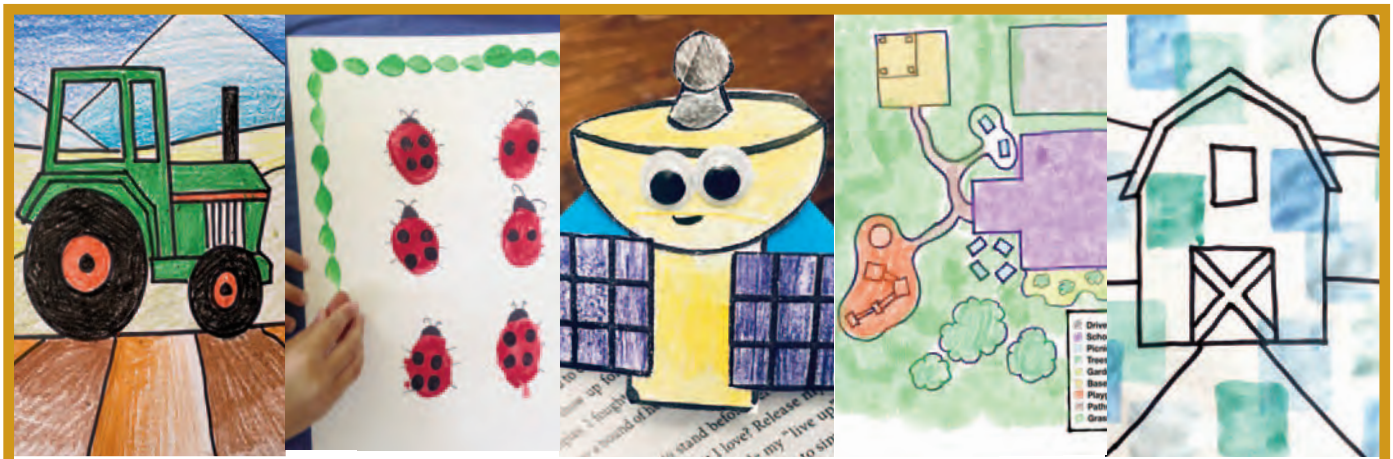
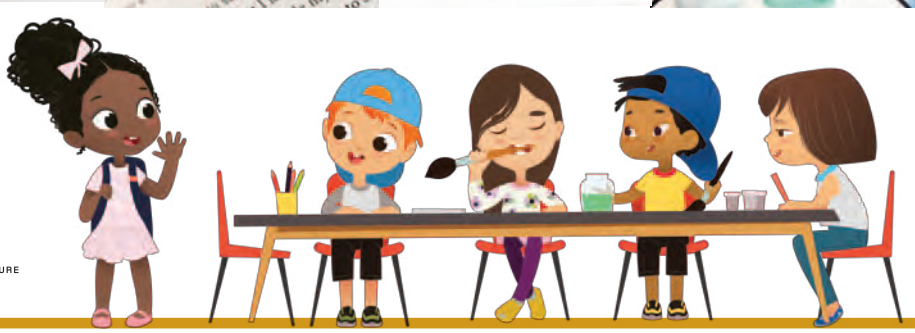
Educator Guide

Episode 3: Tractors in Spaaaace!

ART ACTIVITIES WITH
A DRAW-ALONG VIDEO





GOOD in every GRAIN

CANADA AGRICULTURE AND FOOD MUSEUM
MUSÉE DE L'AGRICULTURE ET DE L'ALIMENTATION DU CANADA

www.GoodInEveryGrain.ca/draw-with-rob

THIS PUBLICATION IS produced by Grain Farmers of Ontario in partnership with Canada Agriculture and Food Museum, with special thanks to Rob Biddulph and Jodie Hart (artist/art educator) for their involvement.

Good in Every Grain is Grain Farmers of Ontario's public outreach campaign, which aims to tell the story of agriculture and grain farming to educators and students across the province. Grain Farmers of Ontario is a not-for-profit organization representing 28,000 barley, corn, oat, soybean, and wheat farmers in Ontario, Canada.

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https://goodineverygrain.ca

The Canada Agriculture and Food Museum is a working farm in the heart of Ottawa. It offers visitors a unique opportunity to explore agricultural science in action, to see diverse breeds of farm animals and to learn about where their food comes from. The museum is a part of Ingenium – Canada's Museums of Science and Innovation.

P.O. Box 9724, Station T, Ottawa, ON, K1G 5A3
Tel: (613) 230-2770 ext. 2000

https://ingeniumcanada.org/agriculture

Rob Biddulph is a bestselling and multi award-winning children's author/illustrator whose books include Blown Away, Odd Dog Out, and Kevin. In March 2020, he started #DrawWithRob, a series of draw-along videos designed to involve children were forced to stay home from school due to the pandemic. It has garnered international media coverage and millions of views across the globe

http://www.robbiddulph.com/draw-with-rob

WELCOME EDUCATORS!

This guide was developed for educators, families and community leaders to accompany Rob Biddulph's Draw with Rob video Tractors... in Spaaaace! released on May 11, 2021. See the video at www.GoodinEveryGrain.ca/draw-with-rob

We developed these videos and subsequent activities to help elementary students explore their artistic creativity and grow a lifelong awareness of local farming, food origins and nutrition. Exploring science through art is like creating a portrait; the artist strives to understand the subject and then renders it in their medium of choice.

Rob's video helps students explore the importance of tractors and how they have changed. Today, farmers need to know a lot about using computers and technology. For an overview of tractors, including the technology they use, please see All About Tractors: A Resource for Teachers on page 25. Use the activities found in this guide at your own pace and adapt them to suit your needs.

OVERVIEW

This is one of three art-based resources to support learning about science through art. Each resource is based on a Draw with Rob video and includes engaging art projects through which students will explore the themes of plant growth, soil health and farm technology.

- **Episode 1 Magic Beans.** Draw sleepy soybean characters in and out of their pod and learn about plant growth and the many uses of soybeans.
- **Episode 2 Wiggly Worm!** Wiggly worms help teach students about soil health and their community of organisms.
- **Episode 3 Tractors in spaaaace!** Students will draw a tractor and learn about farming technology, including satellite guidance.

TABLE OF CONTENTS

Tractor in spaaaace!

ACTIVITY 1

RECOMMENDED GRADE LEVELS: 1 – 4

TIME: 20 - 30 minutes

BRIEF DESCRIPTION OF ACTIVITY: Students will draw along with the video to create a tractor and begin to learn how important tractors are to growing food and how modern tractors use computer technology, including satellite imagery and global positioning.

KEY CONCEPTS: repetition, form (drawing shapes), the role of tractors in agriculture and their high-tech applications.

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; D2. Reflecting, Responding, and Analysing; and Principles of Design: Repetition and Rhythm.

SUPPLIES

- access to video and ability to display it to the class
- paper and materials for drawing (pencils, crayons, markers)

RESOURCES

All About Tractors: A Resource for Teachers (page 25)

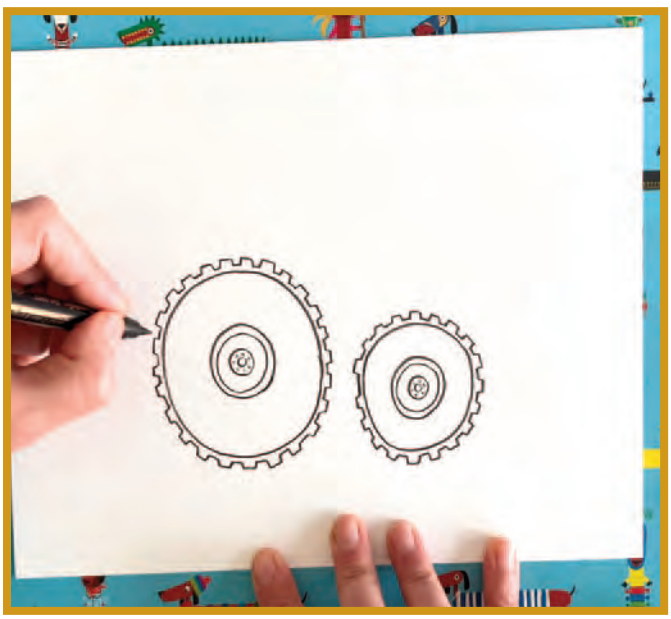
Link: https://GoodinEveryGrain.ca/draw-with-rob/

INSTRUCTIONS

1. **Watch Draw with Rob – Tractors... in Spaaace! with your students.**
   As needed, pause the video to expand on the importance of tractors in farming and allow students to catch up.

2. **Encourage students to listen carefully to what Rob says about tractors, what they do, and how they have changed.**
   Rob says he always thought of tractors as an old-style version; he has learned that tractors have changed. They now use lots of different technologies, including satellite applications and knobby tires.

3. **For younger students, teachers may wish to provide information about tractors themselves using the resource on page 25, and advance the video after the introduction to timestamp 4:00 where the drawing instruction begins.**



DID YOU KNOW?

Before tractors, horses pulled plows and wagons. The first tractor was driven by steam, like a small locomotive, and people said it would never work. But today there are more than 16 million tractors around the world. Farmers use them to grow enough food for 7.8 billion people to eat!

TEACH MORE ART!

Rob Biddulph is a children's writer and illustrator. Michael Martchenko is a Canadian children's writer and illustrator. Besides drawing the pictures for Robert Munsch's books, like *The Paper Bag Princess*, he creates his own stories and pictures, like *Ma, I'm a Farmer!*

OUTDOOR LEARNING

After students have watched the video and drawn their pictures, head outside with sidewalk chalk. Have students draw tractors on the pavement, along with some of the equipment tractors pull.

Basic shapes

ACTIVITY 2

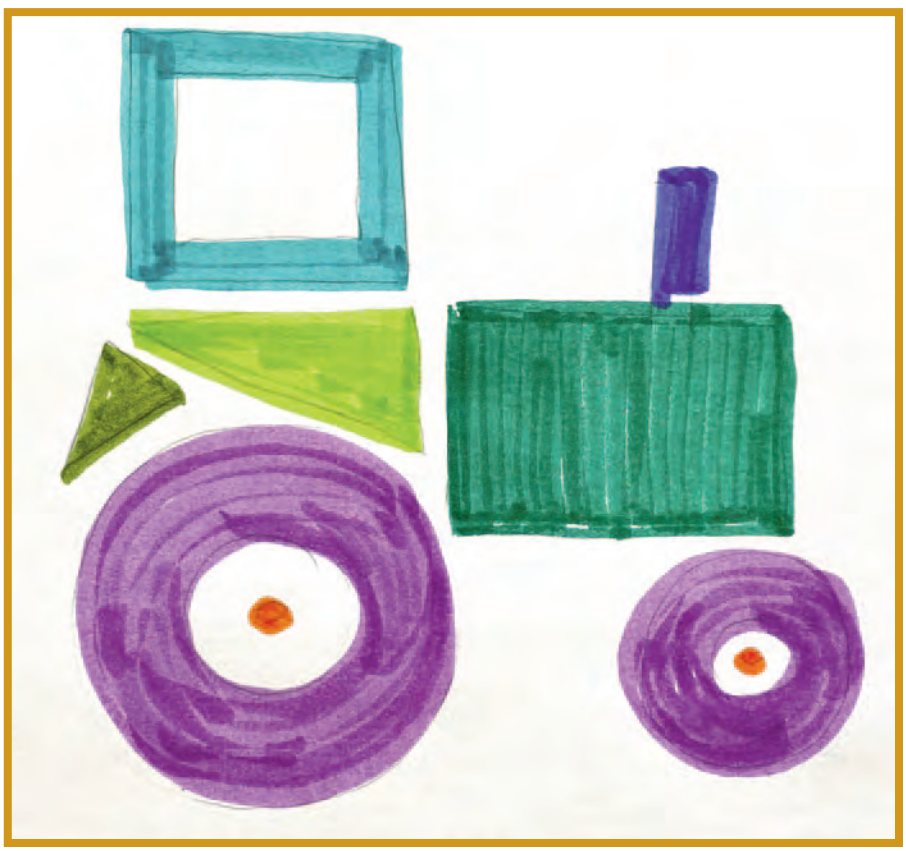
RECOMMENDED GRADE LEVELS: 1 – 2

TIME: 45 minutes

BRIEF DESCRIPTION OF ACTIVITY: Students will study the work of Kenojuak Ashevac, and learn to draw a tractor using basic shapes.

KEY CONCEPTS: Creative problem solving, observational skills, analysis and appreciation.

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; D2. Reflecting, Responding, and Analysing; and Elements of Design: shape.



SUPPLIES

- paper
- pencils
- colour medium such as crayons

RESOURCES

Links:

http://www.dorsetfinearts.com/kenojuak-askhevak

https://GoodinEveryGrain.ca/2020/08/13/photo-story-harvest-equipment/

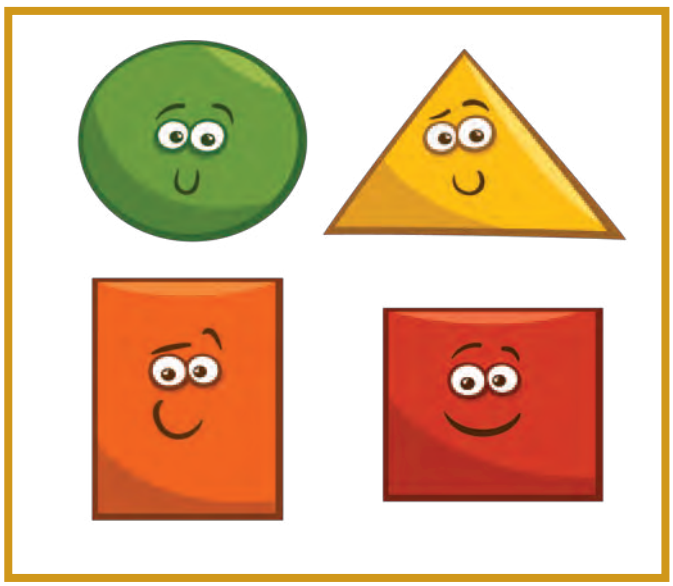
INSTRUCTIONS

1. **Look at Ashevak's Enchanted Owl.**
   Notice how she breaks the owl down into basic shapes. Have students identify shapes they see.

2. **View pictures of things on a farm, such as barns, grain bins, farmhouse, fences, tractors, wagons.**
   Ask students to identify the shapes they see.

3. **Provide reference photos of tractors.**
   Students can use basic shapes (circle, square and rectangle) to depict a tractor. The tractor can be coloured with bold, flat colours, reflecting Ashevak's colour style. (Google "drawings of tractors" for some interesting elemental images.)

4. **Discuss whether the shapes of tractors and other farm things help them work efficiently.**
   Is a round steering wheel easier to turn? Does a round grain bin store better grain? Hint – a round grain bin is best to withstand the weight of the grain.



DID YOU KNOW?

Kenojuak Ashevak's Enchanted Owl has been featured on Canada Post stamps twice since it was created in 1960. She was the first Inuit woman to have her art displayed on a stamp.

TEACH MORE ART!

Everything has a shape! In art, a shape is a flat area surrounded by an outline. An artist needs to know basic shapes for drawing anything: the cube, the cylinder and the sphere. Show students how to draw and shade a square, rectangle and circle to look like a cube, cylinder and sphere.

OUTDOOR LEARNING

Go outside with drawing supplies. Use basic shapes to capture what you see. Before heading out, the teacher can demonstrate how a bird can be drawn using only a circle, oval and two triangles.

Negative space

ACTIVITY 3

RECOMMENDED GRADE LEVELS: 3 – 4

TIME: 45 minutes

BRIEF DESCRIPTION OF ACTIVITY: Students will draw a tractor and create valued areas in the negative space.

KEY CONCEPTS: using lines to create shapes, positive and negative space.

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; D2. Reflecting, Responding, and Analysing; and Elements of Design: space (positive and negative), value.

SUPPLIES

- drawing paper
- pencils
- colour media such as crayons or pencil crayons
- images of Old Lumber Village by A.J. Casson

RESOURCES

Links:

www.thegroupofseven.ca

www.aci-iac.ca/art-books/emily-carr/key-works/self-portrait/

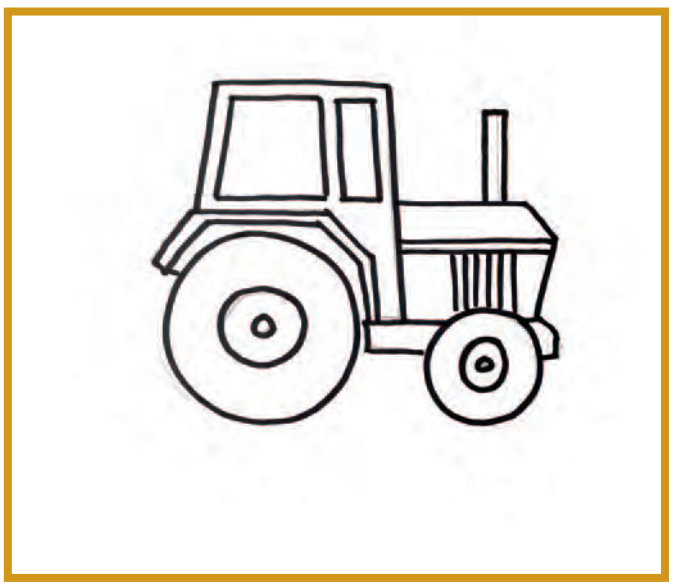
www.artnet.com/artists/alfred-joseph-casson/old-lumber-village-DcdNMyPv5pXDN5HWaUzd3w2

INSTRUCTIONS

1. **Begin with a discussion about positive and negative space.**
   Show images of paintings, such as works by the Group of Seven or Emily Carr. Ask students to identify positive and negative space.

2. **View Old Lumber Village by A.J. Casson.**
   Ask students what they notice about the negative space. Casson divides it with line, and then fills each space with various values (a cubist technique.)

3. **Students will draw a tractor, from a reference or their imagination.**
   The tractor is the positive space. Everything around it is the negative space. Students can draw lines from the tractor extending to the edges of the page, as in the example, filling the negative space with interesting shapes. Each shape can be filled with value, from dark to light, and could represent crops or fields.



DID YOU KNOW?

At first, farming was not like it is now, with big fields of the same crop. Farming grew from picking wild grains and fruit to planting the seeds of those plants. Eventually, people began to develop tools to become more efficient at growing. Tools made of wood were the first farm technology.

TEACH MORE ART!

Cubism is a visual arts style started by Pablo Picasso and Georges Braque. It doesn't try to look like nature or real life. It represents its subjects as forms and uses monochromatic colour schemes (usually tan, brown, gray, cream, green or blue) to focus on form.

OUTDOOR LEARNING

Take art materials outside to capture a familiar scene with positive and negative spaces, using line, form and simple colour values.

Prints and impressions

ACTIVITY 4

RECOMMENDED GRADE LEVELS: 1 – 2

TIME: 45 minutes

BRIEF DESCRIPTION OF ACTIVITY: Students will use a variety of objects to create prints.

KEY CONCEPTS: Creating textures through prints and impressions.

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; Elements of Design: texture, principles of design: variety and pattern.

SUPPLIES

- paper
- acrylic paint
- brushes
- foam stamps
- sponges
- apples, potatoes, carrots
- other objects that can be used to make stamps

RESOURCES

Links:

www.inuitartfoundation.org/profiles/artist/Leetia-Alivaktuk#key-alivaktuk

www.nativecanadianarts.com/gallery/northern-night-life/

www.ntstiresupply.com/ptk-shared/100-years-of-farm-tire-technology

www.dreamstime.com/photos-images/tractor-tire.html

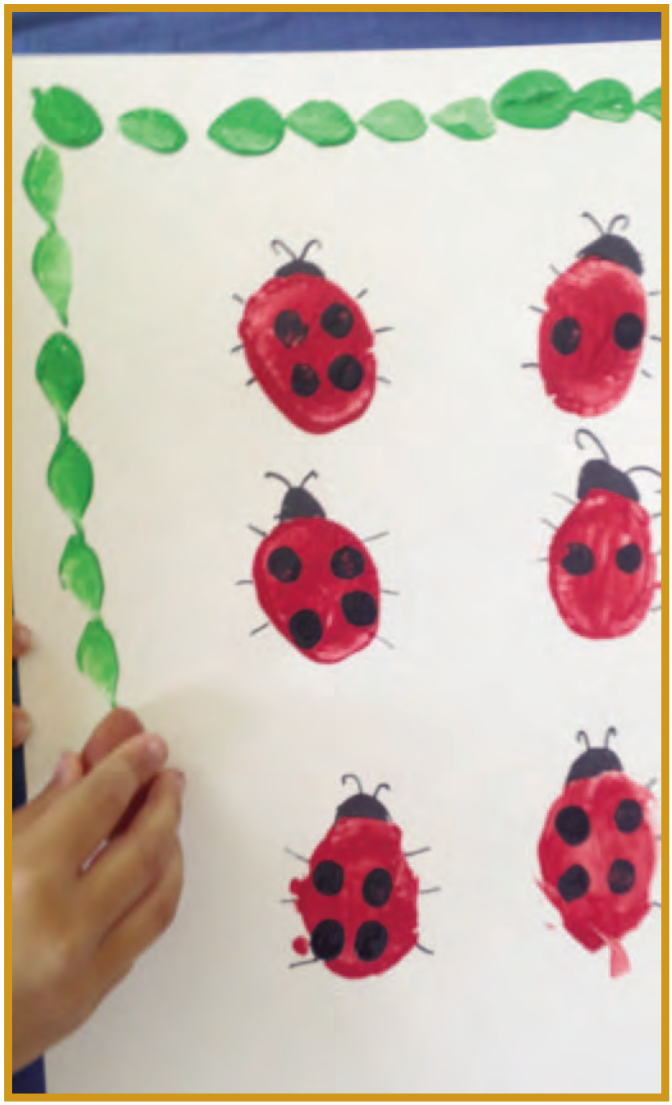
INSTRUCTIONS

1. **Many artists create art with prints and impressions.**
   View the art of Inuit print maker Leetia Alivaktuk, such as Northern Night Life.

2. **Explain print making: artists apply paint or ink to textured material and press it on paper, fabric or canvas.**

3. **Provide a variety of sponges, stamps, hard fruits or veggies, erasers, rubber balls, etc.**
   Apply paint to objects and use them to create prints on the paper. Students can create a representational or an abstract piece of art.

4. **Once the students have made prints, review the story of farm tire technology listed under resources (page 10) and view images of tractor tires.**
   Talk about the patterns and whether they are for appearance or purpose, such as not getting stuck in mud or reducing friction.



DID YOU KNOW?

The word "tractor" comes from the Latin word trahere, which means "to pull." Today it means "traction engine." Tractor tires are made to grip the ground so the tractor can pull heavy equipment better. The first tractors had metal wheels; they didn't grip but were improved by adding strips of metal to them.

TEACH MORE AG!

The tire pattern (tread) matters. A V-tread pushes soil to the side instead of the front or back, so the tire won't get stuck. The back wheels are bigger to give the most traction. Better traction means the tractor uses less fuel and has more power to pull heavy wagons or equipment!

OUTDOOR LEARNING

After viewing images of tires and discussing how the tread pattern on a tractor tire works, head out to an area with soft sand, dirt or snow. Have students take turns stepping or stomping to create tread marks with their shoes and see which way the material moves. Do their shoe treads move material like tires?

Satellite's view

ACTIVITY 5

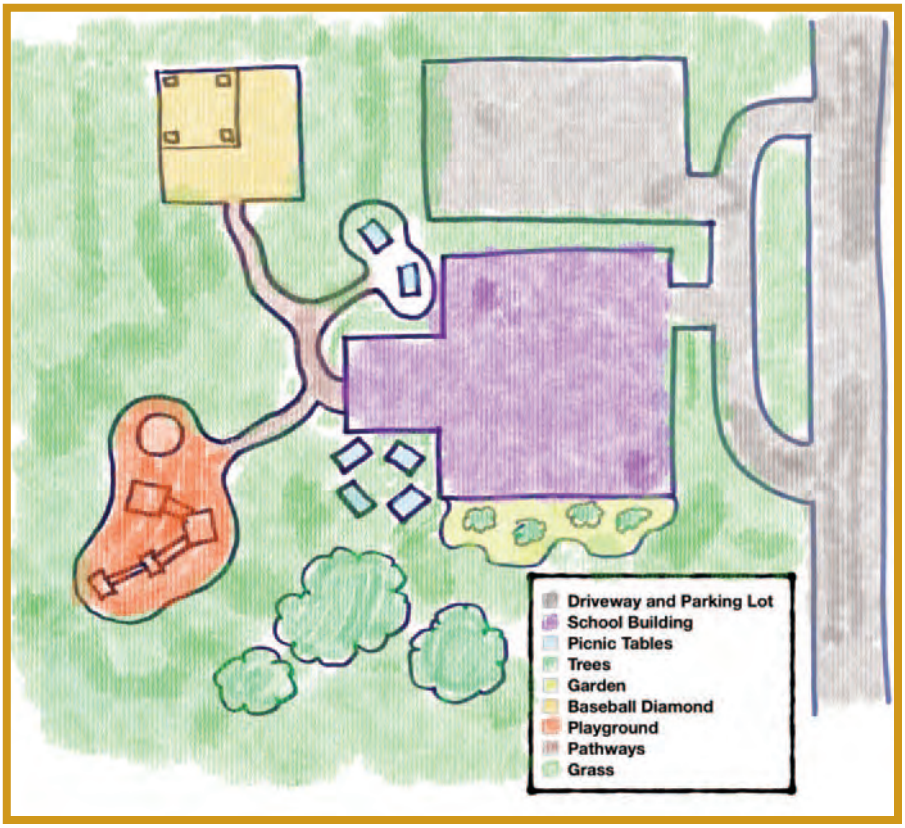
RECOMMENDED GRADE LEVELS: 1 – 4

TIME: 45 minutes

BRIEF DESCRIPTION OF ACTIVITY: Students can imagine what their school yard would look like from the point of view of a satellite, and draw the school yard from that point of view.

KEY CONCEPTS: Point of view/perspective.

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; D2. Reflecting, Responding, and Analysing.



SUPPLIES

- drawing paper
- pencils
- colour media such as pencil crayons or markers
- tracing paper if available

RESOURCES

Links:

www.nasa.gov/feature/amazing-earth-satellite-images-from-2020/

www.asc-csa.gc.ca/eng/missions/expedition58/activities/exploring-earth/map.asp#dataset-filter (select human footprint icon; filter with "farm")

www.agr.gc.ca/atlas/ bimat

INSTRUCTIONS

1. **Discuss point of view.**
   Most art is drawn from the point of view of a person standing on the ground.

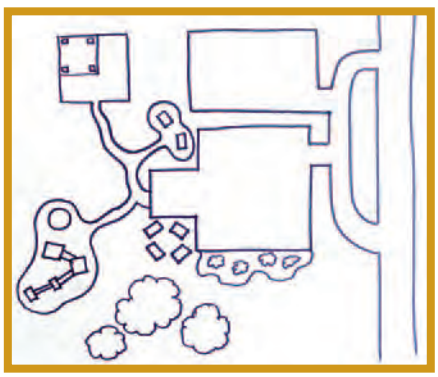
2. **Ask students to close their eyes and imagine their school yard, then imagine going way up to a satellite's height.**
   What would the school yard look like?

3. **Have students draw representations of a satellite's view of the school yard or neighbourhood or an area they know well.**
   Encourage them to consider farmland outside the city.

4. **Have students colour areas to tell what they are — blue for water, green for grass, grey for pavement, different colours for crops grown in the region.**

5. **View satellite photos or Google Earth images of your school, town, and nearby farmland.**

6. **Discuss their drawings compared to the satellite images.**
   Did students show more detail than the satellite?



DID YOU KNOW?

There are about 3,000 satellites in orbit around Earth. The purpose of the satellite determines how high it is. The satellites that take images for farmers are high-resolution satellites, like Landsat or SPOT. They are 500-1000 km above Earth. GPS satellites orbit at 20,000 km.

TEACH MORE AG!

Satellites are important to modern agriculture because they provide an accurate picture of an entire field, showing how well crops are growing. A computer helps analyze the data from the satellite, so the farmer knows where crops need attention. It helps farmers grow healthy crops that can be made to make our healthy food!

OUTDOOR LEARNING

Have students walk around the school, on grassy areas, if possible. Ask them to see the details of grass, plants or cracks in pavement. Have them change their perspective by squatting or standing on tiptoe. Discuss whether they see more or less in one position than in another.

Pixel art

ACTIVITY 6

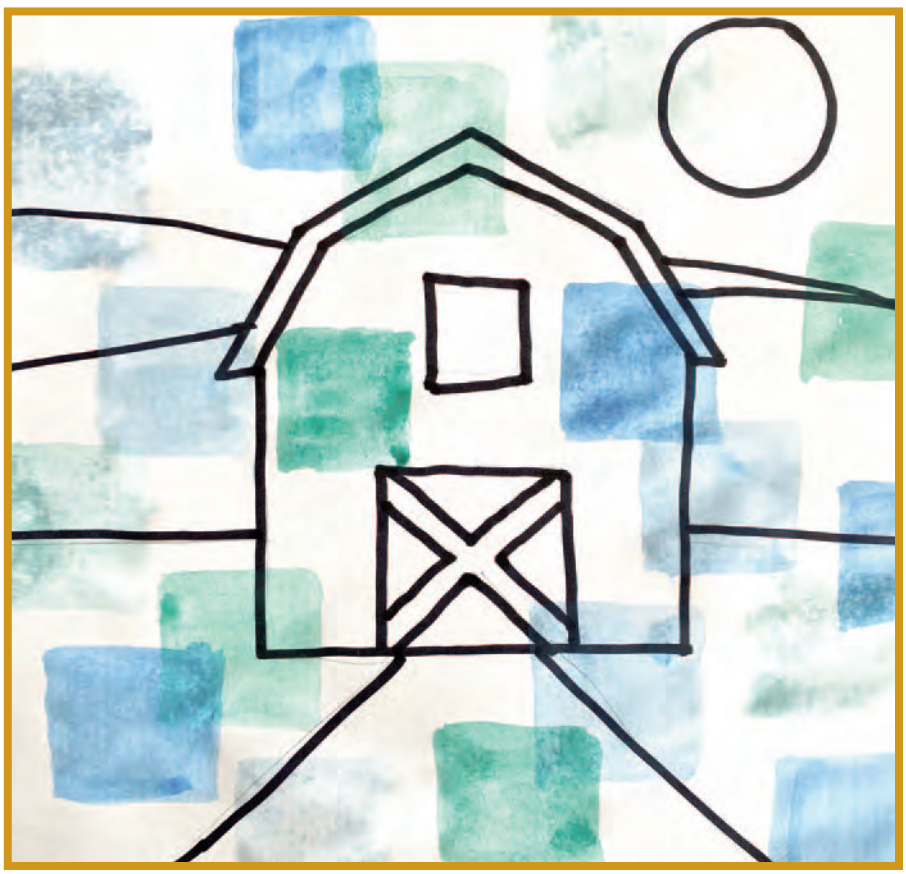
RECOMMENDED GRADE LEVELS: 3 – 4

TIME: 45 minutes

BRIEF DESCRIPTION OF ACTIVITY: Students will create a simple line drawing and add a pixel effect using tissue paper squares.

KEY CONCEPTS: Using multi-media, taking creative risks, using non-traditional materials.

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; Elements of Design: line and shape, balance and repetition.



SUPPLIES

- thicker paper (cardstock or bristol board)
- pencils
- markers
- tissue paper in several colours cut into squares
- water containers
- paint brushes or sponge brushes

RESOURCES

Links:

www.nasa.gov/feature/amazing-earth-satellite-images-from-2020/

www.google.com/earth/

www.sothebys.com/en/articles/pointillism-7-things-you-need-to-know

INSTRUCTIONS

1. **Satellites take pictures of everything on Earth, including farms.**
   The pictures are made up of sections that are put together to make the whole image. Each section is called a pixel. You can create an image that looks like a satellite picture.

2. **Choose a subject from around the farm such as equipment like a tractor or wagon, structures like a grain bin or barn, or farm animals.**

3. **Create a simple line drawing of the subject; and outline it in marker.**

4. **Select several colours of tissue paper squares.**
   Set a square down over the drawing and use a wet paint brush to brush water over the square. When the square is removed, it will leave an imprint over the drawing, creating a pixelated look. Try to achieve balance in the placement of the squares. Create as many squares as you wish.

DID YOU KNOW?

A satellite is like a giant camera. Each picture the satellite takes is made up of pixels. A pixel is a tiny section in a digital image. They make up the detail in a picture—the more pixels, the more detail. For images farmers use, each pixel represents a square on the ground of 30m x 30m.

TEACH MORE ART!

Imagine a picture made of tiny dots of colour close together – like pixels – that combine to form the image. If you look at it close-up, the picture is blurry. When you step way back, the image is clear. Long ago, artists made pictures using dots of colour. The style is called pointillism.

OUTDOOR LEARNING

Take drawing materials outside – paper, coloured pencils/markers. Have students choose a simple object to draw – stone, blade of grass. Draw it, then colour it with dots of colour to explore how many points – or pixels – make an image. Pace out a square of 30m x 30m to compare to a satellite image.

Unplugged coding

ACTIVITY 7.1 ORIGAMI BOOKMARK

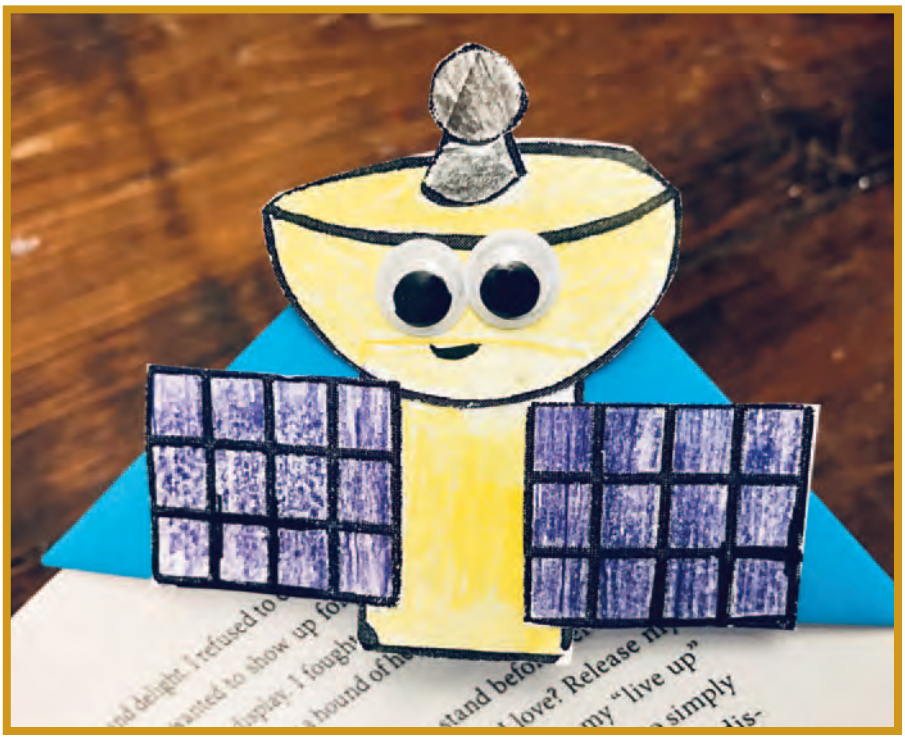
RECOMMENDED GRADE LEVELS: 1 – 3

TIME: 20 - 30 minutes

BRIEF DESCRIPTION OF ACTIVITY: Students will be encouraged to think like a coder to create a bookmark with an image of a tractor or satellite. In part 1, students will order scrambled origami steps to create the project. If they run into issues, they will learn to debug.

KEY CONCEPTS: ppaper folding, discussion of algorithms, sequences and decomposition.

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; D2. Reflecting, Responding, and Analysing; Elements of Design: shape and form.



SUPPLIES

- square paper
- scissors
- pre-folded bookmark sample
- printout of scrambled origami steps

RESOURCES

All About Tractors: A Resource for Teachers (page 25)

Link:
www.youtube.com/watch?v=NyC5FrFEQwk

INSTRUCTIONS

1. **Discuss coding by introducing/reinforcing:**
   a. **Algorithms** – sequence of steps to do a task
   b. **Sequences** – the order steps need to be in; sequencing is putting the steps in the right order to do the task
   c. **Decomposition** – breaking a complex problem into smaller parts; in computational thinking, working backwards from end to beginning helps break large problems into smaller ones

2. **Have students brainstorm about when they naturally break a job into smaller tasks and follow steps in order, such as following a cake recipe.**
   The instructions are sequenced into the order they need to be done to make the cake turn out right. Discuss how farmers use coding to help grow the wheat or soybeans that make flour for cakes.

   a. Discuss how farmers identify the steps to follow to plant, grow and harvest grain.
   b. Discuss how farmers use computers. E.g., computers can't see so they need very specific, detailed instructions. Without good instructions, the results could be really silly! Navigation systems in tractors that steer themselves use coding to follow detailed instructions based on satellite images to drive in a straight line or around obstacles in a field.

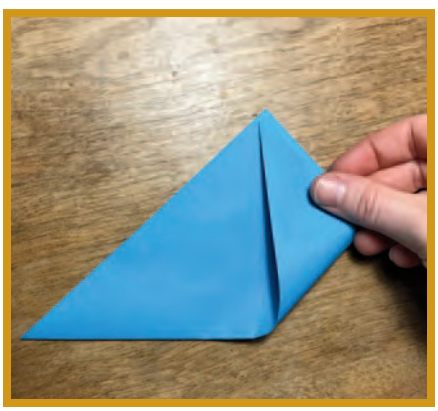
3. **Print the scrambled origami steps (page 20), one per student or group.**
   Have students cut them out along the black lines, mix them up and spread them out.

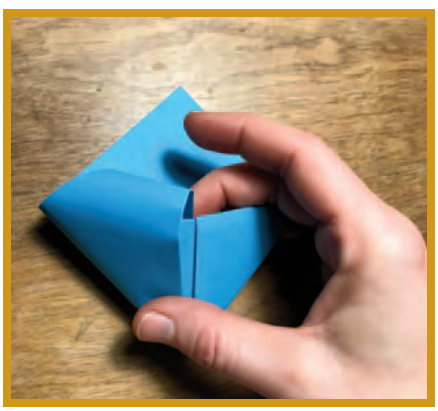
4. **Show students the completed origami.**
   Encourage them to put the steps in the right order by decomposing the origami.

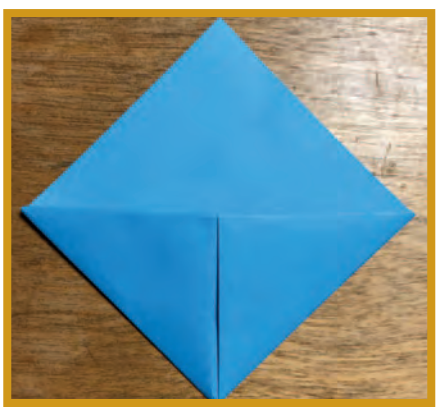
5. **Provide students with sheets of origami/square paper and have them test their algorithm.**

6. **For older students, you could select a tougher origami design that requires more steps to "code" before they can fold the paper.**

See PART 2 (page 18) to use coding to decorate their bookmark.







Unplugged coding

ACTIVITY 7.2 SATELLITE DESIGN

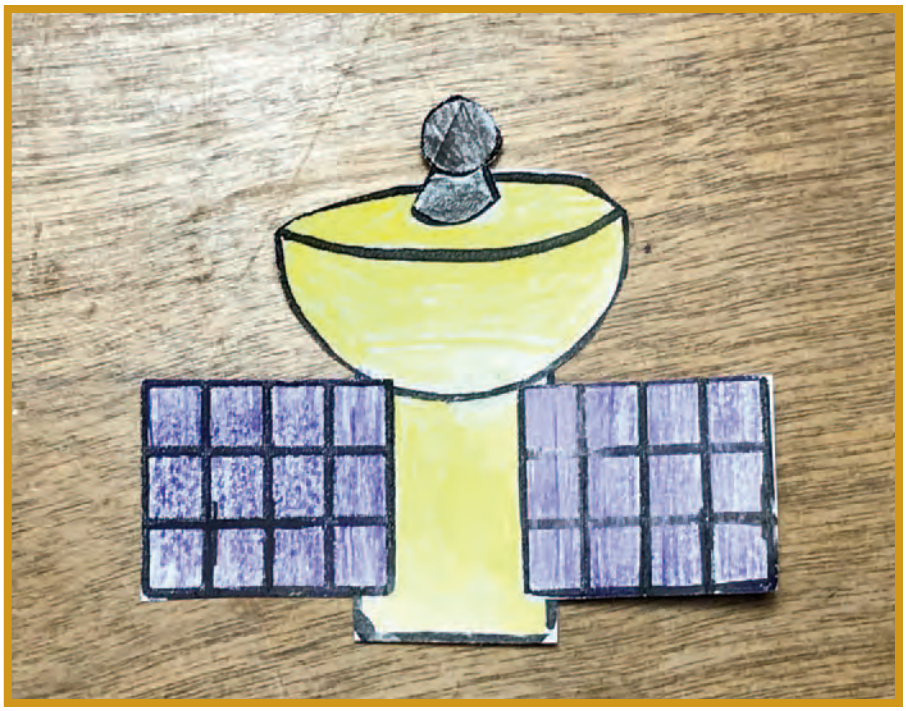
RECOMMENDED GRADE LEVELS: 1 – 3

TIME: 20 - 30 minutes

BRIEF DESCRIPTION OF ACTIVITY: A student will guide their class to make a simple satellite or tractor design by giving them specific instructions. The "players" won't be able to see the finished product, so the "guide" must give detailed instructions so the design can be created properly!

KEY CONCEPTS: discussion of algorithms (steps in a set of instructions), sequences (order of the steps in a set of instructions) and decomposition (breaking down a complex problem into smaller parts).

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; D2. Reflecting, Responding, and Analysing; Elements of Design: shape and form.



SUPPLIES

- materials for drawing (pencils, crayons, markers)
- scissors
- glue stick
- pre-folded bookmark sample

RESOURCES

All About Tractors: A Resource for Teachers (page 25)

TO BEGIN

1. **Remind students of the coding concepts of algorithms, sequences and decomposition (see page 16).**

2. **Introduce students to today's game: one student will guide the class to make a simple satellite by giving specific instructions.**
   Only the "guide" will see what the design should look like and will have to give detailed instructions so the "players" can create it properly!

3. **Make the connection to coding by explaining that the "guide" giving the instructions step-by-step is like giving instructions to a computer.**
   Computers don't "know" anything; they don't know what art is or what the final product should look like. They need detailed instructions to complete a task properly.

INSTRUCTIONS

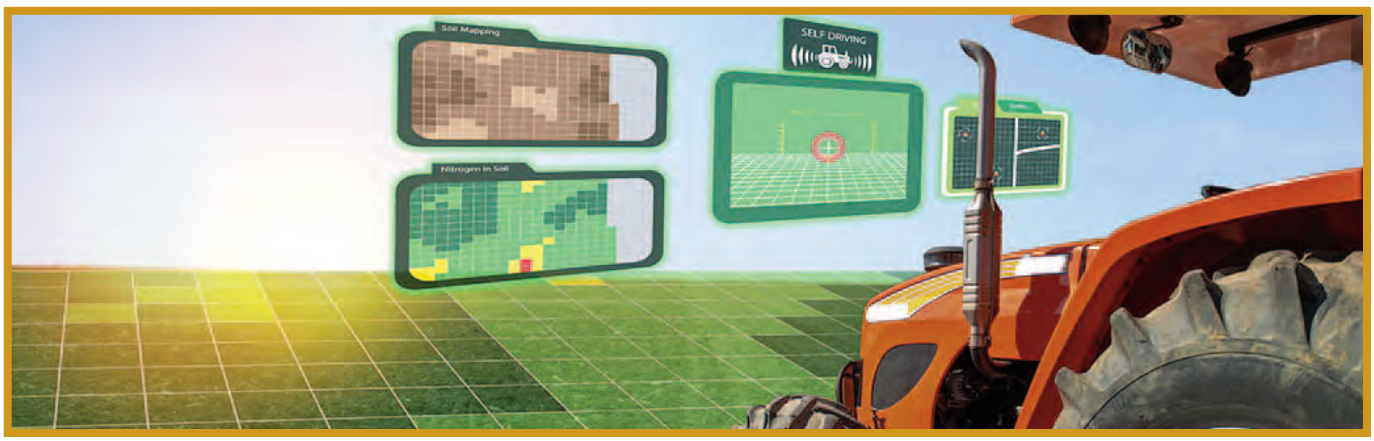
1. **Select a student guide, one comfortable in front of peers.**
   Take them aside; instruct them to create the design and describe how to do it without showing the instructions or finished product.

2. **Provide students with a printed template (page 21).**
   Have students pre-cut the pieces but not assemble them before the guide gives instructions.

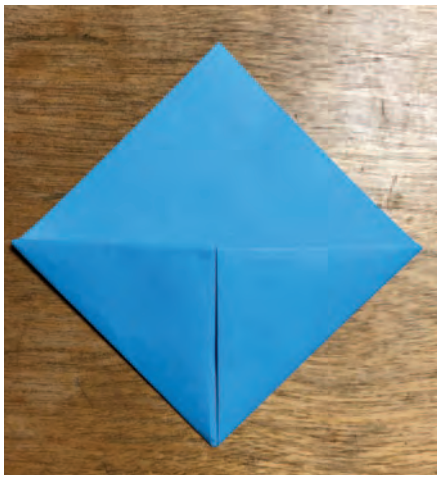
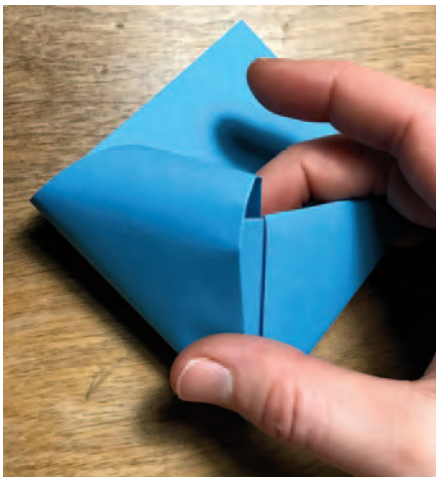
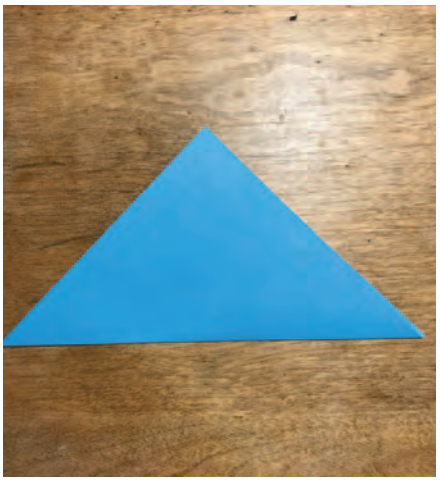
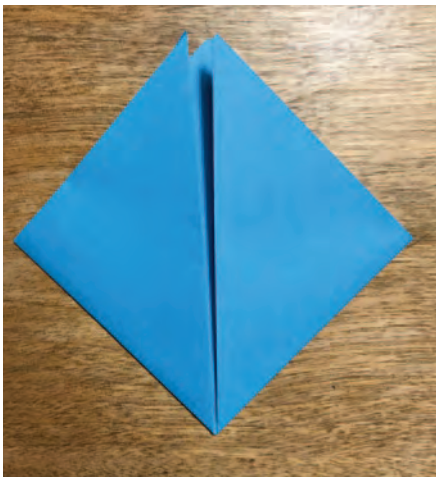
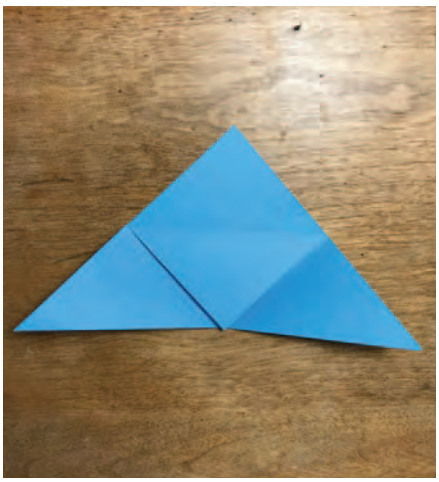
3. **Let the guide start to assemble the design and give instructions one at a time, waiting between steps for students to glue their pieces.**

4. **When the steps are complete, have everyone show their designs — look at the differences.**
   Discuss how challenging it is to create algorithms for computers — they can't see and need exact instructions.

5. **Have students glue their design to their bookmark.**
   Discuss the importance of satellites and tractors to our communities.

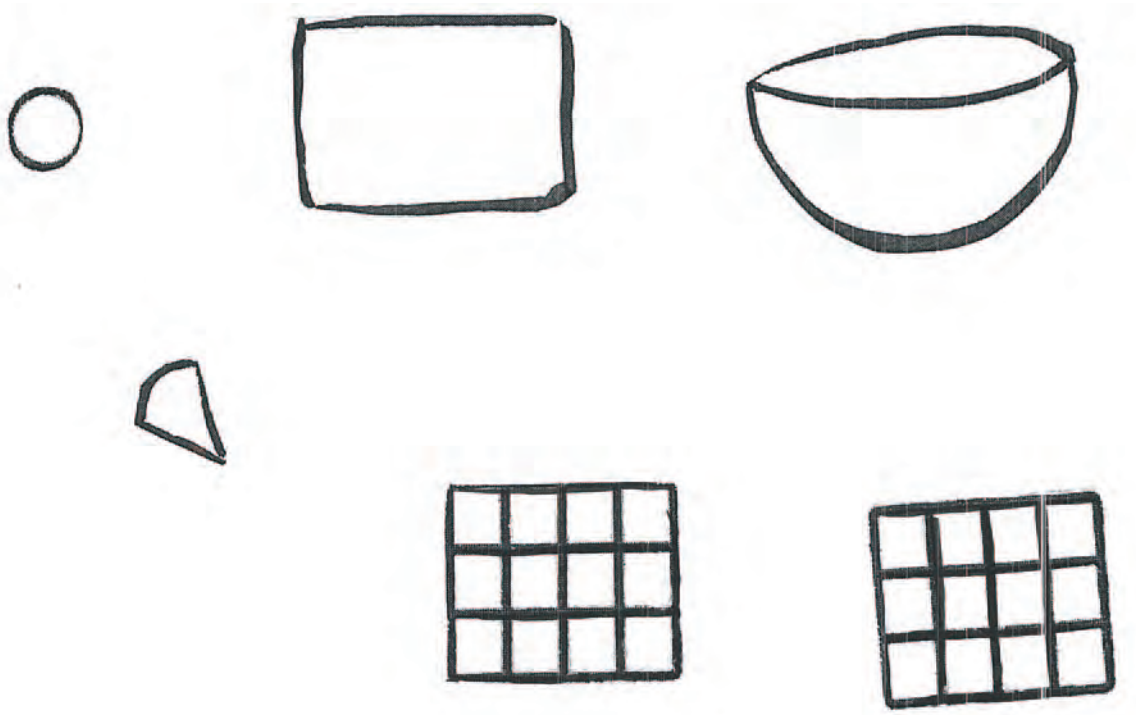




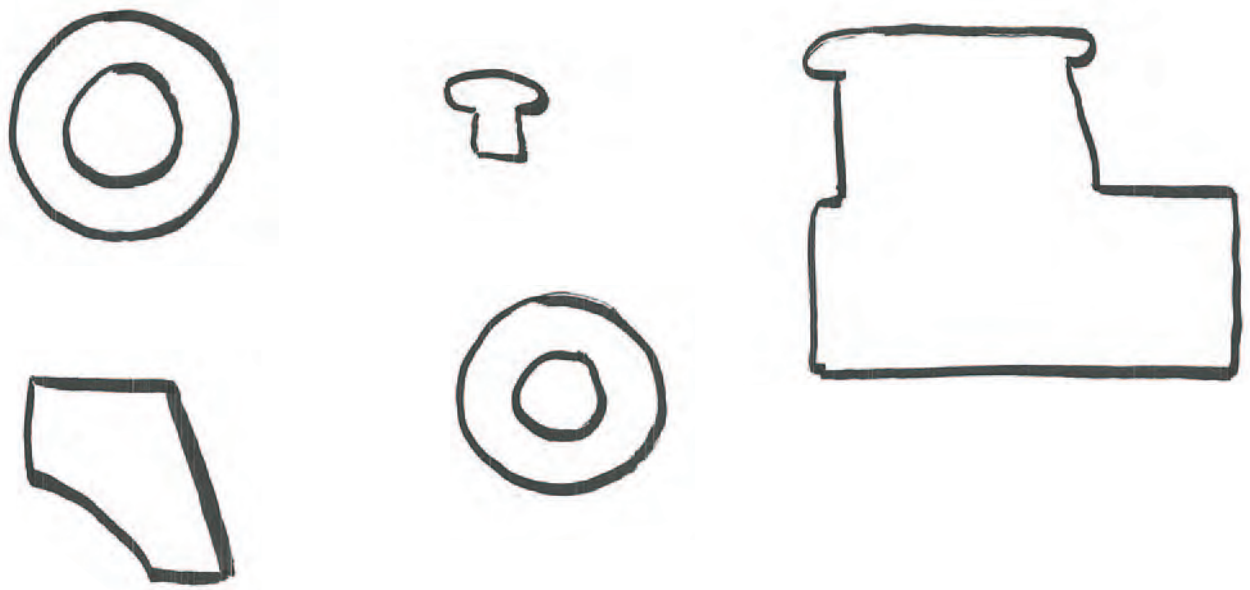






Bookmark Algorithm: Cut out each tile. What steps would you complete first to make the bookmark? Move the tiles around to put them in order on your table.

Design 1



Design 2



Dictated paper design: Cut out each piece of the picture. Wait for your student leader to give instructions on how to put the paper design together.

Future farm machines

ACTIVITY 8

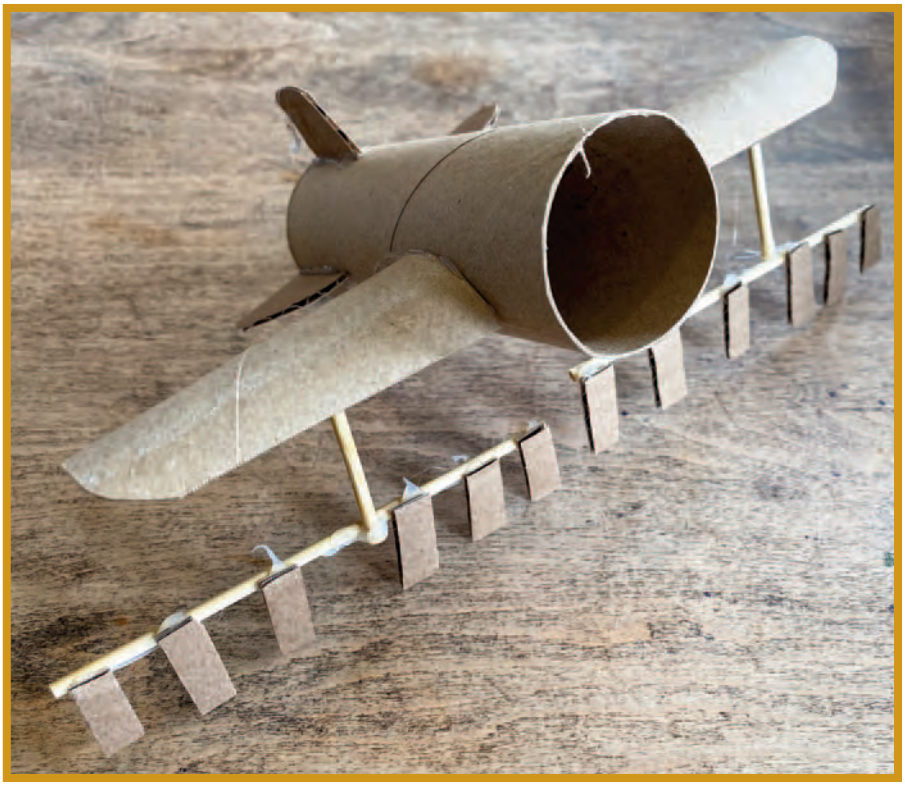
RECOMMENDED GRADE LEVELS: 3 – 4

TIME: 45 minutes

BRIEF DESCRIPTION OF ACTIVITY: Students will apply what they have learned about modern tractors and use cardboard and other materials to create a model of a tractor or machine they imagine will exist in the future.

KEY CONCEPTS: Manipulating materials to represent a concept, creating three-dimensional forms, creative problem solving.

RELEVANT ARTS CURRICULUM: D1. Creating and Presenting; D3. Exploring Forms; Elements of Design: 3-D form.



SUPPLIES

- plasticine
- cardboard boxes
- popsicle sticks
- cardboard tubes
- scissors
- glue
- staples
- elastics
- fasteners
- glue
- chenille stems

RESOURCES

Amazing Tractors in Action

Link:
https://youtu.be/j7CzFeHqf0s

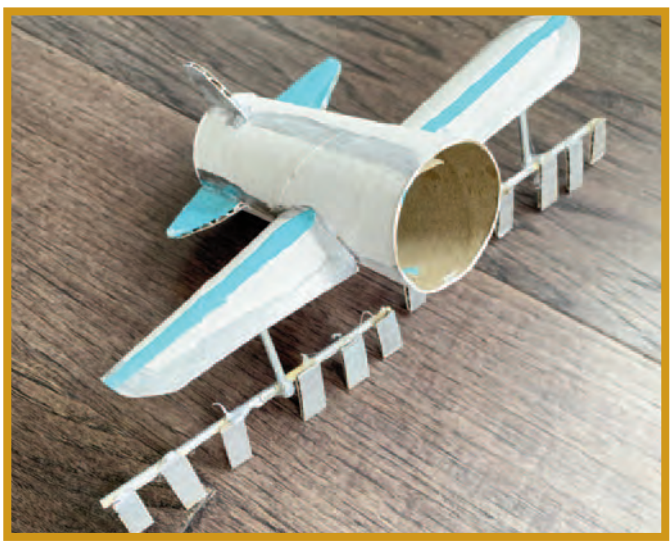
INSTRUCTIONS

1. **Watch the video about amazing modern tractors in action.**

2. **Ask students how these tractors are different from the real tractor you would picture in your head?**
   How are they the same?

3. **Generate a discussion about what types of machines students imagine will be used in the future.**
   Creating the model: This project is best done in pairs or small groups. Students can create a model of a tractor or machine using the materials provided.

4. **Following the creation of the project, have each group present their model to the class and explain what it would do, and what technology they think would be needed (e.g., computer, GPS, artificial intelligence).**



DID YOU KNOW?

Tractors pull all kinds of equipment for doing many jobs on the farm, such as turning the soil, planting seeds, fertilizing, harvesting and hauling things in wagons like harvested grain. Some tractors are designed for specific things, such as orchard tractors that fit between rows.

TEACH MORE ART!

Sculpture is the art of making representative or abstract compositions in three dimensions. Sculpting techniques include carving – cutting away material that isn't part of the final form – or assembling – gathering and joining different materials.

OUTDOOR LEARNING

Have students collect odd or interesting items from around their homes and combine them as a sculpture. Have students show their sculptures to the class and explain what they represent or why they find them interesting.

Bonus activity

HOW TO DRAW A SATELLITE

#DRAW WITH ROB CANADA

1. Draw a circle in the middle of your paper. Don't make it too big!

2. In the centre of your circle, draw three more, one inside the other. Colour in the outside circle.

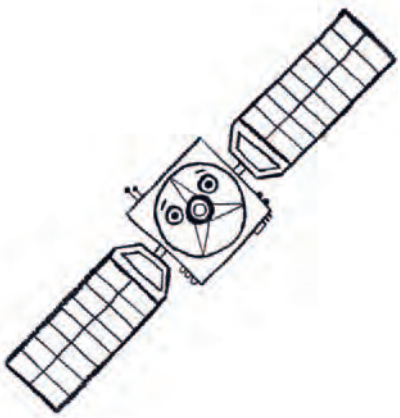
3. Draw three triangle shapes, evenly spaced around this inner circle. Make the triangles quite narrow and the point of each should reach your outer circle (the first one you drew).

4. Draw a diamond shape around your circle and keep the point of the diamond at the very top and centre of your picture.

5. On either side of the top triangle, draw two small circles, each with a black dot inside. These are our satellite's eyes. Add a little dash for the 'brows'.

6. Around the box, draw some buttons and controls like the ones in the picture. Don't forget the two antennas at the top!

7. Add two short lines on each side, and then copy the funny half-hexagon shapes I've drawn. They're similar in shape to a roof (with another, smaller roof inside!).



8. Now draw your satellite's 'wings'. Draw two rectangles, each with a line down the centre and lots of lines running across, to make grids.

9. Colour in using any colours you like. Add more controls and finish off by giving your satellite a signal (a few arch shapes emitting from the antenna).

All about tractors

TEACHER RESOURCE

- Did you know? The word "tractor" comes from the Latin trahere, which means "to pull." Today it means "traction engine."

- How did we get from a machine for pulling to tractors in space? Read on to find out why tractors are so important and why outer space is important to agriculture.

- People began farming – planting seeds and tending plants – more than 10,000 years ago. People became better at growing things as they developed better and better tools. Innovation has changed farm technology from wooden plows to today's high-tech tractor.

- Tractors completely changed farming. Although horses could pull plows and wagons, even the earliest tractors could pull more heavy things than horses and pull it farther. When the first steam-engine tractor was introduced in 1868, people thought it could never work. But they were wrong! Today, there are more than 16 million tractors on the planet; 1/3 of the energy used in agricultural production is used by tractors.

- Farming uses tractors for many things – turning the soil, planting seeds, fertilizing, harvesting and moving things like wagons full of harvested grain. Tractors pull the equipment that do all those jobs and can even use tools for lifting, carrying and digging. There are different types of tractors, such as row tractors that have enough ground clearance for crops grown in rows, and orchard tractors that fit between rows of trees. There are many pieces of equipment for a tractor to pull, depending on the type of farm, such as those listed below.
  - **Plow** for breaking up heavy soil like grassy fields.
  - **Tiller** (or cultivator) breaks up the soil to prepare soil for planting.
  - **Seed drills** (seeder or planter) to plant seeds evenly in rows at the right depth.
  - **Sprayers and applicators.** Plants need fertilizer or help repelling pests. Sprayers are calibrated to deliver the right product to help crops grow.
  - **Wagons** are useful for moving a lot of things on the farm, such as hay, crops like apples and pumpkins, or people on a hayride.
  - **Grain cart** (grain buggy) is for moving harvested grain from a combine to a truck.

- Today's farmer is at the centre of a network made up of a high-tech tractor with touch-screen displays and a satellite receiver that "talks" to other devices and sends information to the farmer's laptop or mobile device. The technology helps farmers monitor equipment functions, know where on their field requires fertilizer, plot the route through a field, including avoiding obstacles, and steer the tractor. For an excellent example, visit geekologie.com/2020/04/high-tech-what-the-inside-of-a-modern-fa.php

- The images from a satellite can tell a farmer where crops are growing best or where they need better soil or more water. The network helps the farmer see what's happening on the farm, collaborate with other people and tools to help work go more efficiently, keep crops healthy and increase crop yield.

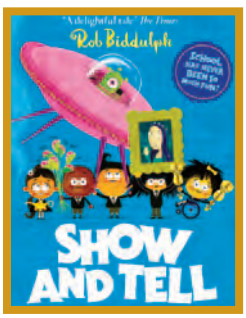
- Tractors are amazing machines! In the future, they may be even more amazing, Already there are autonomous tractors and other machines that can be programed to operate remotely. Tractors of the future may work alongside robots that plant seeds, pick fruit, and fertilize crops. Perhaps they'll hover above the ground so they don't leave wheel impressions, or perhaps they'll make their own fuel from weeds and sunlight. See Amazing Tractors in Action at youtu.be/j7CzFeHqf0s.

Recommendations

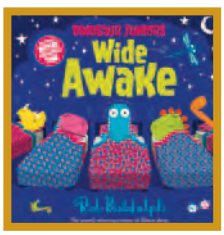
BOOKS FOR STUDENTS

BOOKS BY ROB BIDDULPH

DOG GONE
Edward Pugglesworth is a dog – you can call him Teddy. He has lost Dave, his human. Teddy knows you cannot let your human run around – they are sure to get into trouble. Especially with a terrible troll around! Dave is lucky – Teddy is on the case!



SHOW AND TELL
Show and Tell day is the best! Every person in the class wants to do the best show and tell to impress the teacher and win a prize. There are aliens and parrots, robots and carrots on show. Who will win? Maybe there is a big lesson to learn!



DINOSAUR JUNIORS WIDE AWAKE
It's time for bed for the Tyrannosaurus twins, Otto and Winnie. Otto is ready to sleep but Winnie is not. Otto tries to help with lullabies and counting dino-sheep. Will they ever go to sleep?

BOOKS ABOUT TRACTORS AND FARMING

All of the Factors of Why I Love Tractors
By Davina Bell
Frankie McGee wants to borrow a book about tractors from the library – again! His mother begs him to read about something else – cars, planes, cranes, trains. Frankie tells her all about all the reasons he loves tractors. But will he convince his mom? Laugh out loud with this fun rhyming text. (Grades 1-2)

Ma, I'm a Farmer!
By Michael Martchenko
Fred doesn't like his city job, so he decides to become a farmer. He thinks it will be relaxing. Wow! Was he wrong! The hungry animals on the farm have other ideas and soon Fred is up to his overalls in agriculture. Fred has lots of technical know-how, and in no time, machines are doing his dirty work and he can relax...or can he?

Tractor
By Dk
From the series Machines at Work. Learn how tractors help people on farms. Illustrated with bright, interesting photos of machines in different situations to explain how they work and what they do.

GOOD in every GRAIN

GRAIN FARMERS OF ONTARIO

MUSÉE DE L'AGRICULTURE
ET DE L'ALIMENTATION
DU CANADA

CANADA AGRICULTURE
AND FOOD MUSEUM