AG TECH STEAM

Content Pack:

Agronomy

Soil Health

AG TECH STEAM

S T E A M

How to use the Content Pack?

Each Content Pack for Ag Tech STEAM is formed around the letters of STEAM.

Science.

Technology.

Engineering.

Art.

Math.

Each letter will have a created or curated activity, with links for more learning from our partners and selected sources.

There will be some ‘in field’ (or yard!) activities, some that you can use your computer for and some that are ‘analog’ where you are making and creating, learning and doing.

At the end of each section there will be links to more learning!

The heart of Ag Tech STEAM is to introduce you do some of the awesome science and technology that is used every day in all parts of agriculture.

We invite you to share your work on our social, share ideas for future content packs and connect with us to see more posts and bonus content!

Content packs are for all ages! Have fun!

AG TECH STEAM

SCIENCE

A soil scientist used to say when our founder's Dad was in university:

NOT DIRT, SOIL!

Soil and dirt are not the same thing. Soil is full of life with micro organisms, animal and insect life as well as plants. It helps us with almost everything! Soil health is very important to farmers.

Soil science incorporates a lot of other science for things like insects, plants, nutrients and water. Soil science also considers things that farmers do that might impact soil health.

SCIENCE ACTIVITY

There so many activities we could do we might have to create a few more soil content pack bonus activities!

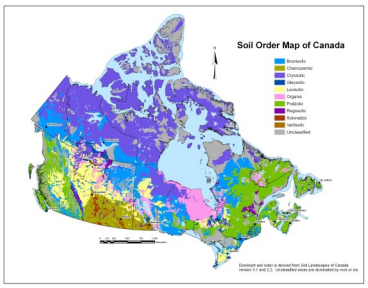
For this Science Activity you will need to go outside to your garden or field. Take a shovel and dig down past the plants, dig through the top soil and measure how deep it. Also note the color and texture. What do you find for materials if you dig deeper? Clay, gravel, a mixture? What color is your top soil?

Each region has what is called a soil type, and as you did down you are seeing the soil profile. Click this link to see the main soil types in Canada and where they are found. https://soilsofcanada.ca/

Soil orders are different across the country and soil science is very interesting and dynamic.

Click the map or go to this link to see a larger map:

https://soilsofcanada.ca/images/Soil_Order_map.jpg



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Technology

In agriculture we can use technology to tell us things about insect activity in our crops during the growing season, and even before the crops come up.

Technology, such as apps, can tell us what kinds of bugs or insects we are seeing, what stage they are in and what jobs they do.

Farmers can use specialized technology in cameras to 'see' insect stress in crops before damage is visible to the farmer's eye. These cameras sense changes in the plants as a response to stress from insects, disease or other stress.

Farmers and agronomists can use mapping and bug counts to determine if they need to spray a pesticide. This link has some images of 'invisible' crop damage! What do you see?

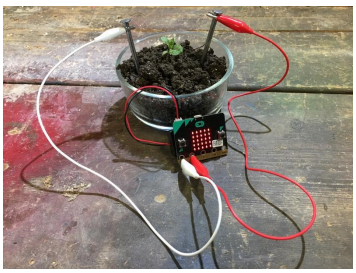
Technology also gives farmers a good idea how well their good bugs are doing in controlling the pests in their fields and orchards.

TECHNOLOGY ACTIVITY

Technology, such as special cameras and mapping, can tell a picture about soil health. Such mapping can let a farmer or agronomist know where a field needs more (or less) nutrients, more (or less) water, more (or less) organic matter and what kind.

Using your Micro:bit, 2 alligator clip cables, 2 nails and some code you can build and code a moisture sensor for the plants in your house.

Find the instructions here: Soil Moisture (microbit.org)



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Engineering

Ag Tech uses engineers to help solve problems, and to create ways to use ag tech to solve problems.

These can be deciding what nutrients the soil has and at what levels, what crops will grow best in those soil conditions and what the farmer should do to improve his soil.

Yes! You can improve soil. By adding organic material, improving drainage and other steps farmers can work on improving their soil.

Using engineering farmers can also use other tests, let's see how those work and you can give them a try!

Ball Test

This one is fun and can be done in a few ways, check out this link for some more!

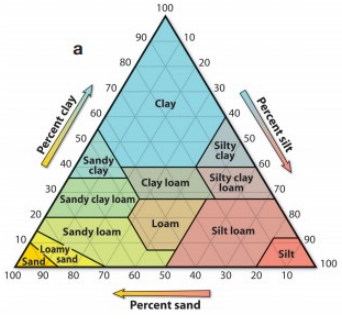
For this activity you need to get a container of soil from your test area. Remove all large pieces of stone, organic material until what you have left is smaller than 2 mm. This ensures what you have in your hand is a mixture of soil particles. If the soil is moist squeeze a handful in one hand.

Observe:

- Did it make a ball? If you throw the ball in the air did it hold together or fall apart?

The percentage of soil particles (sand, clay and silt) make up the type of soil texture you have, and that can help you decide what you can grow or do on that land agronomically. The soil triangle and some math can help farmers and agronomists make those decisions.

Check out a soil triangle here:



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Art

It is often said that there is as much an art to agriculture as there is a science. And scientists have often used art to diagram, map and understand what they are studying.

A really great way to understand how an insect's body works is to model them. We can use computers or things around our homes to make models. Clay, craft supplies and Lego are wonderful for creating models of insects you see.

Look closely at how their bodies work - eyes, antennae, legs, mouths, body shape and size. These all can tell you how the insect hunts, pollinates or helps farmers and crops in other ways. Do they fly or crawl, do they change shapes and functions as they grow?

ART PROJECT

Sometimes what seems like a simple thing - soil for example, can actually be quite complex and even beautiful.

For your Ag Tech art project we are going to create out of art supplies, or Lego a soil horizon model.

Soil horizons are the specific layers that make up the soil in your area, each layer can have different materials and be of different depths.

When you are building your horizons think about what animals, microbes or plant parts might be found in each.

Here is an easy explanation, and visual; https://www.soils4teachers.org/soil-horizons

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Math

DO NOT SKIP THIS! It will be fun. We promise!

Did you know that math plays a very important role in ag tech?

It does!

We use math in ag tech for calculating many things! Some you might already know. Like acres and fuel, or seed and fertilizer. Or how long to the end of the field.

How can we use math in soil science? Math can measure so many things such as how water and nutrients move through the soil, how compacted or loose soil makes it harder or easier for seeds to grow.

MATH ACTIVITY

Ask your grown up for some seeds, peas work really well, and for three containers.

Place soil in each container and a seed. Leave the soil very loose (you can mix it with a fork) in one, leave one the same consistency as you'd find your garden or field, and the other pack down tighter (like where you might have tractors in the field pressing down on the soil).

Water and give sunlight as instructed on the seed package, and observe your plants. Which ones need watering more (or less), which ones sprouted faster and which ones have stronger plants.

Soil compaction, moisture and other conditions have big impacts on plants!

Draw or photograph your observations and be sure to date them so you can see the changes over time.

AG TECH STEAM

These content packs could not be brought to you without a lot of support and friendship.
Many individuals gave freely of their time and expertise to help bring you these packs.
We want to say thank you to them and acknowledge some of the organizations that have so generously helped us. We couldn't do this without you!

Farm Credit Canada / FCC AgExpert
Olds College
Xarvio Canada
BASF
Bayer Crop Science
Canada Learning Code
Kids Code Jeunesse

If you want to learn more head over to these links:

https://www.agricultureforlife.ca/steam-lab
https://fieldheroes.ca/
https://www.makingsciencemakesense.com/science-library/resources/
https://www.deere.com/en/connect-with-john-deere/john-deere-for-kids/
http://publications.gc.ca/collections/collection_2015/aac-aafc/A59-23-2015-eng.pdf
https://www.soils4teachers.org/soil-basics
https://www.soils4kids.org/experiments
http://www.fao.org/3/a-i7957e.pdf

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We thank all of our content creators who generously shared with us for the content pack.
We encourage you to share your creations with us on social media!
Use the hashtags #ruralkidscan and #agtechsteam

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