	N	H	M	T	X
I	S	Y	C	C	S	Q	E	P	A	M	X	L	B	C	E	M	P	B	M
I	I	E	B	O	D	C	X	E	J	Y	N	E	X	N	U	W	E	L	M
E	G	H	X	G	M	M	C	P	R	E	S	S	A	Z	R	W	C	N	O
U	N	Y	I	N	T	P	Z	S	T	U	D	Y	K	M	S	D	P	Z	T
T	J	M	O	J	L	Q	U	V	Z	L	I	S	U	A	H	L	R	V	Z
N	V	I	B	T	J	J	A	T	K	I	K	T	C	Y	I	Y	Z	D	R
W	X	F	M	Q	H	N	G	L	E	R	X	E	U	B	P	W	C	W	V
Q	R	G	W	E	W	O	C	B	A	R	S	M	Z	E	W	L	G	J	X
U	M	J	W	V	V	O	H	X	I	P	H	S	F	H	B	Z	B	F	J
T	R	A	N	S	P	O	R	T	A	T	I	O	N	U	M	J	I	H	R
W	S	V	H	G	S	U	S	S	E	L	G	R	F	X	W	O	W	N	E



Colouring time! Colour in the dino below.



Interesting Facts About UCalgary's Motto

- While most university mottos are in Latin, the University of Calgary motto is in Scottish Gaelic, a language that is mainly used in Scotland (although you will also find many speakers of it in Nova Scotia!).
- The University of Calgary's Motto is in Scottish Gaelic in recognition of the Scottish heritage of those who helped establish the university in 1966, as well as several Scottish people who founded the fort that would become the City of Calgary in the 1890s.
- The area of Calgary itself was inhabited much earlier than 1800s by multiple First Nations groups, including the Piikani, Siksika, Kainai, Stoney Nakoda, and Tsuut'ina nations.
- The university's motto, "Mo shùile togam suas," means "I will lift up my eyes," and is pronounced as "mO hoo-la tO-gum soo-us."



Engineering from Home

Activity: Creating a 'robotic' hand

In this activity, you'll become biomedical engineers and create your very own working 'robotic' hand. Recommended for ages 6+ (adult supervision recommended).

What you will need:

- 1 piece of construction paper
- 2 drinking straws (paper or plastic)
- Roll of string/yarn
- Tape
- Scissors
- Pencil
- Markers
- Decoration material (pencil crayons, stickers, etc.)

Interesting fact: Some people have limb differences. A person with a limb difference may have arms or legs (limbs) that look different or might have a part of their limb missing (like a hand). Biomedical engineers work with people with limb differences to create 'prosthetics,' which act similar to biological limbs. Some of these prosthetics are 'robotic' and move using electricity!

Instructions:

Step 1: Put your hand (or an adult's hand if preferred) on top of a piece of construction paper.

Step 2: Using a pencil, make an outline of your (or the adult's) hand. Afterwards, use a marker to make this outline thicker.

Step 3: Using the outline you just made, cut out your paper hand using scissors (get an adult's help if you need!).

Step 4: Decorate your paper hand (please be aware that some parts of the paper hand may become covered by the next steps - feel free to keep some of the decorating until afterwards if you'd prefer).

Step 5: Cut each straw into five even parts.

Step 6: Cut out five arm-length pieces of string.

Step 7: Tape two straw pieces onto each of your paper fingers - right above where you would like your fingers to bend. The straws will act as 'bones' to these sections, keeping them straight while the other areas bend.

Step 8: Tape the top of the string onto the very top of each finger.

Step 9: Thread the string through the holes of the straws. The string will act as 'joints,' which you will pull to move your paper fingers up and down!

Step 10: Have fun moving your robotic hand!

Schulich's upcoming youth outreach events

Go ENG Girl

Date: Saturday, November 16th

Time: 10am-2pm (complimentary lunch included) With events hosted at most of Canada's top universities Go ENG Girl offers girls and non-binary youth in grades 7-10 the chance to learn more about engineering through a series of fun hands-on activities and exhibits.

Go CODE Girl

Date: Saturday, February 1st

Time: 10am-2pm (complimentary lunch included!) Go CODE Girl provides an exciting opportunity for girls and non-binary youth in grades 7-11 across Canada to learn about the exciting world of coding and software development and discover opportunities in computing and engineering fields.

Schulich Trailblazers #1

Date: Saturday, January 11th

Time: 10am-12pm

Topic: Sustainability within Engineering

Join us for Schulich Trailblazers – an all-family event where you will learn about valuable engineering research through an interactive lecture followed by an engaging hands-on activity. *Lecture and activity content is recommended for ages 6-14, however, younger and older children are welcome to join too!*

Schulich Trailblazers #2

Date: Saturday, March 15th

Time: 10am-12pm

Topic: Mechatronics and Machine Learning

Join us for Schulich Trailblazers – an all-family event where you will learn about valuable engineering research through an interactive lecture followed by an engaging hands-on activity. *Lecture and activity content is recommended for ages 6-14, however, younger, and older children are welcome to join too!*

Schulich Diversity

Scan the QR code or type in the URL below to learn more about our **free** youth outreach events, our digital activity book, and details on entering our 'creativity in engineering' drawing contest for a chance to win a prize!



URL: <https://schulich.ucalgary.ca/community/equity-diversity-and-inclusion/sparking-interest-stem>

For any questions concerning youth outreach please email us at: schulichdiversity@ucalgary.ca