

MATHEMATICS CURRICULUM

CROSS-CURRICULAR AND INTEGRATED LEARNING

The development of skills and knowledge in mathematics is often enhanced by learning in other subject areas. Teachers should ensure that all students have ample opportunities to explore a subject from multiple perspectives by emphasizing cross-curricular learning and integrated learning.

ACTIVITY #1 - THE BEEKEEPER

Working bees (female bees) collect pollen and nectar for the hive. Pollen is used in the hive as a protein source during brood-rearing. The bees make honey from the nectar they collect from flowering trees and plants. Honey is a pure food that will last forever.

Beekeepers use hives called supers that have frames for the bees to build combs for honey and for brood chambers. The Beekeeper places the hives where the bees can find flowering trees and plants. Hives should face south and be protected from the west winds. Bees need fresh water daily. Place water close to the hive. In the spring give your bee's food in the form of Sugar Syrup (1 kg of sugar to 500 ml of water) as available nectar is still scarce. Hives need to be visited weekly.

During the summer the Beekeeper must visit the hives weekly and watch for swarming and over-crowding. Supers need to be removed when the cells have been capped over and extracting of the honey soon thereafter. New supers need to be added. The main harvesting of the honey is done from late summer to autumn. Pollen and Beeswax are also products that are produced by the honey bees and can be sold.

Fall is the season when your queen bee's egg laying is dramatically reduced, the drones begin disappearing and your hive population decreases.

Beekeepers take honey from the supers but leave the brood chambers in place. Honey stored in this part of the hive will see the colony through the winter. Bees will also need more Sugar Syrup in their feeders for the winter. Wrap your hives and narrow the opening so that a very small opening exists, but still allows for good ventilation. For resources and more information check out: www.ontariobee.com



2017

100th INTERNATIONAL
PLOWING MATCH & RURAL EXPO

SEPT 19-23 • WALTON, ONTARIO

Equipment You Will Need To Become A Beekeeper

Hive with supers and frames \$200.00

Pollen Trap \$15.00

Nucleus Colony – 4 frames of bees Stainless Steel with eggs, workers, and a laying queen \$175.00 Smoker \$30.00

Metal Hive Tool for Opening Hives \$8.00

Bee Brush \$7.00

Knife or Scraper to remove caps \$5.00

Leather Gloves \$20.00

Zippered Fencing Veil \$20.00

Extractor \$200.00

50 kg Honey Tank Stainless Steel \$150.00

Strainer \$35.00

Plastic Containers 1kg (each) .65

Glass Jar 1kg (each) .75

Winter Hive Wraps \$17.50

Wax Melting Pot \$125.00

Uncapping Tank \$125.00 Extra Frames (each) \$1.50

Sales

Creamed Honey 1 kg \$11.00

Liquid Honey 1 kg \$11.00

Bee Pollen ½ kg \$21.00

Beeswax Bar ½ kg \$11.00

Suggested Questions

Grade 1

Fold paper in four sections.

Use both sides giving room to answer 8 questions.

Draw 5 working bees and 1 queen bee.

Draw 3 drone (male) bees.

Draw 1 beehive with 3 super boxes.

Draw 4 honeycombs.

Draw 5 plastic containers for creamed honey.

Draw 7 glass jars of liquid honey.

Draw 2 glass jars of Bee Pollen.

Draw 8 bars of Beeswax.

Grade 2

Show the previous work using numbers and pictures.

Grade 3

Show the previous work using pictures, numbers and words to explain your answer. Total the cost of sale items.

Grades 4 - 8

How much would it cost to become a Beekeeper?

If you had 1 bee hive would you make a profit the first year? Explain with numbers and words.

How many bee hives would you need to have the first year to pay for your start-up equipment? Explain with numbers and words.

How many bee hives would you need to have the first year to make a \$500.00 profit for all your hard work? Explain with numbers and words.

What would your profit or loss be the second year if you just kept one bee hive? Explain with numbers and words.

If, you paid yourself \$20.00 per hour for 2 eight hour days per week from April to the end of October, would you make a profit the third year with one bee hive? Explain with numbers and words.

ACTIVITY #2 - THE EGG FARMER

Hens lay eggs when they are about 19 weeks old. After one year of laying eggs they are sold to processors for use as soup. A hen is born with many tiny yolks in her body. One at a time these yolks grow to full size and produce an egg. A hen can produce an egg every 24 hours. Hens need 16 hours of sunlight to produce an egg therefore in winter light must be added to the coop.

Coop

A coop contains nesting boxes, a place for roosting, and an attached fenced run.

Cost \$200.00

Food for Laying Hens

First 6 weeks eat "Starter Feed" 25k bag \$16.50

6 – 18 weeks eat "Grower Feed" 25k bag \$14.28

18 weeks eat "Layer Feed" 25k bag \$14.81

Hens need "Grit" small stones needed in their gizzard to grind food and make shells hard.

Clean water

One laying hen eats 100 grams (or half a cup) of feed per day.

It cost 8 cents to feed one laying hen per day.

Cost of Chicks and Hens

Day old laying hen \$3.10 each

20 week old laying hen \$9.85 each

Free Resources: www.eggfarmersofontario.ca/teacher

Cartons

Egg Cartons .35 each

Sale of Eggs

1 dozen large eggs \$3.75

Suggested Questions

Grade 1

Fold paper in four sections. Use both sides giving room to answer 8 questions.

Draw how many eggs one hen will lay in 2 days.

Draw how many eggs one hen will lay in 5 days.

Draw how many eggs one hen will lay in 7 days.

Draw how many eggs one hen will lay in 12 days.

It takes 12 eggs to make one carton of eggs.

You had 12 hens.

Draw how many cartons you get in 1 day.

Draw how many cartons you get in 3 days.

Draw how many cartons you get in 5 days.

Draw how many cartons you get in 7 days.

Grade 2

Use numbers and pictures to describe the previous work.

Grade 3

Change the number of hens and have students make up cartons of eggs and then sell each dozen for \$3.75. Use pictures, numbers and words to explain your answer.

Grades 4 - 6

How much would it cost to buy one dozen day-old chicks?

How much would it cost to buy one dozen, 20 week old laying hens?

How much does it cost to feed one laying hen for one week?

How much does it cost to feed one dozen laying hens for one week?

How many eggs will you get from one dozen laying hens in one week?

If you have to pay for the feed and the egg cartons, how much would it cost you to keep the 12 hens for one week?

If you sell eggs for \$3.75 a dozen, how much money will you receive?

If you subtract your cost for the week, how much profit did you make on selling the eggs?

How long will it take you to pay for the cost of the coop and the cost of the 12 laying hens?

Grades 7 - 8

As the farmer is it better to buy 12 day old chicks? Why or why not?

How much would it cost to keep the 12 chicks for the 20 weeks until they are ready to lay eggs?

Which will give you the better profit, 12 day old chicks or 12-20 week old laying hens? Explain.

How many eggs would each hen lay before it will be sent to market?

As the egg farmer pick your flock of hens and come up with a profit or loss statement for one year.

ACTIVITY #3 - THE PIG FARMER

Here are a few terms you need to know to get around a pig barn.

Boar: adult male pig kept for breeding purposes

Farrow: to give birth

Feeder pig: piglet after it's weaned from the sow

Litter: group of piglets born at one time from the same sow

Market Hog: pig raised for meat production, weighs up to 110 kg

Piglet: newborn pig, weighs 1 – 2 kilograms

Suckling Pig: piglet still getting milk from the sow

Runt: smallest piglet in the litter

Sow: adult female pig

A pig farmer needs a warm place to house the pigs and a place to act as a nursery after the piglets are born. Sows can be bred by natural mating with boars or by artificial insemination. After breeding the boar must be separated from the sow into another pen. A sow's gestation (pregnancy) lasts for approximately 3 months, 3 weeks and 3 days. A piglet must have drops or a shot of iron within the first three days. The sow can have 8 – 12 piglets in a litter. A sow gives birth about twice a year. The area where the piglets sleep can be kept warm with a heat lamp. Sows nurse their piglets for two to four weeks, until the piglets (Suckling Pigs) are weaned from milk and can eat solid food. Sows usually rear 5 – 6 litters before they are removed from the herd.

Once the piglets are weaned from the sow they are moved to other pens with piglets of the same size. They are now fed a mixture of corn, barley, soybeans mixed with vitamins and minerals plus lots of clean water. This pig feed can be bought as pallets or grown and mixed on the farm. These feeder pigs stay in the nursery until they weigh 25 kg, about 6 weeks.

Then the pigs are 25kg they are moved to the grower-finisher section and fed a mixture of feed 80% carbohydrates, (ground corn), 18% protein,(soy), a daily portion of fat and plant vitamins and two handfuls of vegetable mass like lettuce and beets and plenty of clean water with their meal. They stay in this area until they weigh 110 kg and become ready for market, when they are about 16 weeks old.

A bag of Protein Pallets lasts one nursery pig 1 week. A bag of Pig Feed lasts 1 growing pig 1 week. Vegetable can be leftovers from restaurants or grown on the farm.

Now to start your Pig Farm you will need:

One Sow (thoroughbred) \$200.00
One Boar (thoroughbred) \$300.00
Pig Pen \$100.00 each
Metal Enclosure and fence \$100.00
Automatic Water Trough \$20.00
Feeding Trough \$30.00
Heat Lamp and Tooth Nipper \$15.00
Straw and Wood Chips for bedding \$4.00 every two weeks
Bag of Protein Pallets 20kg \$8.00
Bag of Pig Feed 20kg \$16.00

Market Prices for the sale of pigs are:

Whole Pig weigh 110kg \$550.00
Suckling Pig \$100.00
Plus killing and prep fee \$60.00

Suggested Questions

Grade 2

Draw pictures and put dollar amounts beside each picture to show what you need to start a pig farm with one sow and one boar and feed the sow and the boar for 2 weeks.

Grade 3

Use pictures numbers and words to show what you need to start a pig farm with 2 sows and 1 boar and to feed the sows and boar for 2 weeks. Give a total amount to start the farm.

Grade 4 – 6

How much money would you need to start a small pig farm with 3 sows and 1 boar?

Cost of sow Feeding Trough
Cost of Boar Heat Lamp and Tooth Nipper
Cost of pig pens Straw and Wood Chips
Cost of Metal enclosure and fence
Bags of Protein Pallets 3
Automatic Water Trough
Bags of Pig Feed

You will sell the new pigs when they reach 110 kg in 4 months. Each sow will have two litters per year of 10 piglets. What is your profit or loss at the end of the first year? Second year?
Remember in the second year you do not have to buy equipment.

Grades 7 – 8

Start the same Pig Farm with 5 sows and 1 boar?

You will sell half of each litter as Sucking Pigs and keep the other piglets to 110 kg. What is your profit or loss at the end of the first year? Second year?

For resources and more information check out: <http://www.ontariopork.on.ca/Resources>

ACTIVITY #4 - THE MAPLE SYRUP FARMER

The Farmer needs a supply of Maple Sugar Trees that are at least 30 cm in diameter.

Sap runs when the daytime temperature is above 0 degrees Celsius and the night time temperature is below 0 degrees Celsius. Sap starts to flow in March and runs for 4 – 6 weeks with 10 – 20 days of heavy flow. It ends when the nights are warm and the trees start to bud. Spiles need to be tapped into the tree around the end of February. A 1 cm hole drilled upwards, for the spile should be 60 cm to 120 cm above the ground, with a depth of 3.75 cm.

If the tree is 30 to 45 cm in diameter it will take 1 tap.

If the tree is 48 to 63 cm in diameter it will take 2 taps.

If the tree is above 65 cm in diameter it will take 3 taps.

Collect the sap each day in a large plastic garbage can, on a very strong sled with an ATV or other means of pulling the sled. Sap bucket becomes very heavy so you may need to make several trips.

You need 45 Litres of sap to produce 1 Litre of maple syrup.

Each tap will yield 1 Litre of syrup per season.

After the sap is gathered each day it is boiled to 104 degrees Celsius in pots or pans using wood from the bush. As the water evaporates the sap is changed into syrup. A hydrometer measures the density of syrup liquid to the density of water. When it gets to the proper Brix Scale (min. 66% in Ontario) the syrup is filtered to remove impurities and put into containers. All equipment should be cleaned using 1 part bleach to 99 parts water. Triple rinse with clean water to avoid flavouring your syrup.

For resources and information check out Ontario Maple Syrup Producers Association: www.ontariomaple.com

Bucket Method

Bucket Plastic \$6.00 each Covers \$3.00 each
Spiles \$1.50 each Large Pot \$50.00
Drill Bit 1 cm \$16.00 Filter \$16.00
Thermometer \$30.00 Hydrometer \$20.00
Large Garbage Can \$30.00 Glass Bottle 1L \$1.40 each

Tubing Method

Tubing 150 metres \$64.00 Spile and Tee .70 each
Drill Bit 1 cm \$16.00 2 Garbage Cans \$60.00
Evaporating Pan \$1765.00 Sugar Pan \$296.00
Thermometer \$30.00 Hydrometer \$20.00
Filter \$16.00 Glass Bottle 1L \$1.40 each

Sales

1 L Maple Syrup \$25.00

Suggested Questions

Grade 1

Fold paper in four sections.

Use both sides giving room to answer 8 questions.

Draw 5 maple trees when they are ready to produce sap. (no leaves)

Draw 7 spiles.

Draw 4 buckets for sap.

Draw 1 long plastic hose.

Draw 8 jugs of maple syrup.

Draw 2 drills.

Draw 3 filter bags.

Draw 6 logs for the fire.

Grade 2

Show the previous work using numbers and pictures.

Grade 3

Show the previous work using pictures, numbers and words to explain your answer. Total the cost of any equipment and the sale of any syrup

ACTIVITY #4 - THE STRAWBERRY FARMER

You will need 1 acre or 0.4 ha of sandy loam soil, a small tractor, a planter, a sprayer and a mower.

Irrigation Systems and other Supplies

A “Drip Tape Irrigation System” that is put in the ground before planting to provide fertilizer and water to the plants. An “Above Ground Irrigation System” to be used in case of frost on the blossoms.

Herbicide to spray for weeds and Straw to cover plants in the winter. Cost \$1500.00

Plant Strawberry plants in May of 2017. You will need 13,000 plants. Strawberries plants should be spaced 30 cm to 45 cm apart. Rows should be 1 meter apart. Cost of plants \$2500.00

Labour Cost for Planting

Five people working for two, ten hour days at \$15.00 per hour.

Harvest Strawberries in **June of 2018.**

For more information on Strawberry farmers, go to:
<https://www.ontario.ca/foodland/page/strawberries>

Your land will yield 1100 flats of strawberries.

A Container which includes the flat plus 6 boxes costs \$3.00 per flat.

Berries are picked every other day for 10 days.

Labour Cost for Harvesting

Six people working five, ten hour days at \$15.00 per hour.

Marketing

Wholesale – Delivering to Stores

Labour for Sales - One person works five, eight hour days at \$15.00 per hour.

Sales - \$16.00 per flat

Retail – Side of the Road

Labour for Sales - Two people working five, eight hour days at 15.00 per hour.

Sales - \$24.00 per flat

The Strawberry Plants will produce berries for three years.

Suggested Questions

Grade 1

Fold paper into four sections. Use both sides giving room to answer 8 questions.

Draw a basket with 2 strawberries in it.

Draw a basket with 9 strawberries in it.

Draw a basket with 7 strawberries in it.

Draw a basket with 6 strawberries in it.

Draw a basket with 5 strawberries in it.

Draw a basket with 4 strawberries in it.

Draw a basket with 8 strawberries in it.

Draw a basket with 3 strawberries in it.

Grade Two

Using pictures and numbers add 2 berries to each basket on the first page and 5 berries to each basket on the second page.

Grade Three

Change the number of berries to baskets of berries and sell the baskets for \$5.00 each. How much money will you get?

Use pictures, numbers and words to explain your answer.

Grade 4 – 8

What is your initial cost in the year 2017?

What are your labour costs for planting?

How much will the containers cost for harvesting?

What are your labour costs for harvesting?

How much did it cost you to produce the strawberries?

What are your labour costs for sell Wholesale? Retail?

If you sell your strawberries Wholesale how much money will you receive?

How much profit will you make if you sell the strawberries wholesale?

If you sell your strawberries Retail how much money will you receive?

How much profit will you make if you sell the strawberries retail?

Is it better to sell your strawberries Wholesale or Retail? Why?

Your Strawberry plants will produce fruit for three years. What is your total cost of expenses for the four years including year 2017?

How much profit will you make at the end of the four years?