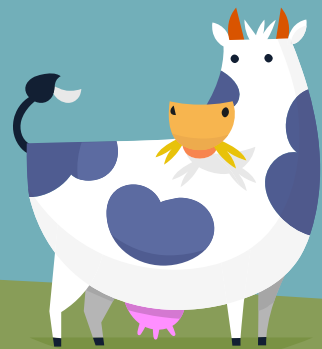


WAY TO GROW!

A Guide to Exploring
the Fields of Agriculture



University
of Manitoba

Faculty of Agricultural
and Food Sciences

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WAY TO GROW!

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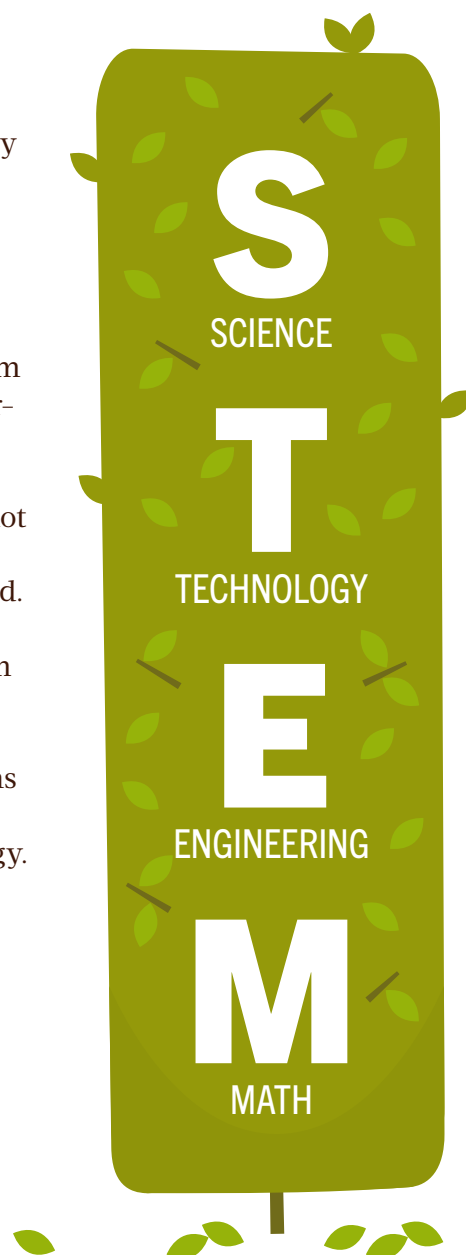
FOREWORD

Way to Grow! is a project borne of the idea to create an activity book for young females with images and content recognizing women in agriculture sectors. As we explored concepts and talked about women who've influenced us, colleagues who support us, and community members who work every day to make an impact we quickly recognized this book could easily become an almanac. I would venture to say that every day I am influenced by an action, a news report, a conversation, an overheard comment, or an interaction with a woman, particularly a STEM woman.

There is a long road of women who have carved pathways, not for the glory, not for hope that it will empower the future for other women, but because at the time they felt self-empowered. Each coming from different backgrounds, life-experiences, and education, but all having the inner-strength and aspiration to pursue their goal.

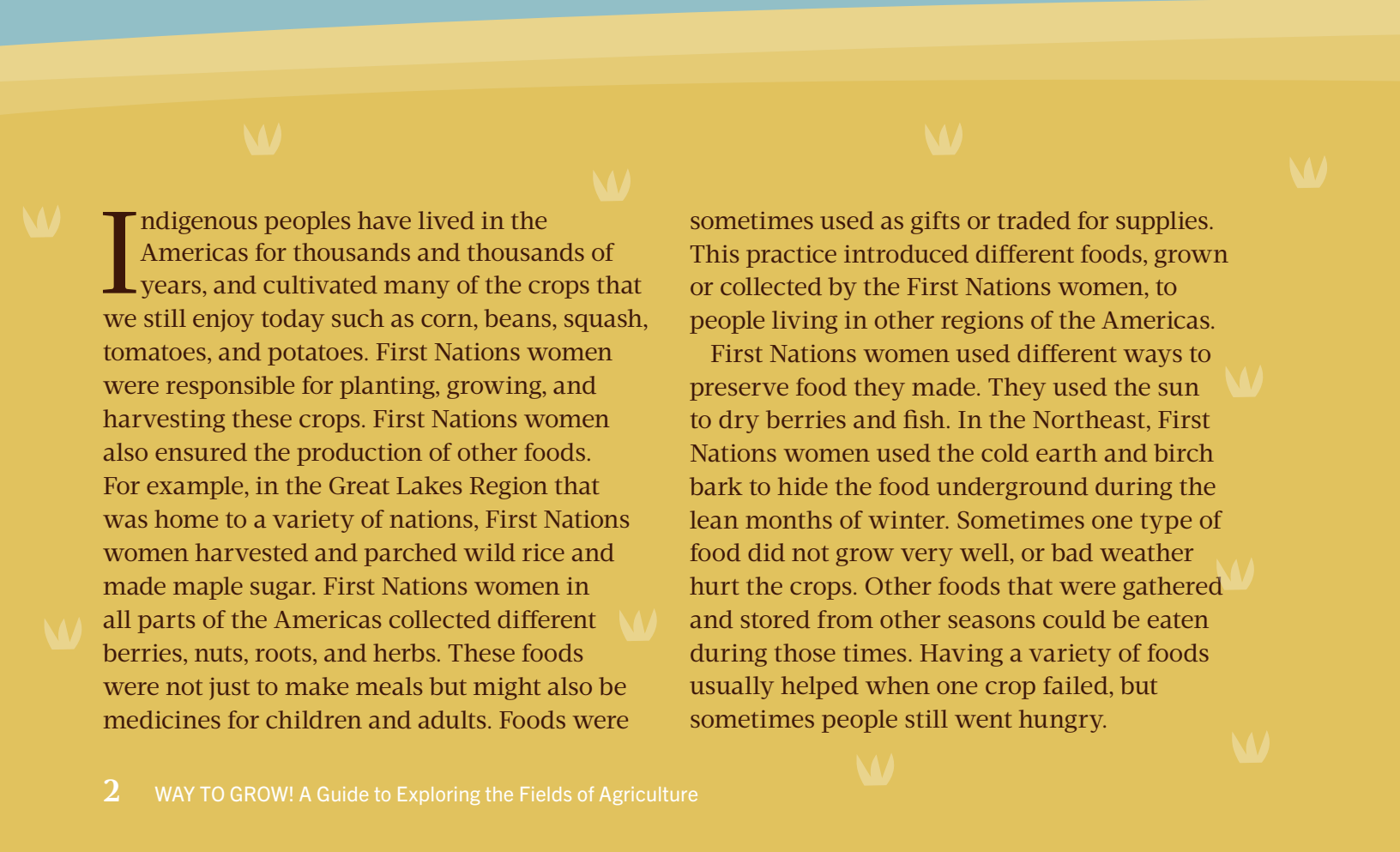
The **International Day of Women and Girls in Science** is the 11th day of February, passed by resolution of the United Nations General Assembly on 22 December, 2015. This day recognizes the critical role women and girls play in science and technology. **Way to Grow!** was conceived to introduce and welcome readers (and those young ones still being read-to) to learn about some of the STEM women in our community. We also want to support and encourage young learners to continue to explore, play, participate in sport, and all types of activity and to know that they are already carving their pathways. Learning comes in many formats and experiences. Continue to explore new opportunities and lean-in towards your goals and dreams.

- Annemieke Farenhorst





FIRST NATIONS WOMEN'S ROLE IN THE ADVANCEMENT OF AGRICULTURAL PRACTICES



Indigenous peoples have lived in the Americas for thousands and thousands of years, and cultivated many of the crops that we still enjoy today such as corn, beans, squash, tomatoes, and potatoes. First Nations women were responsible for planting, growing, and harvesting these crops. First Nations women also ensured the production of other foods. For example, in the Great Lakes Region that was home to a variety of nations, First Nations women harvested and parched wild rice and made maple sugar. First Nations women in all parts of the Americas collected different berries, nuts, roots, and herbs. These foods were not just to make meals but might also be medicines for children and adults. Foods were

sometimes used as gifts or traded for supplies. This practice introduced different foods, grown or collected by the First Nations women, to people living in other regions of the Americas.

First Nations women used different ways to preserve food they made. They used the sun to dry berries and fish. In the Northeast, First Nations women used the cold earth and birch bark to hide the food underground during the lean months of winter. Sometimes one type of food did not grow very well, or bad weather hurt the crops. Other foods that were gathered and stored from other seasons could be eaten during those times. Having a variety of foods usually helped when one crop failed, but sometimes people still went hungry.



It was First Nations women who discovered that the “three sisters”—corn, squash, and beans—grew best when planted together.

Source: Women & the American Story (WAMS), New York Historical Society

DID YOU KNOW?



This wooden digging stick was produced by the Nlaka’pamux people, who lived in the Cascade Mountains that span modern-day British Columbia, Canada and Washington State. The tool was used to dig plant roots and tubers. The cross-piece at the top of the stick allows the user to drive it into the earth with two hands. The main shaft is curved to help pull roots and tubers from the ground.

Source: Women & the American Story (WAMS), New York Historical Society

By looking at each plant and how it was growing, the First Nations women selected the seeds from the strongest plants for the following year’s crop. Thousands of years ago, corn only grew in Central America, but First Nations women planted the strongest seeds a little further north each year until a strong variety of corn was growing in Canada.

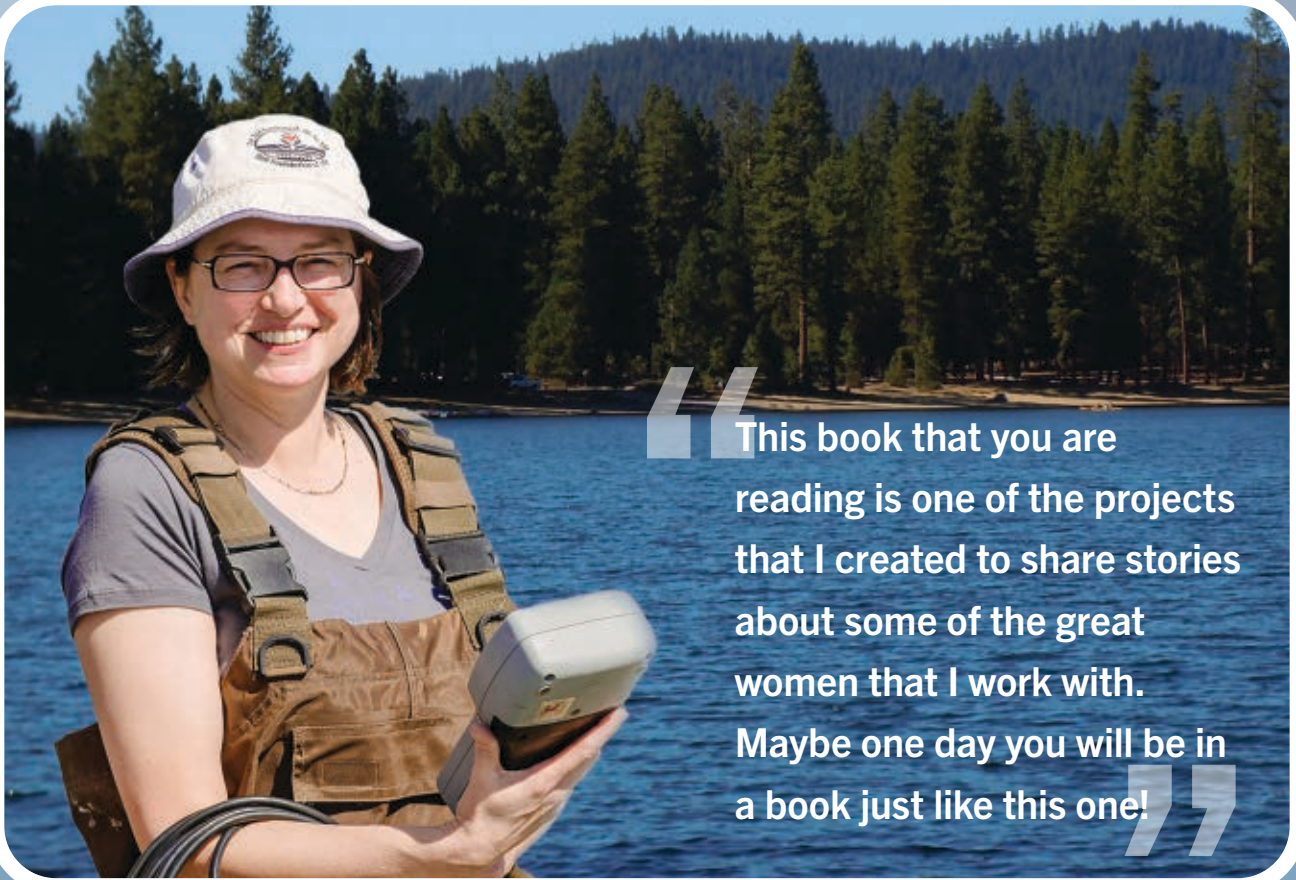
For many First Nations, the work of planting, collecting, and producing food was done in work groups, led by very wise women, called Elders. Elders passed on their knowledge to younger women and taught the young girls in the skills needed to have a variety of food throughout the year. In these work groups,

the Elders connected with the younger women and girls and discussed many topics, including their kin and community. This was valuable time and forged bonds between all of the women. Today, Elders are still highly regarded and their wisdom is passed down through their teachings.

We can be thankful for the advanced agriculture skills of the First Nations women and the variety crops and plants that grow in Canada today.

— **Susan Wade**

*PhD Student, History, University of Wisconsin, 2020
MA, History, University of Wisconsin, Milwaukee, 2011
BA, Anthropology, McGill University, 1989*



“This book that you are reading is one of the projects that I created to share stories about some of the great women that I work with. Maybe one day you will be in a book just like this one!”

DR. ANNEMIEKE FARENHORST

PROFESSOR, DEPARTMENT OF SOIL SCIENCE, ASSOCIATE DEAN (RESEARCH),
FACULTY OF AGRICULTURAL AND FOOD SCIENCES

I am a soil scientist, and my favorite soil is a podzol because it is very colorful. Soil scientists work on many different things, they help to improve soil health so farmers can grow better crops and they also help to protect surface water and groundwater. This is important because without healthy water, plants and animals in the world will not be able to survive, including humans! My students and I study chemicals and bacteria

in the environment. We collect samples from the rain or rivers, and even people's tap water. We test whether there are chemicals and harmful bacteria in these samples, and at what levels. We also work on biobeds, which is not something you can sleep in, but it is something that can be used by people who are applying pesticides. A biobed is a mixture of straw, soil and peat, which helps to grow beneficial bacteria that like

to use pesticides as their food source. Thus, when wastewater that contains pesticides is applied to the biobed, the bacteria help to clean the water.

I also work with women who are interested in science, engineering, agriculture and the environment. I provide support and encouragement to young female students, and women researchers to help them in their studies, and their research.

WHEN I WAS YOUNG

When I was a young girl I liked to play with PlayMobil figures. The figures that were the firefighters or engineers were always the boy figures, and never the girl figures. I did not think that was fair so I took the firefighter and engineer hats from some of the boy figures and put them on some of the girl figures. This made me feel better and I still believe that workplaces are so much better when there is a lot of diversity among its people.

There are so many career choices today! Are there any that interest you right now? See how many you can think of - list them below:



DID YOU KNOW?

There are over 1,000 soil types in Manitoba. As of 2010, Manitoba's official soil is called Newdale Clay Loam.

DID YOU KNOW?

Edamame are young soybeans that are usually sold still in their pod. They are often steamed and served as a snack or with a meal.

“I am always excited to tell farmers about what we have learned from our experiments and to hear what new questions they have about growing crops or managing soil on their farms.”



DR. YVONNE LAWLEY

ASSISTANT PROFESSOR, DEPARTMENT OF PLANT SCIENCE,
FACULTY OF AGRICULTURAL AND FOOD SCIENCES

As a professor, I work with students to research new ways to grow food that are reliable for farmers, good for our environment, and healthy for us to eat. My current research is finding improved ways to grow

new crops, like soybean and corn, on the Canadian prairies. I am working with Manitoba farmers who are planting and growing soybeans and corn crops and want to learn what are the best practices to harvest healthy crops.

Farmers have to make many decisions about how to grow their crops. Some of the decisions we are examining in my research include: seeding rates, planting dates, fertilization, crop rotation, and residue management.

WHEN I WAS YOUNG

When I was young, I loved to collect things from nature. I had a rock collection. I would pick up sticks everywhere I would find them. I spent hours finding acorns under the oak tree in front of my house. There were so many different types of flowers, leaves, and plants to find in the garden. When I was in school and university I loved learning how to identify, compare, and organize all these things I found in nature.

Match each item to the group they belong with, then write the letters in the spaces below to see the University of Manitoba Faculty of Agriculture and Food Sciences' VISION STATEMENT.

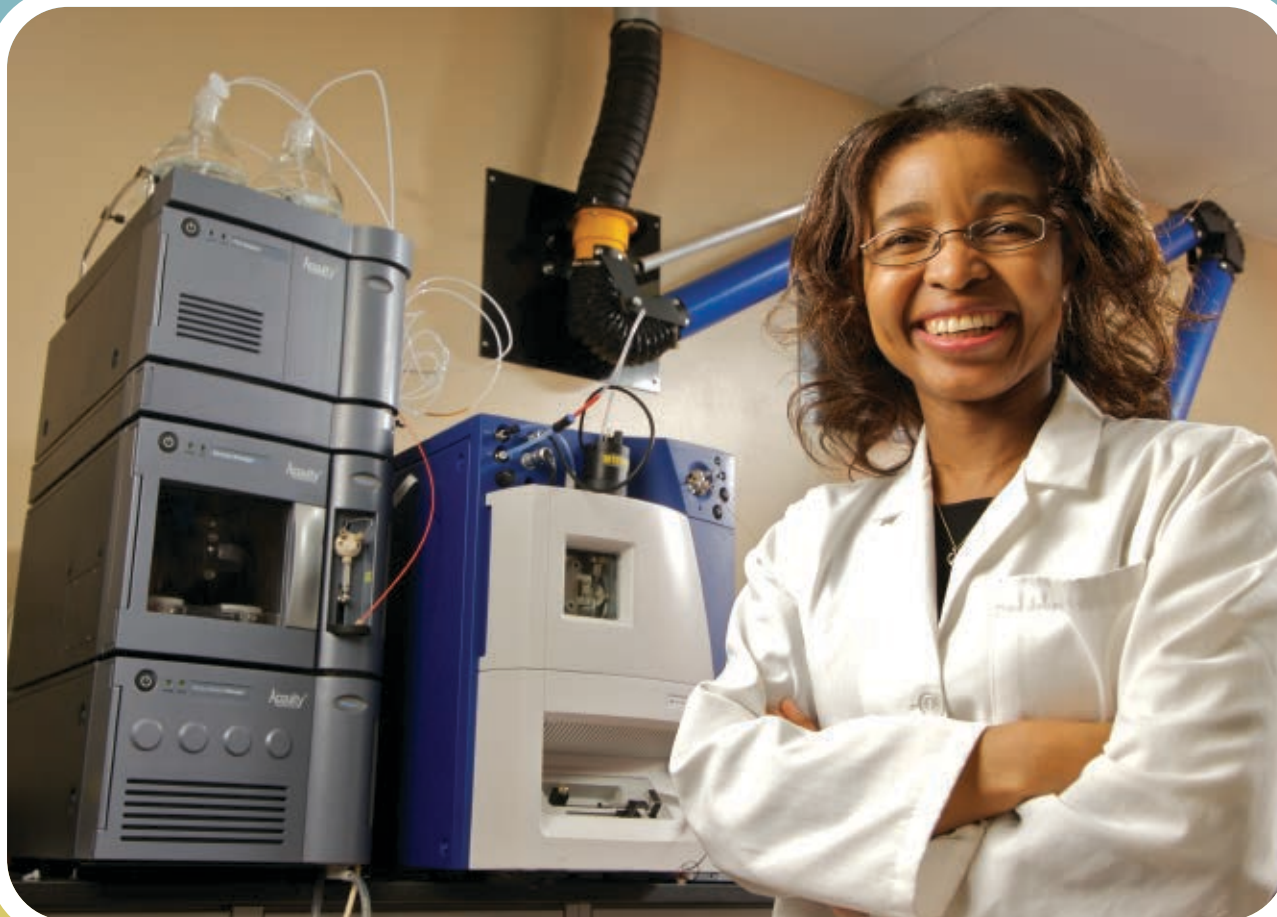


To 1 2 3 4 5 6 7 the World, without costing the Earth.

Answer: To NOURISH the World, Without costing the Earth.

DR. TRUST BETA

PROFESSOR, DEPARTMENT OF FOOD AND HUMAN NUTRITIONAL SCIENCES,
FACULTY OF AGRICULTURAL AND FOOD SCIENCES



Did you know that when you eat white bread from refined wheat flour, you get less vitamins, minerals and health-promoting chemicals (phytochemicals)? The bran and germ fractions removed from wheat grains during milling are important sources of phytochemicals.

I am excited that my research identifies the mechanisms by which nutrients and phytochemicals

in grains work together to prevent chronic diseases. Some phytochemicals serve as antioxidants, that is, they reduce oxidative stress responsible for many chronic illnesses. I have found over 30 such phytochemicals in wild rice, wheat, barley, corn and rice. Together with my team, the goal is to unlock the full potential of these phytochemicals and find best ways to optimize them in whole grain foods.

“I am exploring ways to maximize the health benefits of whole grain foods. Whole grains can play a major role in reducing obesity, heart disease, diabetes and cancer in our populations.”

WHEN I WAS YOUNG

As a child, I loved engaging in various outdoor activities that had a connection with food. Along with my brother, I would go deep into the forests surrounding our neighbourhood to gather a variety of mushrooms, catch edible ants, hunt for birds and fish in nearby river streams. Ants, birds, and fish contributed animal protein to my diet. I would buy novels for 'forest' - leisure reading using the income I earned from selling mushrooms.

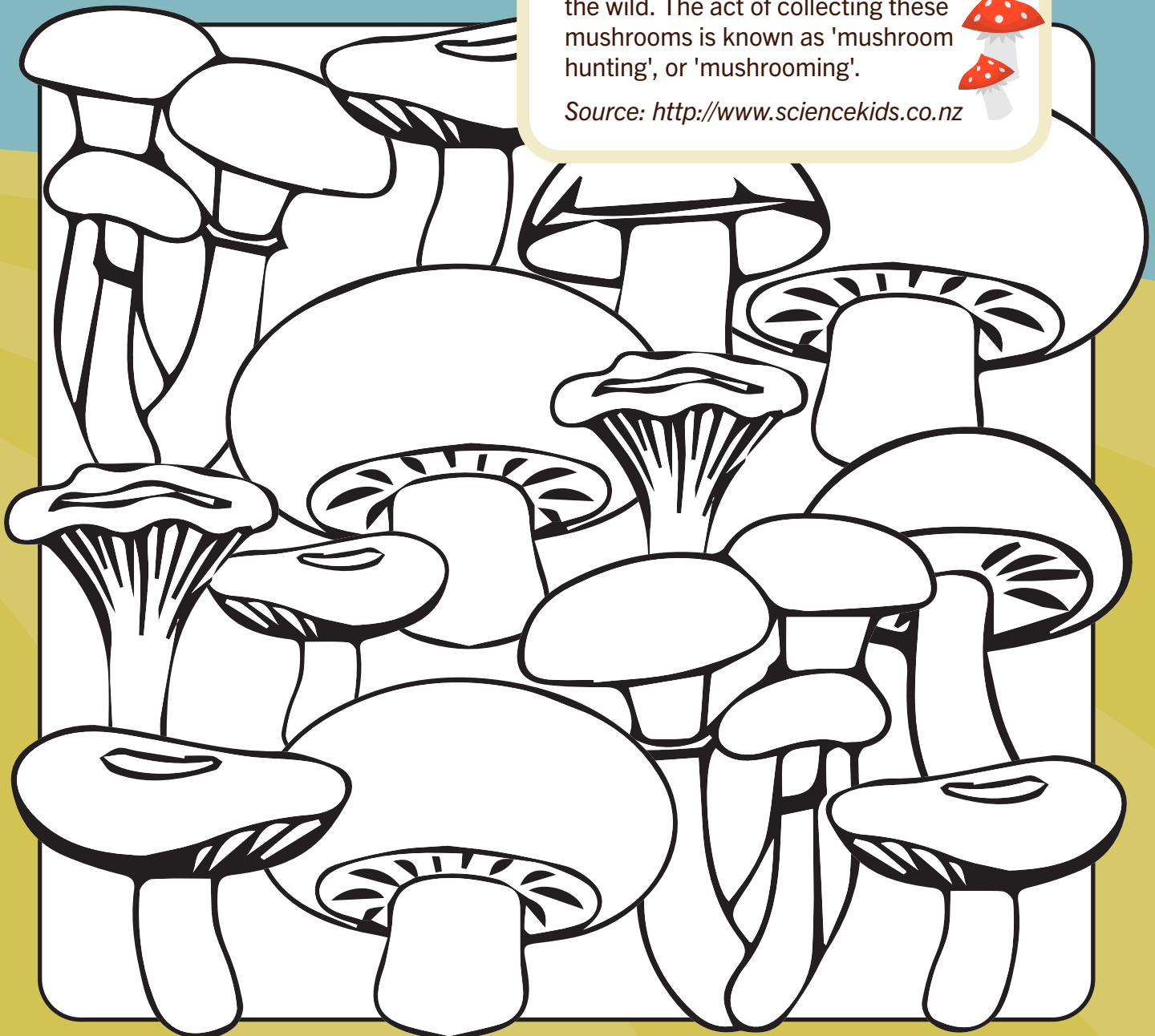
Mushrooms come in many shapes, sizes and colours. What colours would your mushroom garden be?

DID YOU KNOW?

Mycophagist is the term used for people who collect mushrooms to eat from the wild. The act of collecting these mushrooms is known as 'mushroom hunting', or 'mushrooming'.



Source: <http://www.sciencekids.co.nz>



Canadian farmers started noticing problems with their cows, and were looking for help to understand why their cows were not healthy. As a researcher I decided to check their food and eating habits. Through my research we discovered the ground soil was part of the problem and the plants and grasses that the farmers were growing to feed the cows was not nutritious. To help the cows we started adding vitamins to their food and their health improved.

As a researcher we are actively researching methods to improve the health of soil to ensure all foods that are grown by farmers are wholesome and nutritious. Everyday we are working with farmers, other scientists and many others to find a healthy balance for growing food with healthy soil and water on Canadian prairies to help feed the world.



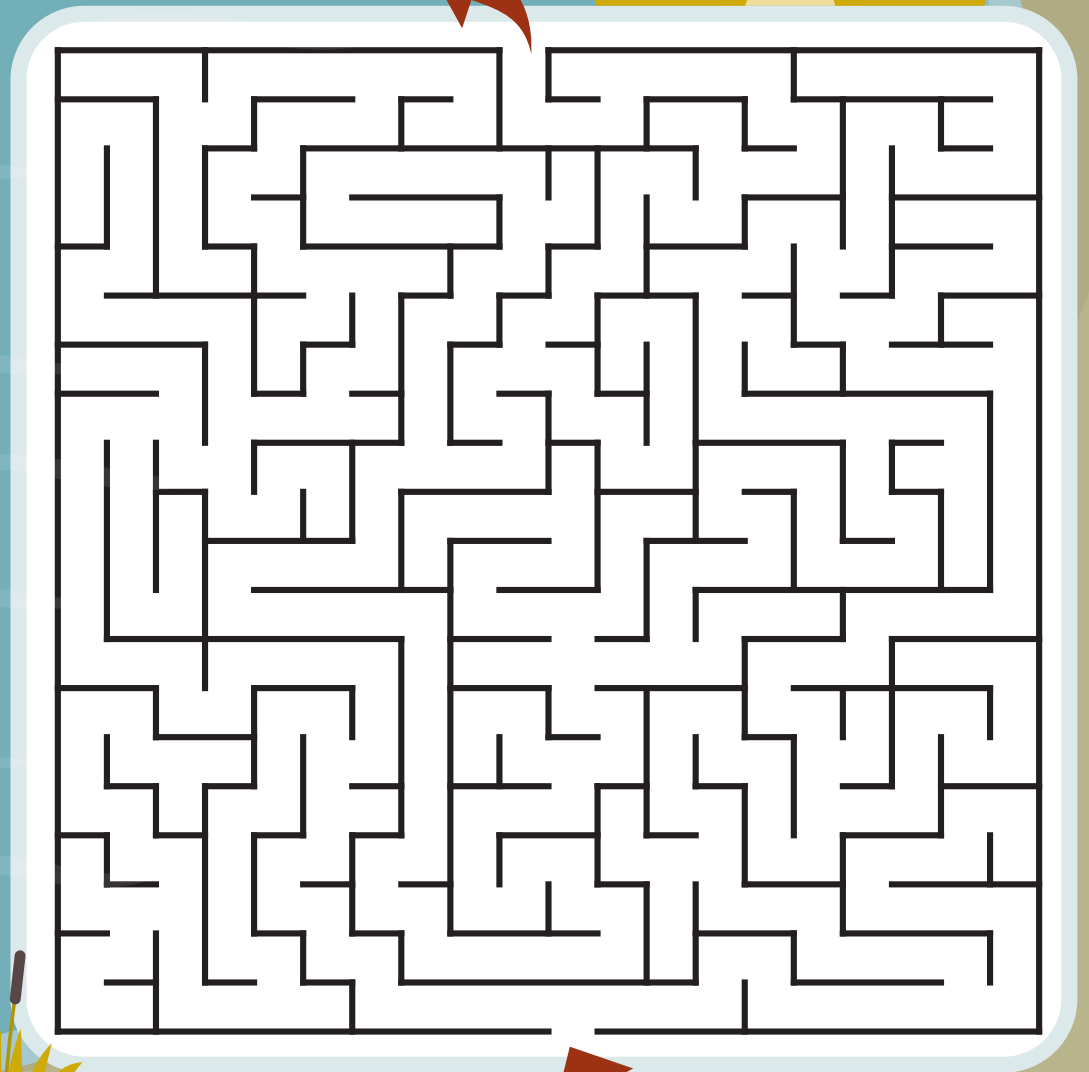
DR. KARIN WITTENBERG

PROFESSOR, DEPARTMENT OF ANIMAL SCIENCE,
FACULTY OF AGRICULTURAL AND FOOD SCIENCES

I am an animal scientist, but I have spent most of my research career trying to understand the impact of our environment and animal health.

DID YOU KNOW?

On average, cows eat 24 pounds of dry hay per day. Dairy cows will often eat 100 pounds of wet feed per day!



WHEN I WAS YOUNG

Growing up I lived on a mixed farm in the Interlake region with my six younger brothers. Not many families lived in the Interlake and there were a lot of plants, birds and other wildlife everywhere. As a young girl I spent many hours riding a Shetland pony. When I was older I rode a Palomino Stallion through miles and miles of grasslands and bush, enjoying the freedom and the natural beauty in our part of the world. One evening I road my horse to Miami Beach with my brothers to go for a swim.

Help Karin's horse find its way to the beach!



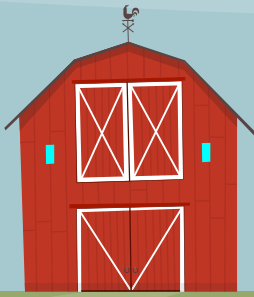


DR. ANITA BRÛLÉ-BABEL

PROFESSOR, DEPARTMENT OF PLANT SCIENCE,
FACULTY OF AGRICULTURAL AND FOOD SCIENCES

Ido research in wheat breeding and genetics. I focus on making wheat resistant to diseases that are most common when wheat is grown using environmentally friendly production practises. Unlike humans, when wheat gets sick with a disease, you can't give it medicine to make it better. So, the best thing is to make sure it does not get sick at all. I look for genes that can keep wheat from getting sick and make new wheat varieties that can stay healthy. One of the diseases I work on is Fusarium head blight. Making wheat resistant to this disease can save billions of dollars, and ensures the food and feed made from wheat is safe to eat.

“I love my job. It is like solving a mystery. I use the clues from the experiments we do to figure out ways to make better wheat varieties that can stay healthy.”



WHEN I WAS YOUNG

Bike riding was my favourite thing to do when I was young. I loved to ride my bike on a hard packed dirt road near our farm. I would go as fast as I could downhill to see if I could get up the next hill without peddling. Our farm dog would always run beside me to keep me company. I still love to bike ride and go fast.

Help Anita solve the mystery of the diseased wheat!
One of the sheafs of wheat below is sick like this sample.
Can you find the match so she knows what field it's from?



FIELD 1



FIELD 2



FIELD 3



FIELD 4



FIELD 5



FIELD 6



FIELD 7



FIELD 8



FIELD 9



FIELD 10



FIELD 11



FIELD 12



FIELD 13



FIELD 14



FIELD 15



FIELD 16



FIELD 17



FIELD 18



FIELD 19



FIELD 20



FIELD 21



FIELD 22



FIELD 23



FIELD 24

DID YOU KNOW?

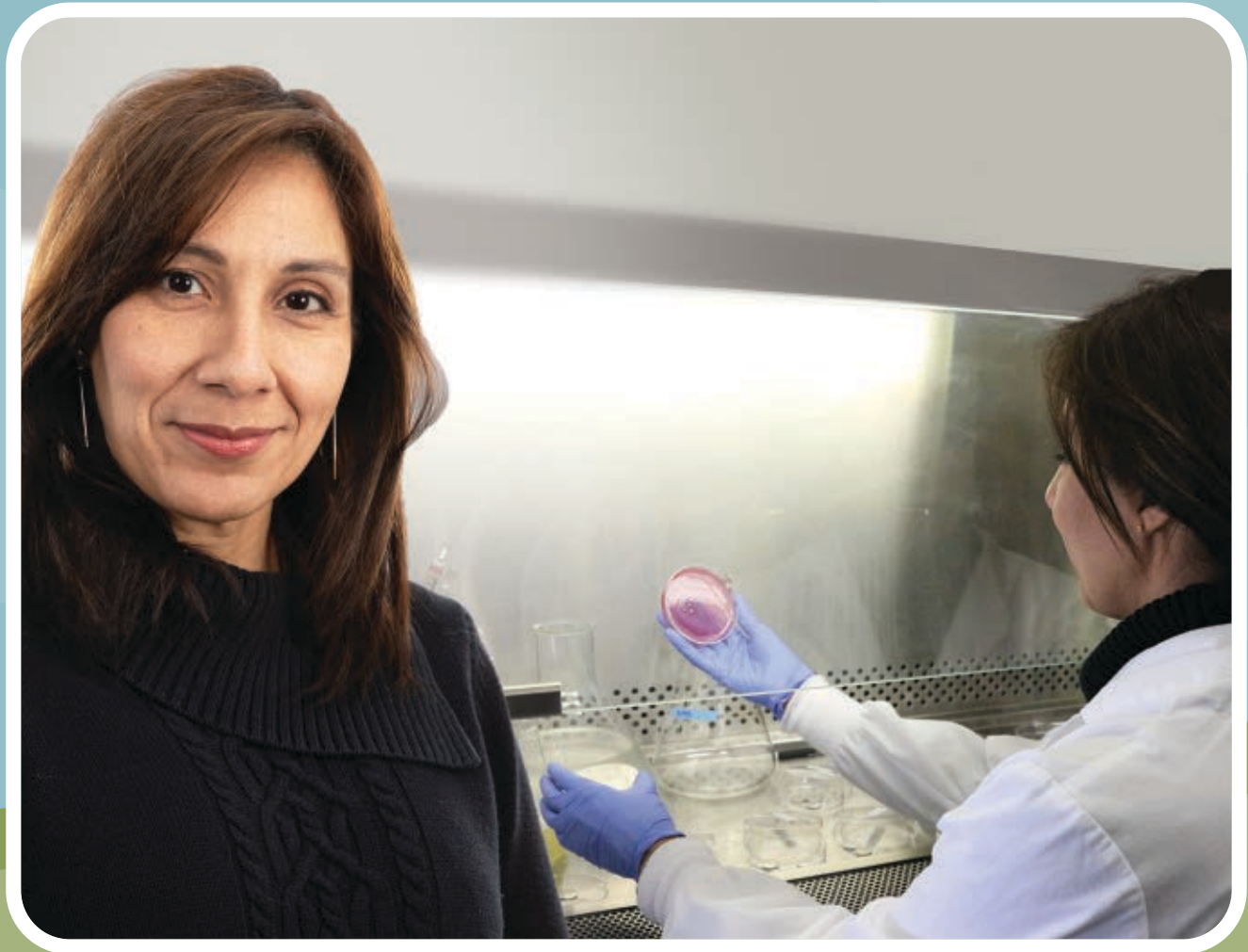
Wheat is milled into flour which is then used to make a wide range of foods such as, bread, muffins, cakes, cereal bars, and pasta.

**The sick wheat
is in FIELD _____**

Answer: The sick wheat
is in FIELD 12

DR. CLAUDIA NARVAEZ

ASSOCIATE PROFESSOR, DEPARTMENT OF FOOD AND HUMAN NUTRITIONAL SCIENCES, FACULTY OF AGRICULTURAL AND FOOD SCIENCES



As an associate professor at the University of Manitoba I work on research and education. My major area of research is food quality and food safety. The foods that I am researching are meat products, such as chicken, pork and beef, and produce (fruits and vegetables).

I am looking to find new ways to reduce pathogenic organisms during the growing season and after the produce has been harvested from the farm fields.

Pathogen – is an infectious germ. Organism – is a living single-cell. Our bodies have TRILLIONS of cells. Animals and plants are also made up of living single-cells.

I am also researching new ways to reduce the transfer of bacteria from livestock meats, such as chicken, pork and beef.

“My major area of research is food quality and food safety.”



Find words you would need to know to do research in the field of food quality and food safety:

DID YOU KNOW?

In 1609 Galileo Galilei, an astronomer, perfected the first device known as a microscope.

Source: www.britannica.com

~~FRUIT~~

VEGETABLE

CHICKEN

PORK

BEEF

PATHOGEN

ORGANISM

TRILLION

CELL

ANIMAL

PLANT

BACTERIA

LIVESTOCK

PROFESSOR

RESEARCH

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

DID YOU KNOW?

Dr. Baldur Stefansson (1917 - 2002), a professor and researcher in the Department of Plant Science at the University of Manitoba was one of the originators of canola. In 1978, the newly developed variety of crop, called canola, was officially registered and Dr. Stefansson became known as the “Father of Canola”. Canola oil is one of Canada's top edible oils and one of the largest oilseed crops in the world.



“It always makes me feel good to do something to help farmers be successful.”

DELANEY ROSS BURTNACK

EXECUTIVE DIRECTOR, MANITOBA CANOLA GROWERS

I am the Executive Director of the Manitoba Canola Growers Association. We work with farmers to help them grow strong and healthy canola fields. Farmers work long hard days caring for crops, and growing the food

we eat. I am always excited to drive in the country and see the huge yellow fields of canola growing and know that the fields will be harvested and the canola crop will eventually become an oil that many people will use

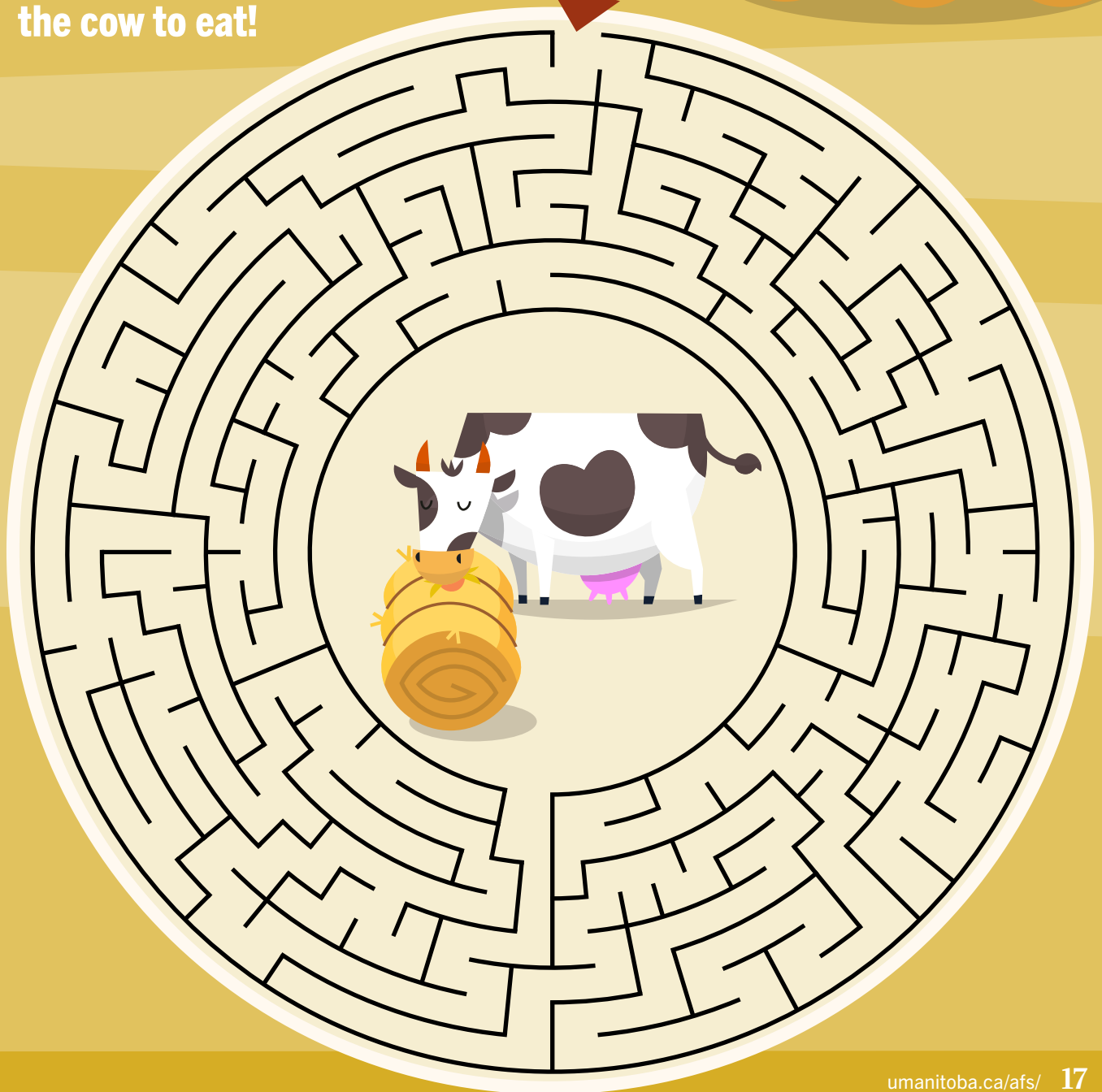
when preparing meals.

I really enjoy leading my work team as we create programs that give farmers and other people important information about canola. The place I work feels like a family, and it makes work fun.

WHEN I WAS YOUNG

When I was little, I loved visiting my grandpa's farm. He had cows and pigs, and fields of flax, oats, canola, barley and wheat. One of my favourite things to do was drive the tractor. I helped pick up the bales of hay and move them from the field to where the cows would eat.

Help Delaney drive the tractor and bring the bales for the cow to eat!





DR. FILIZ KOKSEL

ASSISTANT PROFESSOR, DEPARTMENT OF FOOD AND HUMAN NUTRITIONAL SCIENCES, FACULTY OF AGRICULTURAL AND FOOD SCIENCES

My research is about remodeling food structure to make foods attractive and tasty, and loading wholesome ingredients into foods to make them nutritious and delicious. For example, I develop fiber- and protein-rich puffed snack foods that are crispy and crunchy, bran-packed muffins that are moist and fluffy, and veggie burgers that taste just like meat.

What excites me about my research is the range of innovative techniques I use for testing food quality. For example, using ultrasound waves, I characterize the airy structure of bread crumbs. This is like how doctors use ultrasound to scan organs and how dolphins use it to communicate underwater. When ultrasound waves travel through foods, food components dance to the beat of the ultrasonic “music”. Different food components dance to different beats so that their echoes can be used to identify food structure.

“What excites me about my research is the range of innovative techniques I use for testing food quality.”



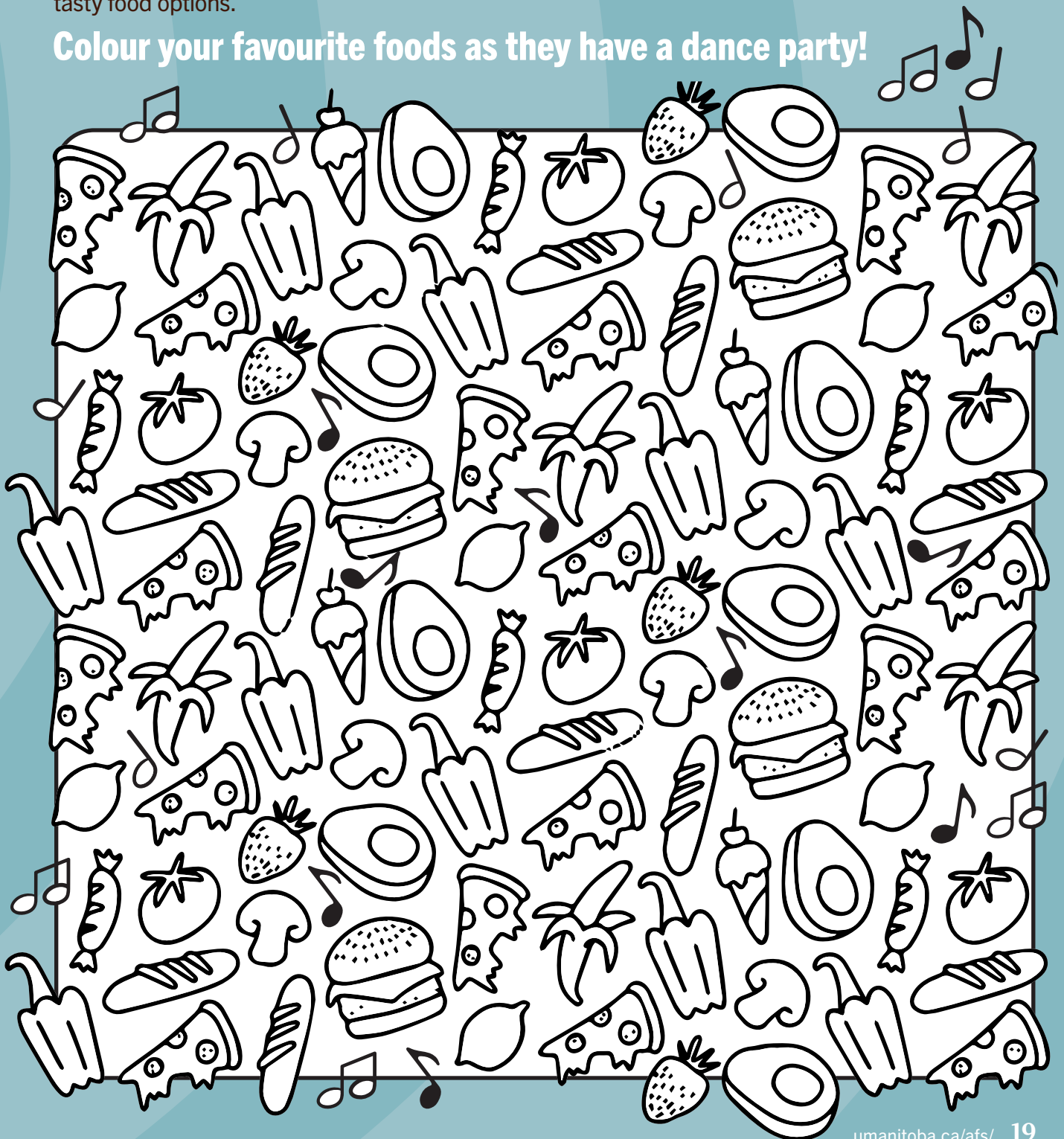
WHEN I WAS YOUNG

When I was a child, my favorite activity was singing. Every time my family and I visited my grandparents, my sister and I used to put on a singing talent show. I feel so happy now that I can use sound waves to study foods and help food processors produce healthy and tasty food options.

DID YOU KNOW?

Cooking meals with your family is a great way to connect and add fun to your day. You can try traditional foods and explore different cultures.

Colour your favourite foods as they have a dance party!



MAGDA ROGALSKY

OPERATIONS LEAD, BAYER CROP SCIENCE

DID YOU KNOW?

Building a fort at home is easy! You need pillows, blankets, and some clothespins. Then find the perfect location and start creating your hideaway.



Working as an Operations Lead for Bayer Crop Science, I am responsible for managing a team of researchers, and seasonal staff at our plant breeding research station in Headingley, MB. I work with my team to test canola, soy and corn crops in the field. The seeds we plant have undergone genetic engineering to make them more useful to humans and better for our environment (ex. disease resistance, higher production, better water use). In one growing season (late April – early November), we look at the overall health of the plants, how tall they are, how well they do in different environments, and how much grain and seed they produce! After harvest, we provide the collected data to plant breeders, to help them make decisions on which products should go to market and be available for commercial production. These crops will then produce many of the foods and products we eat and use every day!

“... I am responsible for managing a team of researchers, and seasonal staff at our plant breeding research station in Headingley, Manitoba.”

WHEN I WAS YOUNG

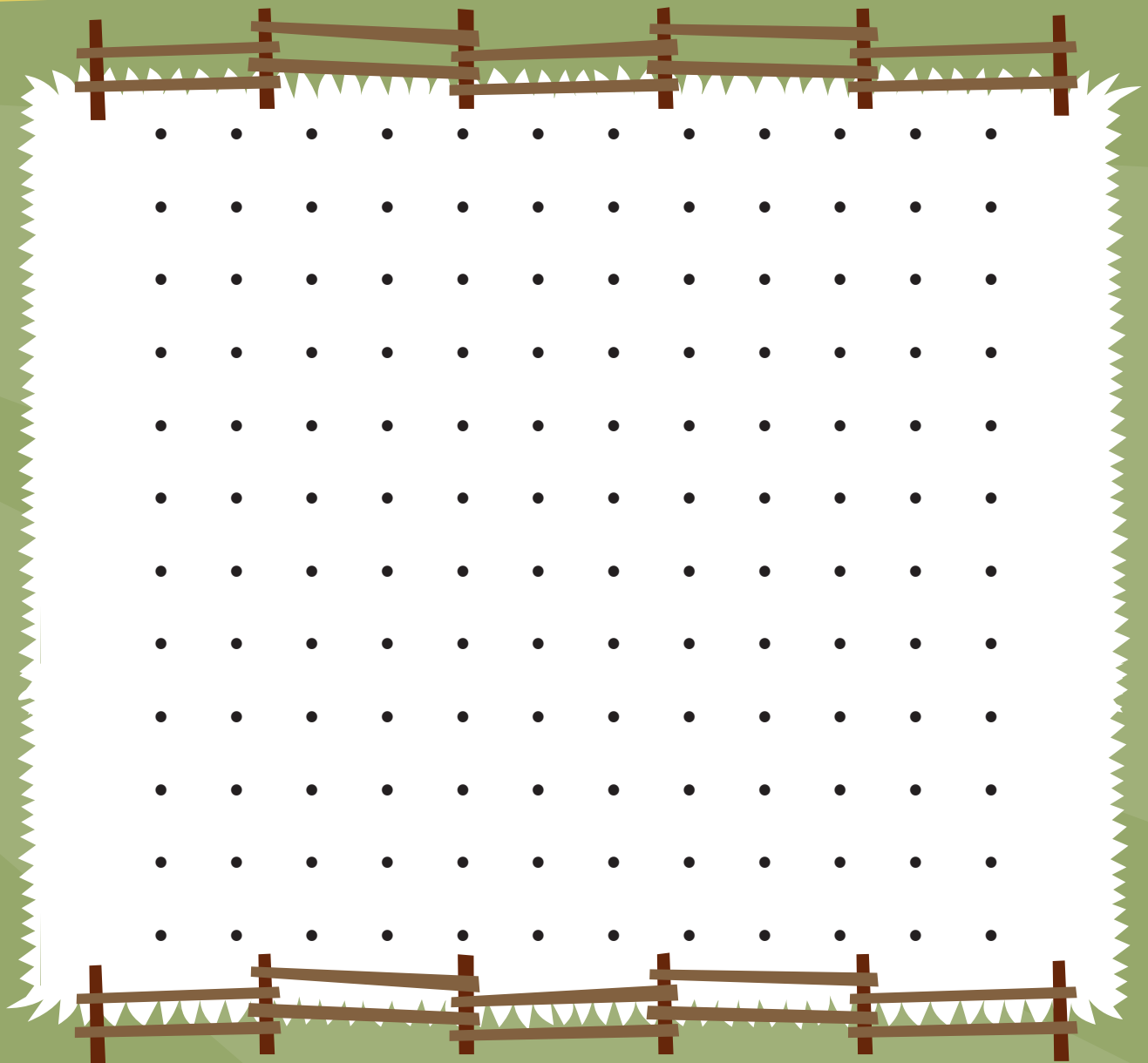
As a young kid, I loved playing outside. My favourite activities included climbing trees, playing with soil, and building forts. My mom always encouraged all these troublemaking activities; however she would cringe at the amount of dirt and scrapes I'd be covered in by the end of the day! Needless to say, I still come home covered in soil some days, and I love it!

Find a friend and play to become a Fort Master, like Magda was!

FIRST: You draw a straight line (no diagonals) to connect two dots.

NEXT: Your opponent gets a turn to connect two dots.

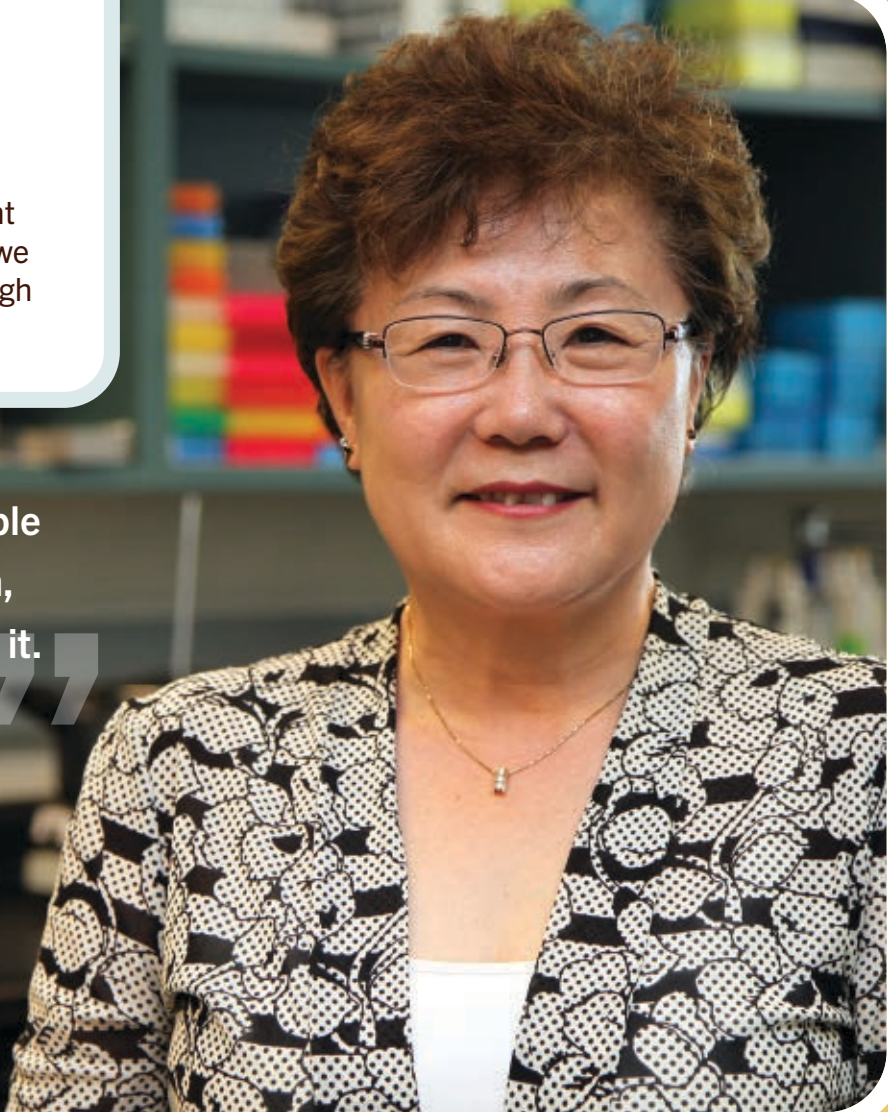
Keep going until one of you closes in a square and makes a fort! Whoever closes the square puts their initials inside the square. Continue to build as many forts as you can. Whoever has the most initials in squares at the end is the Fort Master!



DID YOU KNOW?

Your eyesight is one of your most important senses: 80% of what we perceive comes through our sense of sight.

“When I help people with my research, I feel good about it.”



DR. MIYOUNG SUH

PROFESSOR, DEPARTMENT OF FOOD AND HUMAN NUTRITIONAL SCIENCES,
FACULTY OF AGRICULTURAL AND FOOD SCIENCES

I am interested in finding which foods and nutrients we can eat to improve or prevent eye disease.

As we get older, many people experience eye disease that makes us lose our ability to see or even go blind.

Many healthy foods we eat

contain special nutrients like a fat called docosahexaenoic acid (or DHA for short!) or carotenoids that give vegetables their bright colours. My research uses foods with these special nutrients such as fish, eggs, carrot powder and algae to

help a part of the eye called the retina, and prevent eye disease.

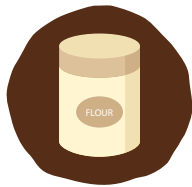
As a clinical dietitian and researcher, I can help people with eye disease by finding the best type and amount of these nutrients that are beneficial for our vision.

WHEN I WAS YOUNG

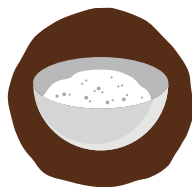
I was a picky eater when I was young. But I always heard you are what you eat. When my mother introduced me how to bake breads and cookies, I made loads of those for fun and shared with my friends and neighbors. That was my fun memory.

Ask an adult to help you make this yummy cookie recipe at home!

Chocolate Chip Cookie Recipe



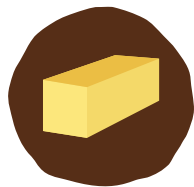
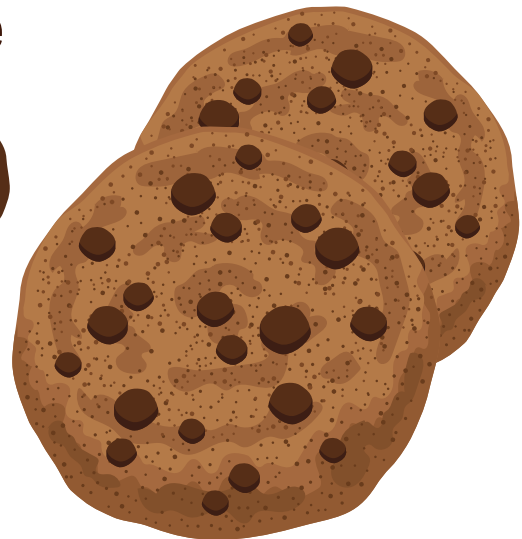
2 1/4 cups
all-purpose
flour



1 teaspoon
baking
soda



1/2
teaspoon
salt



12 tablespoons
unsalted butter,
at room temp.



3/4 cup
packed light
brown sugar



2/3 cup
granulated
sugar



2
large
eggs



1 teaspoon
pure vanilla
extract



One 12-ounce
bag semisweet
chocolate chips

Directions:

Preheat oven to 375°F. Line 2 baking sheets with parchment.

Whisk together flour, baking soda and 1/2 tsp. salt in a large bowl.

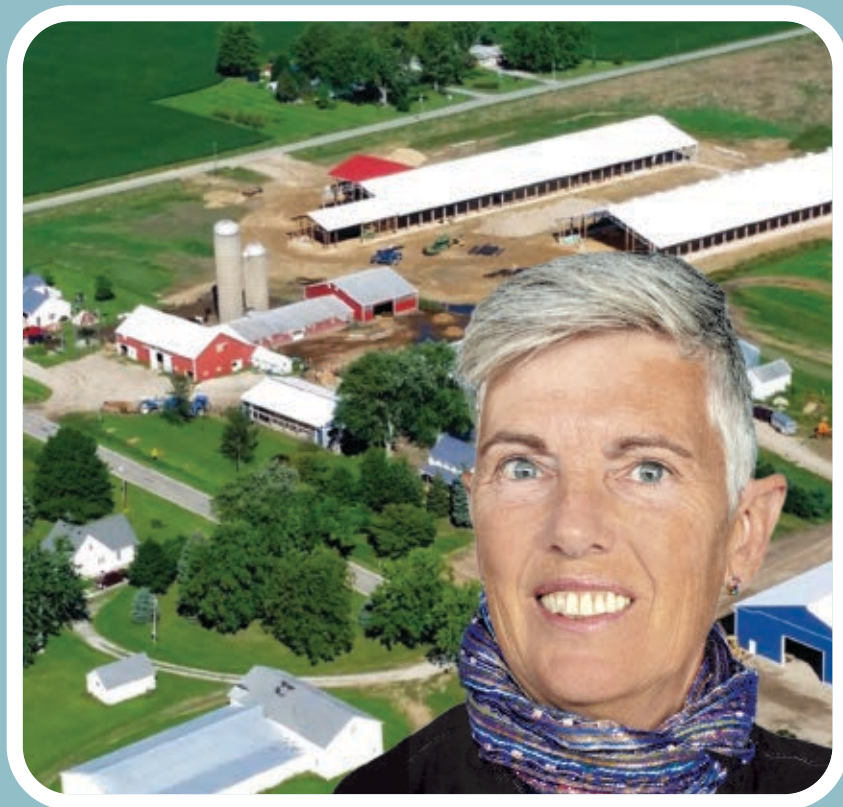
Beat butter and sugars on medium-high speed in the bowl of a stand mixer fitted with a paddle attachment (or in a large bowl if using a handheld mixer) until light and fluffy, about 4 minutes. Add eggs, one at time, beating after each addition to incorporate. Beat in the vanilla. Reduce the speed to medium, add the flour mixture and beat until just incorporated. Stir in the chocolate chips.

Scoop 12 heaping tablespoons of dough about 2 inches apart onto each prepared baking sheet. Bake 12 to 15 minutes (the longer the cook time, the crunchier the cookies). Let cool for a few minutes on the baking sheet, and then transfer to a rack to cool completely.

Enjoy!

DR. TRACY GILSON

OPERATIONS MANAGER, GLENLEA RESEARCH STATION



“What I love about my daily work is the opportunity to work with animals, students and researchers. Together we are focused on education, research and creating a safe learning environment.”

As the Operations Manager at the University of Manitoba's Glenlea Research Station I am responsible for the safe operation of the research station – which is more like a farm. I ensure that the staff look after and feed all of the animals, keep the barns clean and running smoothly, and ensure the tractors and equipment are working.

The Station is used by researchers, university

students and visitors who want to learn more about where their food comes from. University of Manitoba researchers conduct important research in the areas of animal nutrition, health and welfare, and provide students with hands-on learning. Some of our students have not grown up on a farm, and our Station provides them with experiences in safe livestock handling, and animal health

and welfare.

We have 105 dairy cows, 150 sows with piglets, and 4500 chickens. The Station is also home to the Bruce D. Campbell Farm and Food Discovery Centre and the Dairy Farmers of Manitoba Discovery and Learning Complex. These Centres have interactive displays and viewing windows for visitors to learn about every aspect of food production from farming to retail sales.

WHEN I WAS YOUNG

I grew up on a dairy and beef farm at Narcisse where the garter snakes live. My brother, sisters and I enjoyed sharing our backyard playground with many of the animals who lived there. Our best times were spent riding horses and exploring. We would spend hours riding through the trees and bush to see how many critters we could spot like deer, birds, snakes, and frogs.

How many critters (including bees!) can you spot in the trees?



DID YOU KNOW?

Manitoba's red-sided garter snake dens are world famous for being the largest concentration of snakes in the world.

Source: Wildlife Branch/ Government of Manitoba

I found

critters.

Answer: there are 21 critters in the trees.

DID YOU KNOW?

The 3 biggest crops (by acreage) grown in Manitoba are: canola, wheat, and soybeans.



“... we enjoy spending as much time as possible visiting with our farming clients on their farms to see their crops and animals grow.”

JULIE EDIGER

SENIOR FINANCING SPECIALIST, ROYAL BANK OF CANADA (RBC)

I work for a bank. What many people don't know is how closely we partner and provide advice to farmers and agri-business.

An important part of our job is to help finance (lend money and provide advice on how money is used) to farmers for things such as growing the size of their farm, purchasing land, animals, machines and equipment to plant their crops

or feed their animals, and trucks so that they can bring what they produce to the market for us to buy and eat.

Most people might think we spend most of our time in an office in a bank. In fact, we enjoy spending as much time as possible visiting with our farming clients on their farms to see their crops and animals grow.

Together, we make plans for

the farm or the business for today, next year, and for many years from now.

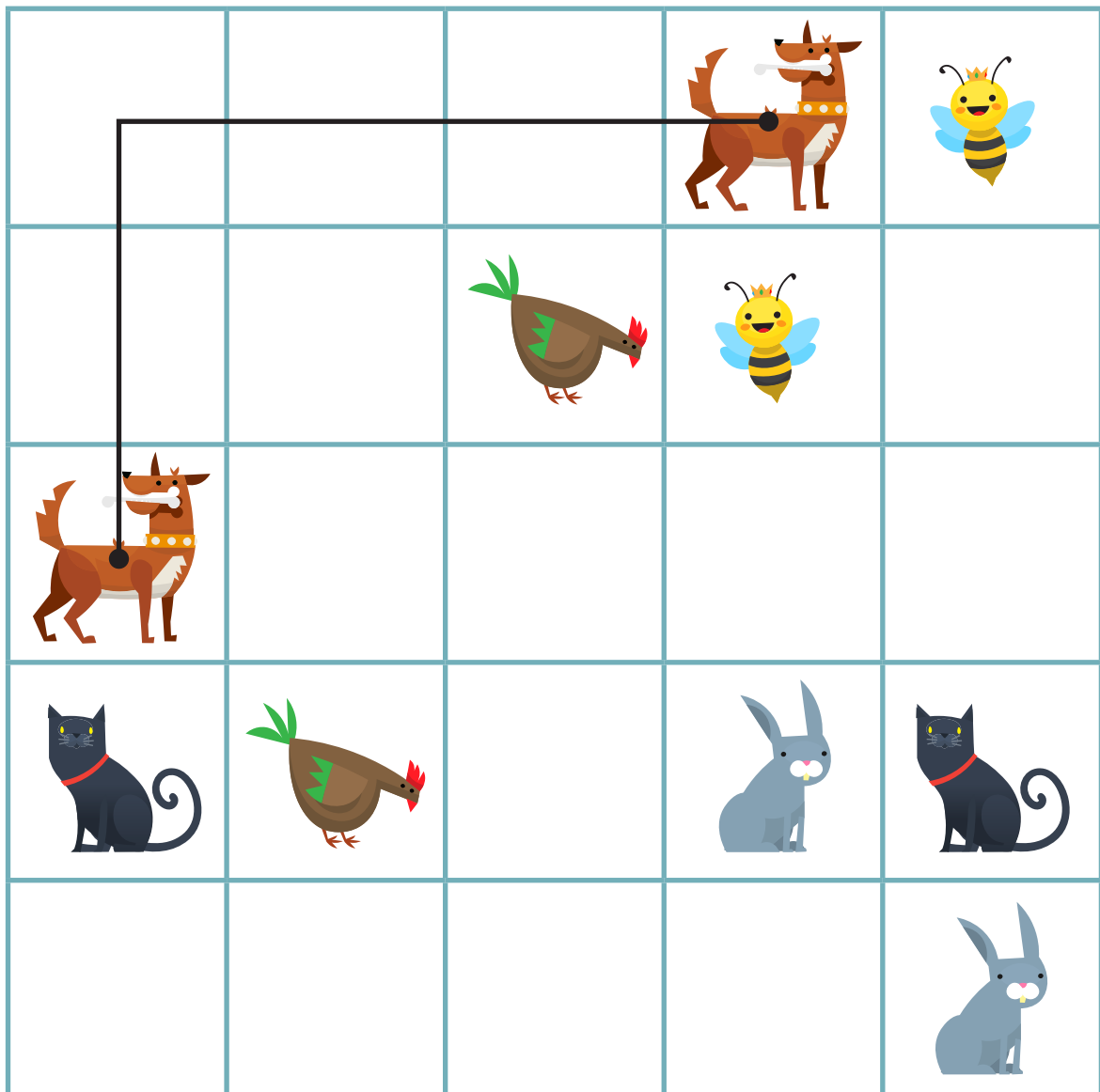
We have an important job when it comes to Canada's farms, farming, and farming related businesses. We help farmers and business owners achieve their dreams by helping provide the advice, tools, and financing to begin pursuing these dreams starting today.

WHEN I WAS YOUNG

I grew up on a farm and spent many hours outside – biking, skating, running, and building forts and treehouses. I now bring my passion for farm life and spending time in the outdoors with me to my work every day as a banker! And now, instead of tree houses and forts, I help build farms and farming related businesses!

Match the animals and solve the puzzle!

Connect matching pictures with a line to create a path.
Cover every square on the board to complete the puzzle
- BUT DON'T CROSS OR OVERLAP LINES! The first match has been completed ...



DR. SIRAJUM (RUMI) MUNIRA

INSTRUCTOR, KEYANO COLLEGE

“I am excited about my work that I am finding ways to limit the movement of agrochemicals and pollutants from soil to water bodies to safeguard our environment!”



As an instructor of environmental science at Keyano College, I work with my students to test and monitor water, soils and aquatic organisms. We go outside to collect river water, groundwater and soil samples to examine in the laboratory. We also go fishing! We collect fish, bugs, and flies from

creeks and view them with a microscope. My students and I work together to assess the impact of industrial activities (pollutants) in the ecosystem to protect our environment.

I have also worked as a soil scientist at the University of Manitoba. My research examined the behaviours of agrochemicals (chemicals

used in crop production) in the environment. My research helps identify contaminants in our drinking water and river water due to agrochemicals used on field crops. The outcome of my research can provide useful information to farmers of the environmental impact when choosing agrochemicals.

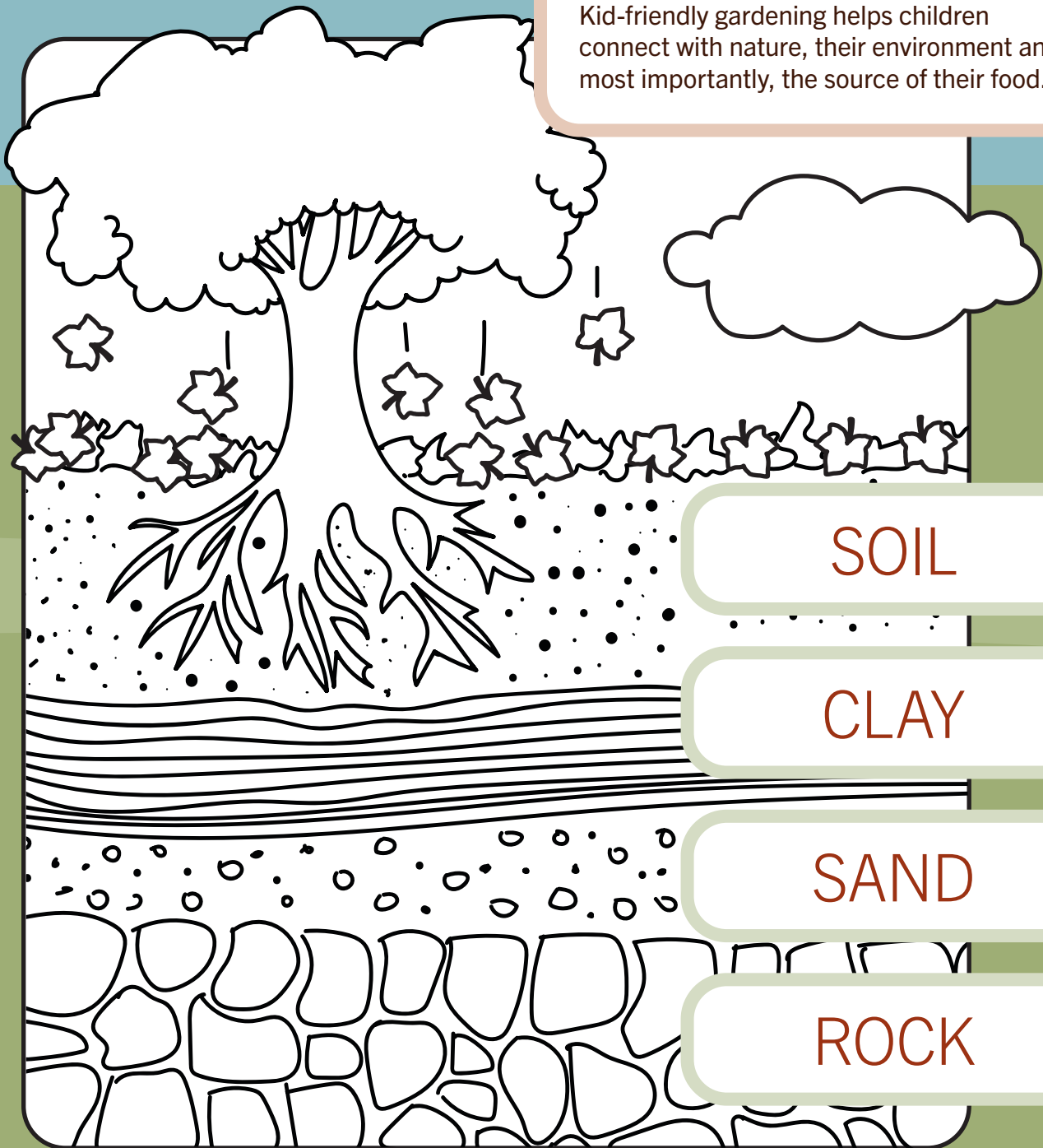
WHEN I WAS YOUNG

I love nature, particularly plants and soil! When I was a kid, I liked to garden with my parents in the front yard of our house. I had a lot of collections in my garden - different varieties of rose, jasmine, gardenia, begonia and gladiolus. I spent late afternoons taking care of them. Also, I loved making pottery. My aunt taught me how to use clay to make fruits, like bananas, apples, and toy plates, pots and pans.

Colour the picture of the different soil layers.

DID YOU KNOW?

Kid-friendly gardening helps children connect with nature, their environment and most importantly, the source of their food.



SOIL

CLAY

SAND

ROCK



“One aspect I like about my research is that I get to spend time outside collecting insects or working with animals, but I also work in a lab with my microscope.”

DR. KATERYN ROCHON

ASSOCIATE PROFESSOR,
DEPARTMENT OF ENTOMOLOGY,
FACULTY OF AGRICULTURAL AND FOOD SCIENCES

Most insects don't cause any problems for us, our crops, or our animals, but some can cause serious trouble. As a veterinary entomologist, I do research on insects that affect animals, either by biting them and being annoying or by transmitting bacteria or viruses that can make them sick. I try to find ways to keep animals healthy and more comfortable – because it's really unpleasant to be bitten by flies all day! One aspect I like about my research is that I get to spend time outside collecting insects or working with animals, but I also work in a lab with my microscope. And because there are insects that can affect almost all kinds of animals, I can work with cows and horses on farms, but also with wildlife!





WHEN I WAS YOUNG

Oddly enough, I didn't like insects when I was growing up, but I always loved animals. What I liked most was drawing. I spent a lot of time with my pencils and colouring books, drawing what I saw around me. I liked to make colourful macramé bracelets, too.

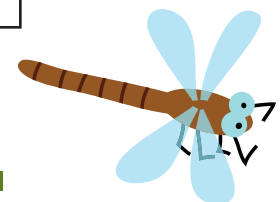
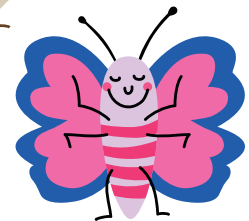
DID YOU KNOW?

The Wallis-Roughley Museum of Entomology, located at the University of Manitoba has one of the largest insect collections in Western Canada.

Unscramble the common insect names. Fill in the circled letters in the spaces below to see a fun bug themed saying!

ecrkcit	<div><div></div><div>R</div><div></div><div></div><div></div><div></div><div></div></div>
qmoitsuo	<div><div></div><div></div><div></div><div>Q</div><div></div><div></div><div></div><div></div></div>
ebe	<div><div></div><div></div><div></div></div>
kict	<div><div>T</div><div></div><div></div><div></div></div>
nta	<div><div></div><div>N</div><div></div></div>
laef	<div><div></div><div>L</div><div></div><div></div></div>
yfl	<div><div>F</div><div></div><div></div></div>
teflurtby	<div><div></div><div></div><div>T</div><div></div><div></div><div></div><div></div><div></div></div>
gorfdalny	<div><div></div><div></div><div></div><div></div><div></div><div>O</div><div></div><div></div><div></div></div>

_ U _ _ _ S _ _ U _ .



Answer: Cute as a bug.

We all have a favorite food. It might be cereal; it might be meatballs, maybe potatoes or maybe ice cream. You may get it from your own kitchen, a grocery store, a restaurant, bakery or movie theatre. So many choices of delicious and safe food. It is such a long list that I cannot name them all.

The most important thing to remember is that our food is **SAFE** to eat. Our farmers work hard to make sure you have the best food to feed your bodies. They follow many rules to get you the best food. My job is to see that everyone knows the rules and are following those rules to make all foods safe.

I travel and meet many people involved in agriculture in Manitoba, across Canada and all over the world. I also get a chance to talk to people at events and conferences. My favorite topic to talk about is trust. People who buy and eat food are trusting that it is safe and will not make them sick. I am proud that my work is about trust and food safety.



DORI GINGERA-BEAUCHEMIN

DEPUTY MINISTER, MANITOBA AGRICULTURE

I travel and meet so many people involved in agriculture in Manitoba, across Canada and all over the world.

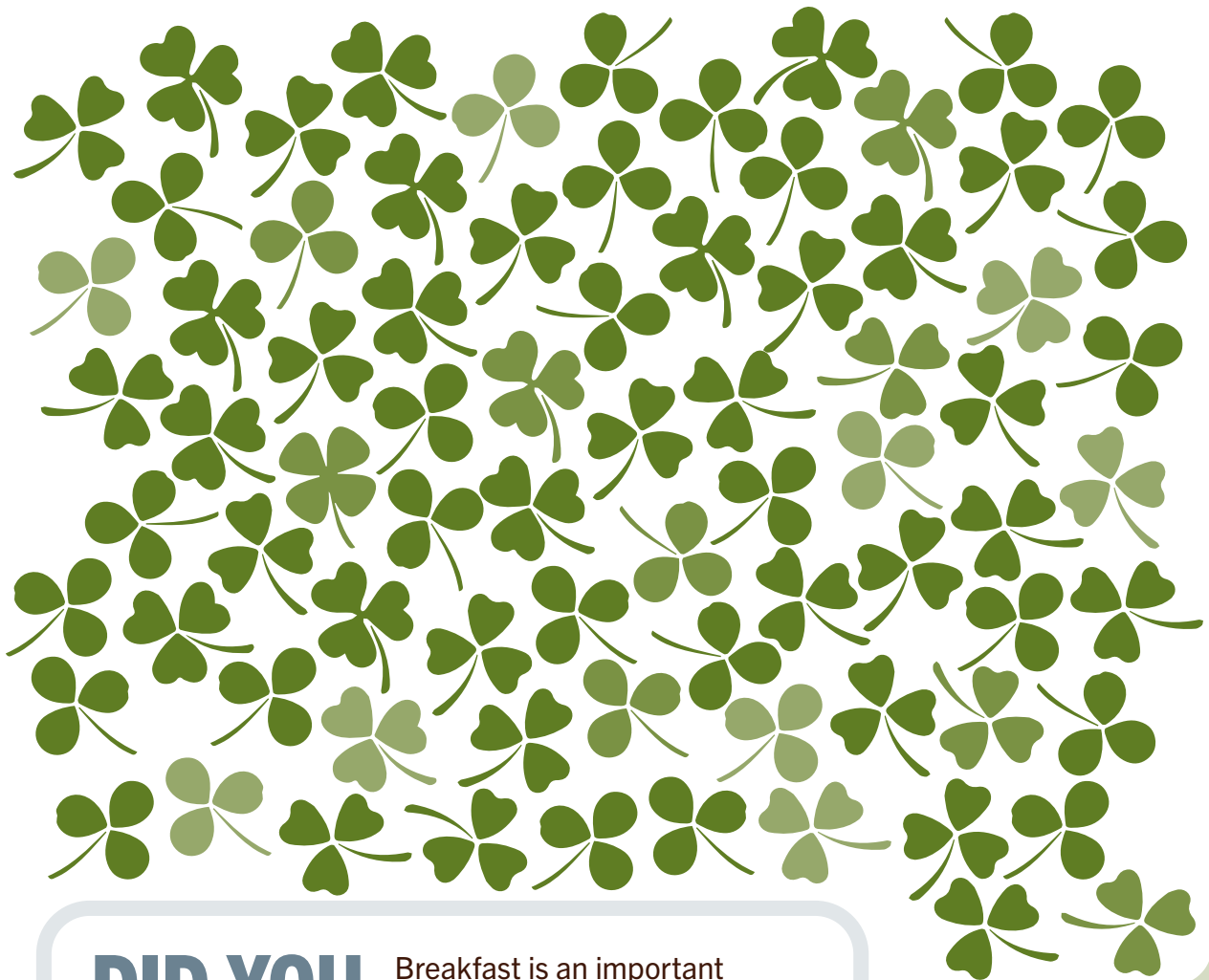
WHEN I WAS YOUNG

My favorite activity when I was young was attending 4-H. It is an organization that helps rural kids develop skills and confidence, as well as a great place to have fun. Some of my best times were attending 4-H camp, public speaking and meeting wonderful people.

4-H holds a very special place in my heart and I am proud 4-H in Canada started right here in Manitoba in 1913!

The organization 4-H uses a 4 leaf clover for its logo. The four-leaf clover is a rare variation (around 5,000 to 1!) of the common three-leaf clover. According to traditional superstition, such clovers bring good luck.

Can you spot the four-leaf clover in the patch below?



DID YOU KNOW?

Breakfast is an important meal because it provides the necessary fuel to give you energy for the day.

DR. MELISSA ARCAND

ASSISTANT PROFESSOR, DEPARTMENT OF SOIL SCIENCE,
UNIVERSITY OF SASKATCHEWAN



“As a soil scientist, I use knowledge of biology and chemistry to study how soils supply plants with the nutrition they need to grow.”

Underneath our feet lies a world teeming with life that controls important processes for our ecosystems—the soil. As a soil scientist, I use knowledge of biology and chemistry to study how soils supply plants with the nutrition they need to grow. I also study how soil organic matter can form

to keep more carbon in the soil and less escaping to the atmosphere to help lessen climate change.

But my work involves more than soil—I work with people, especially farmers and First Nations land managers, to understand how their decisions affect the soil and how the unique characteristics

of their soil can determine the best farming practices or land uses. Without healthy soil, we would not be able to grow the food that we need to sustain us, and the beautiful natural forests and grasslands would struggle. It's our responsibility to ensure that the health of our soils is maintained for future generations.

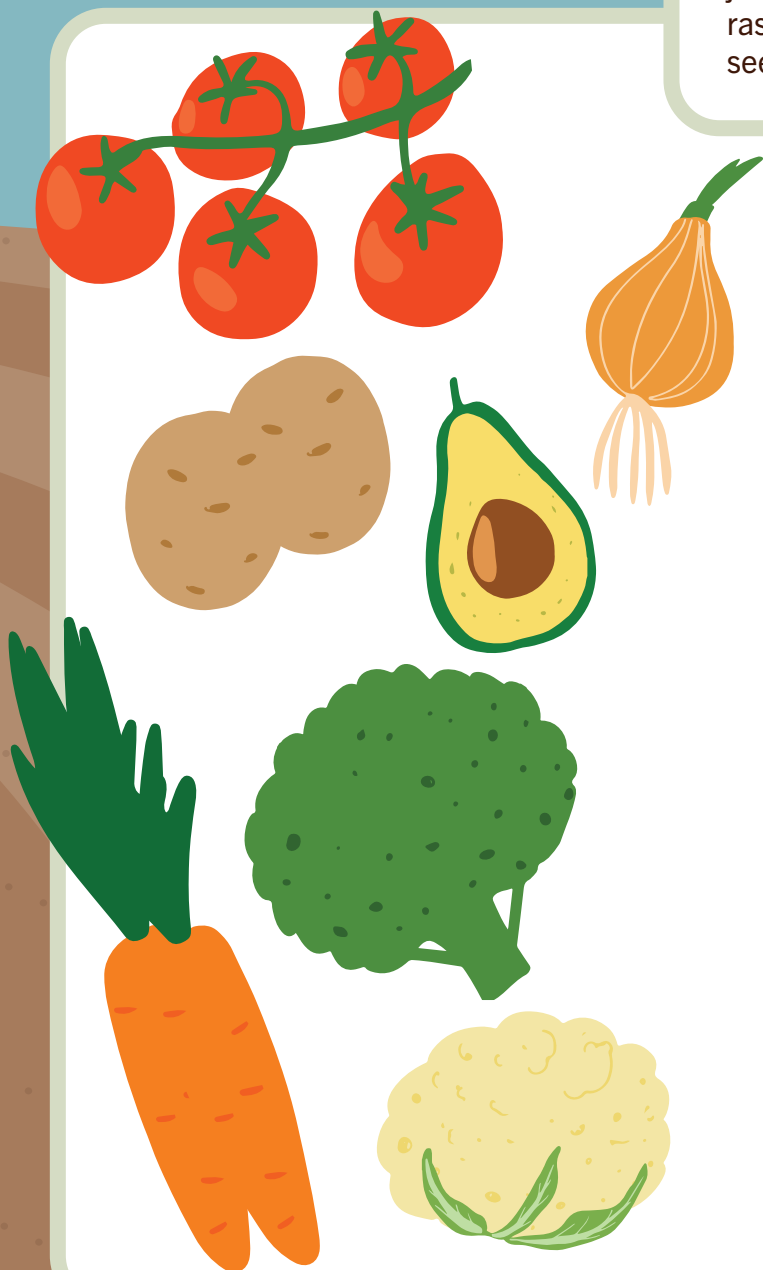
WHEN I WAS YOUNG

One of my favourite memories involves working in the garden with both my maternal and paternal grandparents. I spent countless hours planting potatoes with my grandpa, weeding with my grandma, and picking raspberries with my kokum. The time I spent with them, with our hands working in the soil, taught me the value of hard work, care for the land, and an appreciation for the healthy food that the earth can provide.

Can you think of recipes or meals that you can make with each of the foods below?

DID YOU KNOW?

If you are new at jam-making, raspberry jam is a good one to start with as raspberries have natural pectin in their seeds that quickly thicken the jam.



ELLA CORA HIND

WESTERN CANADA'S FIRST FEMALE AGRICULTURE JOURNALIST AND A WOMEN'S RIGHTS ACTIVIST

Ella Cora Hind was Western Canada's first female agriculture journalist and a women's rights activist.

E. Cora Hind was born in Toronto on September 18, 1861 to Edwin Hind and Jane Carroll. She was the youngest with two older brothers, Joseph and George. After the untimely deaths of both parents the Hind children moved to Grey County, Ontario, to live on a farm with their paternal grandparents, Joseph and Tamazinah.

In Grey County, Cora was home schooled by an aunt in the early years. Cora was eager to spend all of her free-time in the barn, and soon became her grandfather's shadow on the farm. Her grandfather taught her about crops, horses, and cattle. Farming, at times, was a hard life and it proved difficult over the years, however this hands-on experience would later shape her future.

After high school, in 1882, Cora moved west to Winnipeg, Manitoba, because there was a call for teachers. Failing the teacher's exam she was unable to acquire the credentials for teaching, but this did not affect or deter Cora because she also had dreams of becoming a journalist.

Cora approached the editor, W.F. Luxton, of the Manitoba Free Press with an application for a position as a reporter. Luxton turned her down indicating that a newsroom was no place for a woman. A few months later Cora submitted an article to Luxton, which he accepted and published, but chose not to acknowledge her as the author.

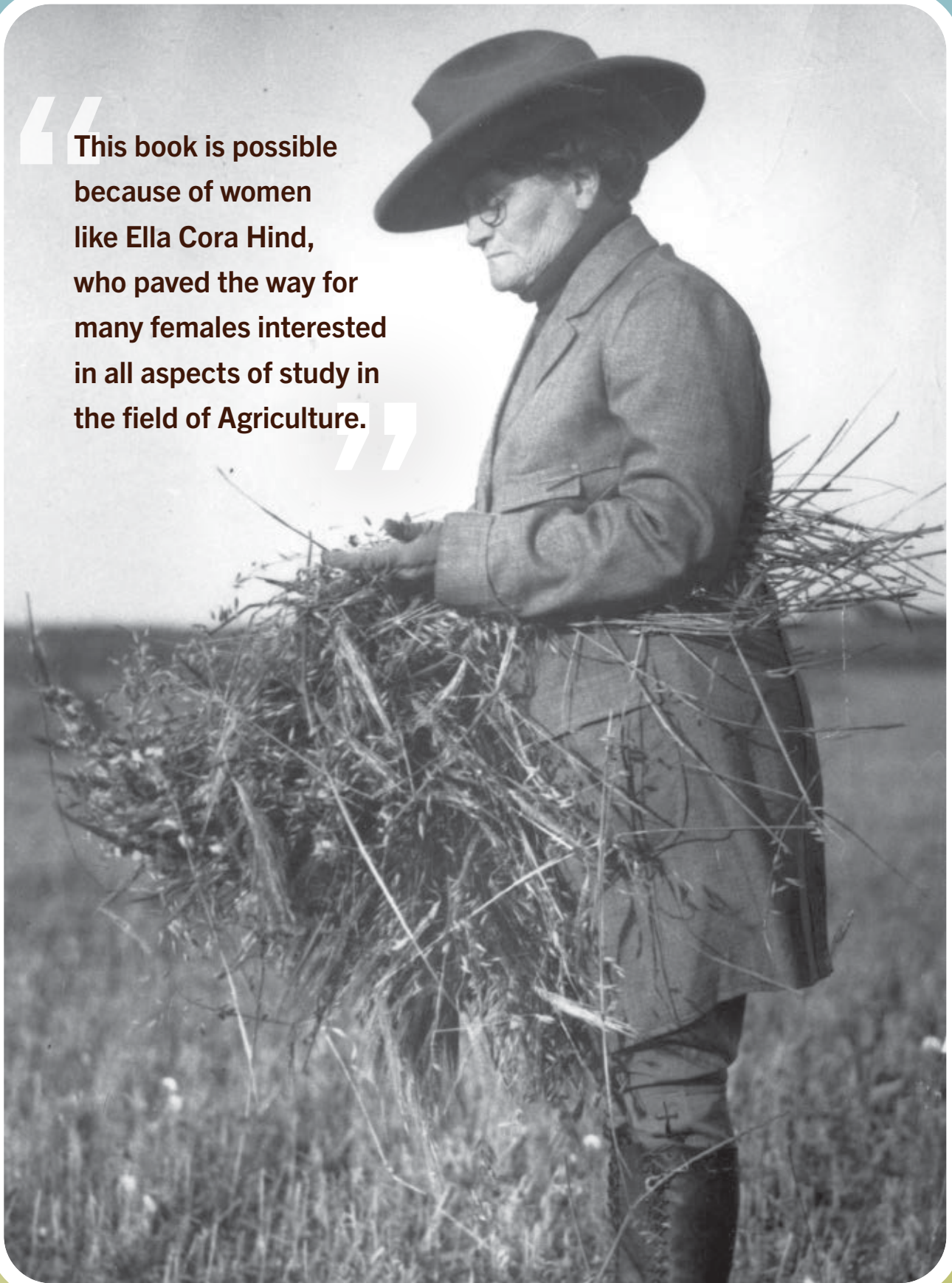
Cora continued to have a strong interest in agriculture, and had a very good understanding of crop growing. In 1898, she began making crop predictions, and her predictions made her popular with local farmers and resulted in her becoming known as the local expert in prairie wheat crops. Her expertise and high regard in the community finally led her to a position as the agriculture reporter for the Manitoba Free Press (now known as the Winnipeg Free Press), and ultimately the agricultural editor of the newspaper. Between 1935 and 1937, Cora travelled to 27 wheat producing countries capturing her experiences in a series of letters to the Winnipeg Free Press. Cora became renowned for her accurate analysis of crop yields, and those predictions were used to determine the price of Canadian wheat.

Cora Hind's extraordinary life experiences lead her to form the Political Equality League with Lillian Beynon Thomas and Nellie McClung in 1912. Their campaign for women's voting rights later were granted in 1916.

Throughout her career Cora received honours from The Western Canada Livestock Union, Wool Growers of Manitoba, and Canadian Society of Technical Agriculturists. In 1935, the University of Manitoba presented her with an honorary LLD degree.

She died on October 6, 1942. In recognition of her lifetime of contributions, the Winnipeg Grain Exchange was halted for two minutes in her memory.

“ This book is possible because of women like Ella Cora Hind, who paved the way for many females interested in all aspects of study in the field of Agriculture. ”



BIOGRAPHIES

ARCAND, Melissa

Dr. Arcand received her PhD in Soil Science from the University of Saskatchewan and conducted her post-doctoral research with Agriculture and Agri-Food Canada. She teaches and is the academic advisor for students in the Kanawayihetaytan Askiy program, designed to train students to work in resource management and land governance in Indigenous communities across Canada. Melissa is a soil biogeochemist with research interests focused on optimizing plant-soil synergies for the design of nutrient and energy efficient cropping systems.

BETA, Trust

Trust has a PhD from the University of Pretoria, South Africa. Dr. Beta is a professor in Food Science and a Canada Research Chair in Grain-Based Functional Foods. She is a certified food scientist and her research projects focus on non-traditional components in plant foods that can potentially prevent or delay onset of diseases related to aging.

BRÛLÉ-BABEL, Anita

Dr. Brûlé-Babel received her BSA and PhD degrees from the University of Saskatchewan. She is a professor in the Department of Plant Science at the University of Manitoba working in the area of wheat breeding and genetics.

EDIGER, Julie

Julie received her BSc Agribusiness from the University of Manitoba, and is a member of the Manitoba Institute of Agrologists. She is a Senior Financing Specialist at RBC supporting Agriculture and Agribusiness clients. In this role she is focused on helping the largest, most complex operations in the prairie region.

FARENHORST, Annemieke

Annemieke has a Doctorandus (Drs.) in Physical Geography and Soil Science from the University of Amsterdam, the Netherlands; and a PhD in Physical Geography from the University of Toronto. She is the Associate Dean (Research) in the Faculty of Agricultural and Food Sciences, and a professor in the Department of Soil Science at the University of Manitoba. She is also the Prairie NSERC Chair for Women in Science and Engineering. Her research program focuses on the fate of pesticides, natural steroid estrogens and antibiotics in soil and water, and on community-engagement in water resource management.

GILSON, Tracy

Tracy has a BA, MA, PhD (Animal Science) all from the University of Manitoba, and recently obtained her MBA (2010) from the University of Manitoba. She has been the Operations Manager at the University of Manitoba's Glenlea Research Station since July 2014.

GINGERA-BEAUCHEMIN, Dori

Dori Gingera-Beauchemin received her Bachelor of Agriculture degree from the University of Manitoba, and joined Manitoba Agriculture in 1979. She currently is Deputy Minister, Manitoba Agriculture and is committed to advancing the sustainable development of Manitoba's agricultural and food sector while supporting vibrant rural communities.

KOKSEL, Filiz

Filiz has a BSc (Food Engineering) and MSc (Food Engineering) from Middle East Technical University (Turkey), and she received her PhD (Food Science) in 2015 from the University of Manitoba. Filiz was born in Winnipeg, but lived most of her life in Ankara, Turkey, until her return to Winnipeg for graduate school. Filiz is an assistant professor in food science, and her research program focuses on food processing to manufacture high quality foods that are safe, nutritious and palatable.

LAWLEY, Yvonne

Yvonne is an assistant professor in the Plant Science Department at the University of Manitoba. Her area of research is agronomy and cropping systems and this involves both small plot and on-farm field scale research. Yvonne received her PhD in soil science from the University of Maryland, an MSc in plant science from the University of Saskatchewan, and a BSc in agronomy from the University of Manitoba. Dr. Lawley enjoys communicating the results of her research to a wide range of audiences including farmers, agronomists, scientist, and especially in the classrooms where she teaches at the University of Manitoba.

MUNIRA, Sirajum (Rumi)

Rumi has a BSc (Plant Science), MSc (Horticulture) from Bangladesh and she recently defended her PhD thesis in Soil Science at the University of Manitoba. She worked as a Postdoctoral Research Fellow at the University of Manitoba. She is an Instructor in Environmental Science at the Keyano College, AB. Her research interests focus on fates and transports of contaminants and removal of contaminants using phytoremediation technique.

NARVAEZ, Claudia

Claudia has a degree in Veterinary Medicine, an MSc (Microbiology) and a PhD (Animal Sciences) from Texas Tech University. She is an associate professor at the University of Manitoba, Food and Human Nutritional Sciences Department. Her research focuses on the development of suitable pre-harvest and post-harvest interventions to reduce the presence of pathogenic organisms in the food continuum.

ROCHON, Kateryn

Kateryn has a BSc (Biology) from Université de Sherbrooke, MSc from the University Lethbridge, and a PhD (Veterinary Entomology) from North Carolina State University. She is an associate professor in Entomology at the University of Manitoba. Her research program at the U of M focuses on arthropods as vectors of both livestock and wildlife pathogens, with a current emphasis on tick distribution and ecology.

ROGALSKY, Magda

Magda has a BSc from University of Winnipeg and a MSc from University of Manitoba. She is a soil scientist with a passion for agricultural production and research. She started her career with Bayer Crop Science in March 2017 as a Research Associate, as of 2018 Magda is the Operations Lead at Bayer Canada, Crop Science Division, and is responsible for the day-to-day operations of their multifunctional research site.

ROSS BURTNACK, Delaney

Delaney Ross Burtnack joined the Manitoba Canola Growers Association in 2017 as Executive Director, also leading the research and advocacy work for the association. Previously, Delaney led the Canadian Association of Agri-Retailers as President & CEO, and worked for nearly 10 years in the agricultural communications industry. She holds her Masters of Science in agronomy from the University of Manitoba.

SUH, Miyoung

Miyoung received her MSc from the Catholic University of Daegu, South Korea, and her PhD at the University of Alberta. She is a professor in the Department of Human Nutritional Sciences at the University of Manitoba. She has been trained as a Clinical Dietician and served as the Director of the University Dietetics Program for 6 years. Dr. Suh's on-going research involves studying the fundamental roles of dietary lipids and antioxidants in brain, retina, and testes/sperm under alcoholic, diabetic and obese conditions.

WITTENBERG, Karin

Karin obtained her BSc (1975), MSc (1977) and PhD (1985) from the University of Manitoba. Dr. Wittenberg served for five years as Head, Department of Animal Science; for nine years as Associate Dean (Research); and for five years as Acting Dean and Dean of the Faculty of Agricultural and Food Sciences. Dr. Wittenberg's work as a university academic and professional agrologist reflects the continuing need to address key issues facing animal agriculture in Canada.

ACKNOWLEDGEMENTS

I want to thank Annemieke Farenhorst. I am grateful and honoured to have worked on this project with you. Our early conversations about this book certainly evolved! Thank you for your trust, never-ending support, and for always being available to hear my thoughts and ideas. Our shared enthusiasm kept our minds open and in the end led us to creating a book that has gone beyond a fun activity book for a young audience, and has become a book that has something to offer all ages.

—*Kim Stefaniuk*

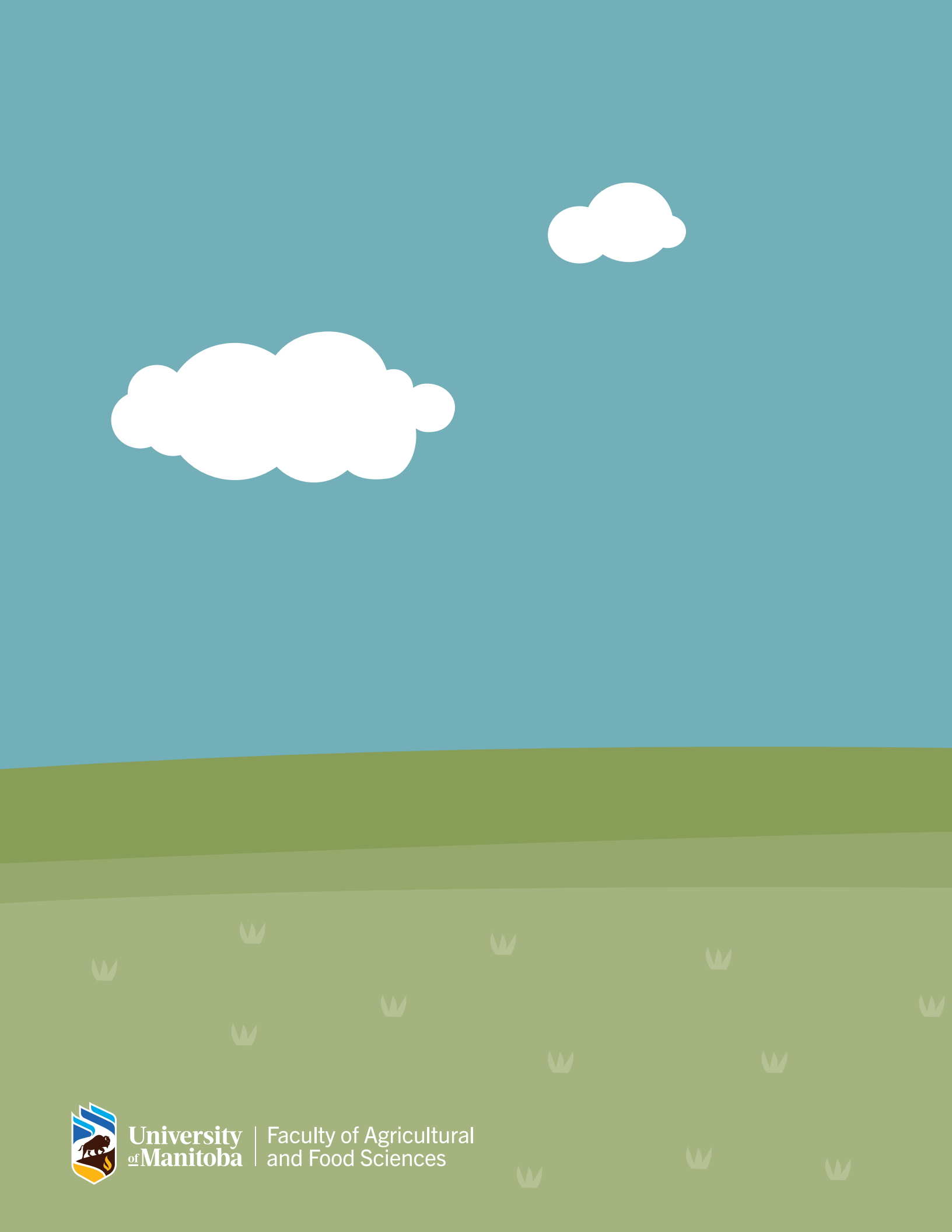
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Feature Photography

Claudia Narvaez (page 14) – Mike Latschislaw, Photographer
Miyoungh Suh (page 22) – Rob Blaich, Photographer
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