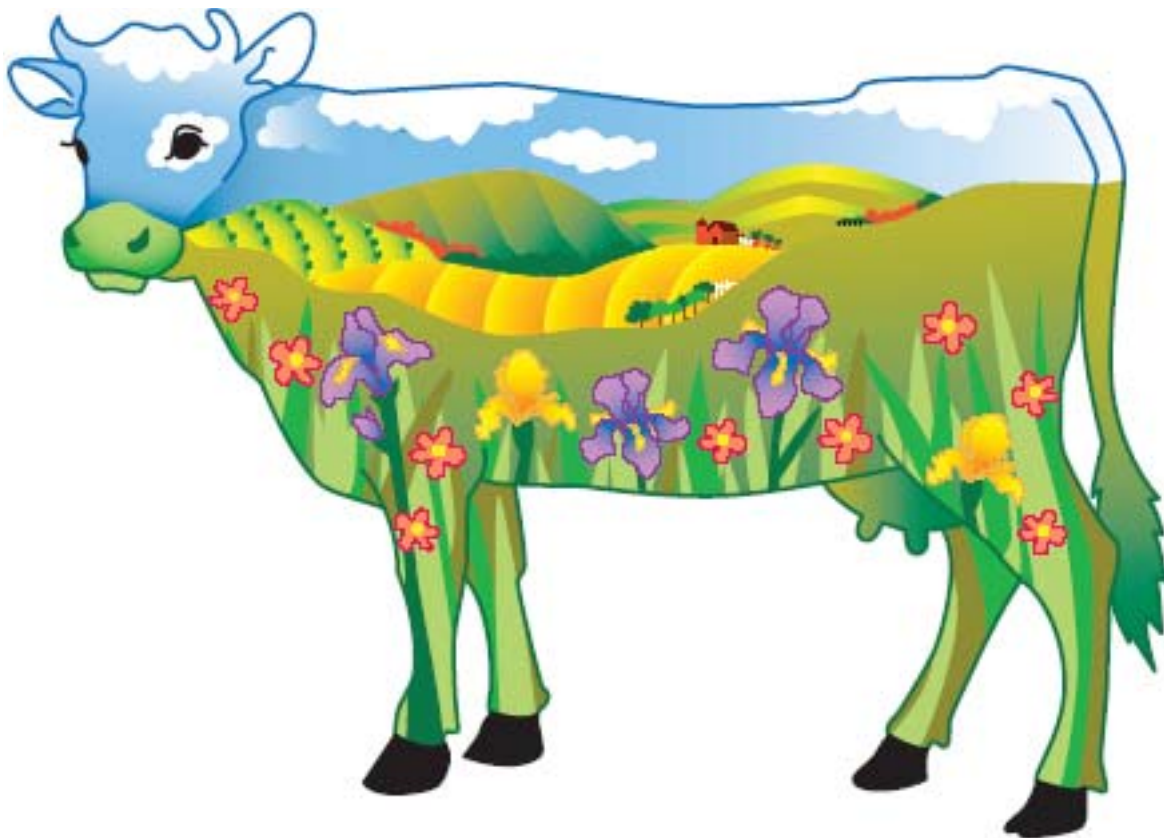


SOLE  
Sciences of Life Explorations:  
Through Agriculture  
Grades 4 and 5



Teacher Guide  
Unit: Harvesting the Garden



## UNIT PLAN

### UNIT TITLE

Harvesting the Garden

### MONTH

September

### GOAL

Students will compare and contrast the process of harvesting, processing, and preservation of food, and be able to recognize that growing food is a business that involves many risk factors.

### OBJECTIVES

Students will:

1. Identify vocabulary appropriate to harvesting by using it orally and in written form (NYS Standard 1 Communication Skills #1).
2. Using concrete materials, calculate model numbers and number relationships for whole numbers, common fractions, and decimal fractions (NYS Standard 3 Numeration #2).
3. Perform mathematical operations and their relationships to add, subtract, multiply, and divide (NYS Standard 3 Math Operations #3).
4. Utilize physical materials and diagrams to explain mathematical processes (NYS Standard 3 Math Modeling #4).
5. Make estimates, compare to actual results, and make predictions (NYS Standard 3 Math Uncertainty #6).
6. Explain that scarcity affects cost and investigate how production, distribution, exchange, and conservation of goods are economic decisions by using systems dynamics (NYS Standard 4 Economics #1).
7. Explain that next year's pumpkin crop is generated with this year's seeds (Food and Fiber Systems Literacy III, A K-1).
8. Explain that output determines agricultural input (Food and Fiber Systems Literacy IV, A 4-5).
9. Explain how traders, explorers, and colonists brought plants and animals to this country by locating the origins of regional agricultural products (Food and Fiber Systems Literacy I, D 4-5).
10. Explain how a shortage or surplus of a product provides an opportunity for trade, and predict what happens when shortages or surpluses occur (Food and Fiber Systems Literacy IV, A 2-3).
11. Explain how factors such as culture and convenience affect food choices, and analyze how food preferences have changed over time (Food and Fiber Systems Literacy V, C 4-5).

## TERMS

Expenses - money spent on items needed to make and sell products

Income - money earned from selling products

Loss - money spent on making products that was not earned back after selling them; when expenses cost more money than the income earned (Expenses are GREATER than Income)

Preserve - to can, pickle, or similarly prepare for future use; keeps harvested fruits and vegetables from rotting.

Net Profit - money left over from selling products after you've subtracted the costs of labor and care; when expenses cost less money than the income earned. (Expenses are LESS than Income)

Gross Profit - Money taken in before expenses are subtracted.

Combine - A machine that harvests and cleans grain plants. The result is the seed (such as canola or flax) or grain (such as oats, wheat, or rye); a by-product is loose straw, which is the remaining husk of the plant with all of the nutrients removed.

Harvesting - The operation of cutting, picking, plucking, digging, or a combination of these operations for removing the crop from under the ground or above the ground and removing the useful part of fruits from plants.

*Integrated Pest Management is a specialized form of environmental management wherein scientific research and real world application work together to reduce pests such as insects, diseases or weeds.*

- 1. Proper identification of pests*
- 2. Learn the pest/host biology*
- 3. Sample the environment for pests*
- 4. Determine an action threshold*
- 5. Choose the best tactic*
- 6. Evaluate results*

## SAFETY

Follow standard classroom safety practices.

## Standards Matrix for this Lesson:

Standards:										
Month	Unit	Math/Science/and Technology	English Language Arts	Social Studies	HEALTH	ARTS	Food & Fiber Literacy	CDOS	Other Languages	Interconnectedness
9	Harvesting the Garden		1.1				III A K-1			
		3.2					IV A 4-5			
		3.3					I A 4-5			
		3.3					I D 4-5			
		3.4					III C 4-5			
		3.6					IV A 2-3			
		4.1		4.1			III A 4-5			6.6
							V C 2-3			
							V C 4-5			

### Matrix Key:

NYS Learning Standards arranged by Standard: Category, Level

e = elementary i = intermediate

Categories:

- |   |  |
|---|--|
| 1 Career Development                            | 10 Science                             |
| 2 Universal Foundation Skills                   | 11 Technology                          |
| 3 Language for Information and Understanding    | 12 Interconnectedness: Common Themes   |
| 4 Language for Literary Response and Expression | 13 Interdisciplinary Problem Solving   |
| 5 Language for Social Interaction               | 14 History of the United States and NY |
| 6 Communication Skills                          | 15 World History                       |
| 7 Analysis, Inquiry, and Design                 | 16 Geography                           |
| 8 Information Systems                           | 17 Economics                           |
| 9 Mathematics                                   |  |

## ADDITIONAL RESOURCES

Keller, Thoennes. *From Wheat to Bread*. ISBN 0-7368-2638-6 90000

## SUPPLIES AND EQUIPMENT

Dice and/or coins - enough for each student to use one  
One sheet of paper per student

## QUESTIONS FOR STUDENTS

What is harvesting?  
What does harvesting have to do with me?  
What can I do with the food I grew?  
Can I make money selling my harvest?  
What is a combine?  
What are some harvesting problems?  
What does profit mean?

## BACKGROUND FOR TEACHERS

Harvesting is an important part of the growing cycle. Students who have experience with gardening or farming will understand that harvesting can happen all at once or over the period of many months, depending on the crop they are harvesting. This lesson can be used in classrooms regardless of whether or not students will be gardening.

Harvesting must be done regardless of the size of your crop. Depending on the growing season, a crop may be big or small because of forces out of the control of the farmer or gardener. Unless you can control all aspects of growing (plants are susceptible to heat, cold, too much or too little water, and insects and diseases) the harvest will vary.

Some crops can be harvested over and over again, while others may produce one crop which is ready all at once. Students will learn that harvesting can be done by hand or with machinery. A short story about wheat and bread will remind students of the growing cycle.

Students will also be given the chance to examine what it is like to grow and harvest pumpkins. They will understand that things occur which affect crops and therefore the harvest. They will be introduced to the concepts of income and expenses.

Anyone who has experienced a successful harvest of any crop needs to decide what to do with it. Students will be reminded that crops need to be stored, preserved, sold, or eaten fresh. Harvest time is the culmination of a lot of hard work. People all around the world generally find time to celebrate in this busy season, as a successful harvest is very important to their survival.

## INTEREST APPROACH ACTIVITIES

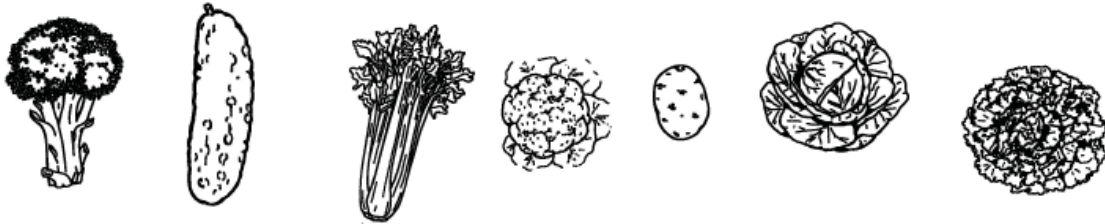
### Beauty and the Beets

Est. Time: 20-25 minutes

#### Materials:

4 samples of garden produce (e.g.: eggplants, tomatoes, beans, squash, beets, etc.)

1. Divide the class into groups of 3 or 4.
2. Explain that their task is to look at the vegetables and rank them from 1 to 4, 1 being the vegetable they think is the most attractive.
3. Teacher should guide the students about characteristics of color, size, etc. as they circulate the room
4. Each team should write its answers down, including a few reasons for placing one over another.
5. Each group will select a spokesperson to share its reasons with the entire class.
6. Now, ask the entire group to make a consensus based on what was said by each group.
7. Class discussion: What role does appearance play in selling produce?



### Tasty Treats

Est. Time: 20-25 minutes

#### Materials:

Paper plates

Cutting board

Knives

Plastic gloves

Small plastic containers

Various vegetables (could use vegetables from first activity)

1. Wash hands and make sure you have a clean cutting surface. Wash vegetables prior to cutting. Ask the class about the do's and don'ts of using a knife, and why you would want to wash the vegetables and have clean hands.
2. Cut vegetables into bite-size pieces.
3. Guide the students (have them wear gloves!) to make an attractive presentation of produce on paper plates, one variety per plate.
4. Set the seeds aside, each vegetable seed in its own container, and label them. Later, seeds can be dried and stored.
5. Have the students write down sensory qualities of each vegetable they taste. Include color, texture, taste, and smell.
6. Have the class rank each vegetable 1 through 4, 4 being the most liked.
7. Class discussion: What role does taste and texture play in selling produce?

(Adapted from: After School Agriculture [www.n4hccs.org/afterschoolag.com](http://www.n4hccs.org/afterschoolag.com))

## SUMMARY OF CONTENT

- I. What is harvesting?
  - A. This is an introductory page
  - B. Discusses how and when we harvest what we grow and what some problems are with harvesting.
  
- II. How do we harvest what we grow?
  - A. Includes an illustration of a combine
  - B. Imaginative mechanic harvesting machine art project along with questions to ask students about their machine.
  
- III. What does harvesting have to do with me?  
(2 pages)
  - A. Bread: A journey from the field to your table
  - B. Discuss how the journey to your table meets up with several agriculture related careers.
  
- IV. What are some harvesting problems?
  - A. This page is a review from earlier lessons pertaining to IPM.
  
- V. What can I do with the food I grew?
  - A. Discusses the 5 main things that can be done with harvested food
    - i. Store
    - ii. Sell
    - iii. Preserve
    - iv. Eat
    - v. Donate

## TEACHING-LEARNING ACTIVITIES

- I. What is harvesting?
  - A. Students may read to themselves or you may initiate a group discussion around the essential questions (Student Worksheet 1)
  
- II. How do we harvest what we grow?
  - A. Students can take turns reading this page aloud.
  - B. Student should complete the activity at the bottom of the page. Make sure that student use their writing skills to describe the machine and what it does.
  - C. Display the classes machines on the classroom walls. (Student Worksheet 2)
  
- III. What does harvesting have to do with me?  
(2 pages)
  - A. Students may read this story aloud or to themselves.
  - B. Discuss how the journey to your table involves several agriculture-related careers. (use the transparency found in the lesson supplements)
  - C. Students can answer the questions on the following worksheet to test their comprehension of the story. (Student Worksheets 3-4)
  
- IV. What are some harvesting problems?
  - A. Students may read this page on their own or as a class.
  - B. Questions can be used to begin a class discussion. (Student Worksheet 5)
  - C. Extension activity 3 (Lesson supplements) relates to this page.
  
- V. What can I do with the food I grew?
  - A. There are many that things to do with freshly picked food besides eat it. Discuss some of these alternatives as a class. (Student Worksheet 6)
  - B. Extension Activity (Lesson supplements) relates to this activity.



## SUMMARY OF CONTENT

### VI. Growing Pumpkins: A Business Lesson (2 pages)

- A. Having students set up a small school business using their harvest is an experiential real-life method for understanding complex concepts including marketing, customer relations, location, gross profit, input vs. output, leftover produce, and supply and demand.

### VII. From seed to pumpkin

- A. Using their answers from the previous activity, students will complete math problems to address the concept of profit, loss and expense.

### VIII. Review

### IX. Test your knowledge

### X. Vocabulary

### XI. Lesson Supplements

## TEACHING-LEARNING ACTIVITIES

### VI. Growing Pumpkins: A Business Lesson (2 pages)

- A. Setting up a small business
  - 1. Track all garden expenses
  - 2. At harvest time, know when and how to pick crop
- B. Business Lesson Activity
  - A. Need coins and sheets of paper
  - B. Marketing
    - 1. Attractive posters stating 5 “W’s” of your harvest. (Who, What, When, Where, Why)
    - 2. School paper ad
    - 3. Decide on pricing
  - C. Interacting with customers
    - 1. Being a salesperson
    - 2. Negotiating as needed
    - 3. Making change
  - D. Decide on plant stand location with the most staff and student traffic.
  - E. After closing stand, students figure out gross profits.
  - F. Input vs. output: what changes need to be made to increase profits?
  - G. Decisions are also made on what to do with leftover produce:
    - 1. Reduce prices and resell
    - 2. Give to the school cafeteria
    - 3. Donate to needy families
    - 4. Next year’s strategy: pick fewer products at the same time so that supply is equal or even less than demand.
    - 5. Scarcity increases how much money people are willing to pay for your product. (Student Worksheets 7A-C)

### VII. From seed to pumpkin

- A. Students should complete this activity on their own.
- B. Ask the class what students with a loss should do next time. Ask students with a profit what they will do with the money (Student Worksheet 8)

### VIII. Review

### IX. Test your knowledge

### X. Vocabulary

### XI. Lesson Supplements

## Student Lesson: Harvesting the Garden

### What is Harvesting?

After you have planted seeds, watered them, and watched plants grow, the time will come when the crops are ready to use.

Harvesting is the picking or gathering of ripened crops. Fruits, vegetables, and grains are picked when they have finished growing and are ready to eat or process.  
How do we harvest what we grow?

What does harvesting have to do with me?

What are some problems with harvesting?

What can I do with the food I grew?

Can I make money selling my harvest?

Harvesting can be done by hand in your own garden , or by big machines on large farms!



## Student Lesson: Harvesting the Garden

### How do we harvest what we grow?



If you planted a garden, you would pick your vegetables and fruits with your hands. Some things you might have to dig out of the ground, like carrots and potatoes.

Some fruits and vegetables, like berries and squash, must be removed from their stems. Be careful not to crush or bruise the foods you harvest.

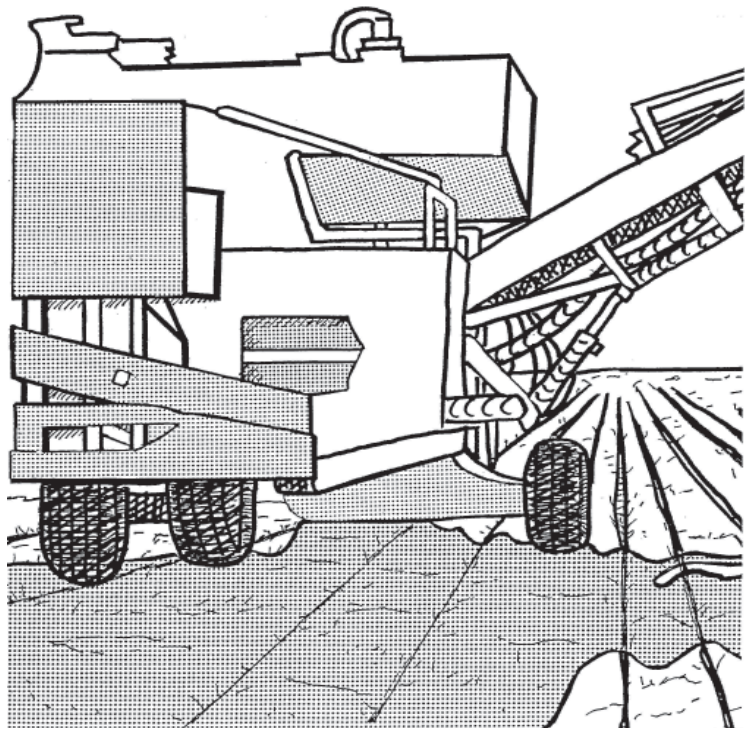
Some people grow herbs in their gardens. To harvest plants like mint, basil, and parsley, pick the leaves when you're ready to use them throughout the season, or cut an entire stem. Most herbs can be used fresh, or dried and stored.

When you are harvesting your garden, you could use a bucket or a basket to hold the foods you picked.

Farmers grow their crops in fields, which are much bigger than gardens. It would take workers a very long time to harvest a whole field with their hands.

That is why workers use big harvesting machines, like the combine pictured here. Combines also separate usable parts of the plants from the parts that are not needed.

Combines can separate ears of corn from their stalks and grains of wheat from their stems (straw). The leftover corn stalks and wheat straw can be used for animals to sleep on or go back in the ground as part of composting.



On a separate sheet of paper:

Machines like the combine are designed to do the work of many people. Imagine a machine that can do the work of picking a fruit or vegetable in your garden. Draw or describe what your own harvesting machine would do and what it would look like. Be creative!

What crop can it pick? How does it work? What does it use for fuel? How big is it? Where do you keep it?

## Student Lesson: Harvesting the Garden

### What does harvesting have to do with me?

Bread: The journey from the field to your table.

It was September and the field was ready for the next crop. Adam, who is a farmer, decided to plant wheat in the field. Wheat is a tall grass used all over the world. Its seeds are used for food.

Adam watched the wheat grow in the fall, winter, and spring. He kept a close watch on his crop. It would be bad for the farm if the wheat was eaten by insects and other animals.

Adam was glad he spent the extra money for seeds. These seeds were from a strong and healthy kind of wheat that would resist many plant diseases.

Finally, it was June. Adam called up his workers. The wheat had turned yellow and was ready to be harvested.

The workers climbed into the big combines and started their engines. As they rolled along the field, the combines cut the wheat and separated the kernels from the stems.

Adam saved some of the kernels, the seed of the plant, to use again in September. The other kernels were sold to a grain elevator company, a tall building with small storage silos around it.

They stored the wheat until it was ready to be sold again. The grain elevator company sold the wheat kernels to some food companies, and even to some other countries.

One food company, a mill, ground the wheat kernels into flour. The mill sold the flour to a bakery. The bakery made loaves of bread and baskets of muffins. Adam's wife stopped by the bakery to buy the bread for their dinner.

Adam had a nice sandwich with two slices of bread. The bread came from the bakery. The flour that made the bread came from a mill.

The mill made the flour from the grains they bought from the grain elevator company. The grain elevator company bought the wheat kernels from Adam!

The End.



# Student Lesson: Harvesting the Garden

What does harvesting have to do with me?

Bread: The journey from the field to your table.

### Questions:

What part of the wheat plant is used to make flour?

\_\_\_\_\_

In what month is wheat planted?

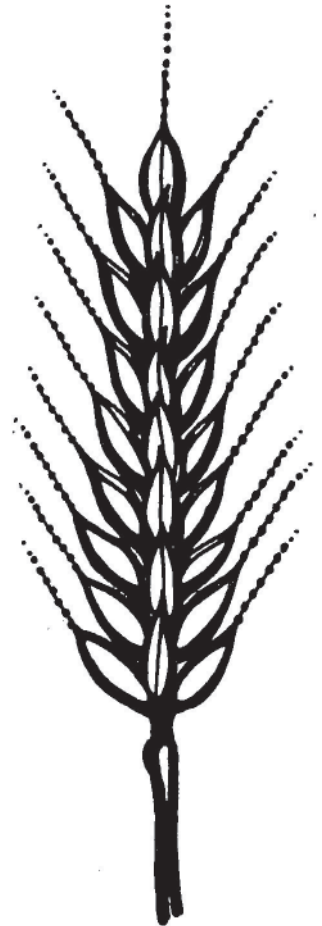
\_\_\_\_\_

In what month is wheat harvested?

\_\_\_\_\_

Why did Adam pay extra money for seeds?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Why would the workers use big combines and not pick the wheat by hand?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Student Lesson: Harvesting the Garden

### What are some harvesting problems?

When it is time to harvest, will a farmer always have a successful crop? Not always. Weather, insects, diseases and other events can affect a crop throughout the season. When it comes time to harvest, the crop might be small.

**Poor Soil:** If the soil is packed down (compacted), it will be hard for the roots to grow and spread out. Plowing a field or garden before planting loosens up the soil and adds fresh air to it.

**Weeds:** Sometimes the seeds from weeds find their way into fields and gardens. A weed can be any plant that grows where we don't want it to. When weeds grow, they take the nutrients and water in the soil away from the crop plants.

Some weeds grow to be very big and prevent the plants from getting enough sunlight. If you see weeds growing around your crop plants, put on gardening gloves and pull out the weeds.

Or, before you plant the seeds, cut holes in a black plastic sheet and lay it down on your gardening space. Cut the holes big enough for your plants to grow through. The black plastic sheet prevents weeds from getting enough sunlight to grow around your crop plants.

**Animals:** Bugs and other animals will find your garden to be a yummy buffet. They will eat away at your growing plants. There are many ways to keep bugs away.

You may have to build a fence around your garden to keep bigger animals out.



One way farmers use Integrated Pest Management (IPM), which is a strategy that prevents pest damage through environmentally friendly methods, is to place scent traps around their property. Because insects often find things by scent, the traps confuse them. This can mean that they will stay away from plants they might damage!

Think about a plant's basic needs in order to grow strong and produce food for humans. What are other reasons for a crop not doing well?

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## Student Lesson: Harvesting the Garden

### What can I do with the food I grew?

You can do four things with your harvest: store it, sell it, preserve it, or eat it!

#### Store it

Crops like pumpkins and winter squash (hard outer shells) can be kept in a cool, dry place. They will last for a couple months.

Soft-skinned squash like zucchini and yellow squash should be kept cold. These only last for a few weeks.

#### Sell it

You must sell your produce at a price that will give you a profit. That means you must make more money than you spent to grow them.

#### Preserve it

Both fruits and vegetables can be prepared and stored in air-tight jars or frozen for future use.

Fruits are often made into jams or jellies. They are cooked on the stove and mixed with ingredients like sugar and pectin. Then they are sealed in jars. These last a long time.

Did you know that cucumbers are turned into pickles when they are preserved in jars of vinegar and salt? You can create flavored pickles by adding things like dillweed (an herb) or peppers. If you preserve chopped up cucumber, peppers, onions, and sugar in vinegar, you can have sweet relish for hot dogs and hamburgers.

#### Eat it

Pick it, wash it, eat it. Fresh vegetables and fruits taste great!

Think of fruits or vegetables you have eaten in each of these ways:

1. Stored: \_\_\_\_\_

2. Sold: \_\_\_\_\_

3. Preserved \_\_\_\_\_

4. Eaten fresh from the garden or tree: \_\_\_\_\_

\_\_\_\_\_



## Student Lesson: Harvesting the Garden Growing Pumpkins: A Business Lesson

### Introduction:



When growing pumpkins, you need to take good care of them so that they will grow big and healthy. You have to be on the lookout for insects, plant disease, and the amount of water the plants get.

When the pumpkin's outer shell is hard, it is ready to be harvested. You can store it in a cool, dry place; make a pie out of it; or, like some farmers do, sell it to other people.

## The Pumpkin Business Game!

In this game of chance, you will follow the journey from seed to pumpkin! As you flip a coin or roll a die, you will see how your pumpkin business might operate in real life.

1. Flip a coin (heads or tails) or roll a die (odds or evens)
2. For each step, circle your result.
3. Write the answer for that step in the right-hand column. Example: If you get heads/odds for step A, circle "Store 1 for \$0.75" and write "\$0.75" in the right-hand column.
4. Solve the questions based on your results.

A. You buy your seeds from:

Heads/Odds: Store 1 for \$0.75

Tails/Evens: Store 2 for \$1

A. \_\_\_\_\_  
Seed Cost

B. You are too busy at school to plant the seeds: B. \_\_\_\_\_

H/O: Neighbor does it for \$10

T/E: Best friend does it for \$8

Labor Cost

C. The soil is poor quality:

H/O: It's pretty poor  
\$24 for fertilizer

T/E: It needs just a little help  
\$20 for fertilizer

C. \_\_\_\_\_  
Fertilizer Cost



name \_\_\_\_\_

## Student Lesson: Harvesting the Garden Growing Pumpkins: A Business Lesson

D. Pests get into your garden and reduce your crop: **D. \_\_\_\_\_**  
(multiply # of plants by # of pumpkins each) **Number of Pumpkins Grown**

H/O: Ten plants live  
each had two pumpkins

T/E: Six plants live  
each had three pumpkins

E. It hasn't rained in a while but you have saved **E. \_\_\_\_\_**  
aside a barrel of rain water: **Labor Cost**

H/O: You water the plants yourself  
\$0

T/E: You're sick; a friend  
does it for you  
\$5

F. It's harvest time! But you broke your arm: **F. \_\_\_\_\_**  
**Labor Cost**

H/O: You hire a neighbor to harvest  
\$8

T/E: A friend helps you  
\$4

G. You are ready to sell your pumpkins: **G. \_\_\_\_\_**  
**Number of Pumpkins Sold**

H/O: You sell half of your crop  
(Divide step D by 2)

T/E: You sell all of your crop  
(Divide step D by 1)

H. You sold your pumpkins for: **H. \_\_\_\_\_**  
**Sale Price**

H/O: \$4.50 each  
(Multiply by step G)

T/E: \$5.00 each  
(Multiply by step G)

Game over! Turn to the next page to find out how you did!



# Student Lesson: Harvesting the Garden From Seed to Pumpkin!

Solve the following exercises to see if your income (money you made) was more (profit) or less (loss) than your expenses (money you paid out for labor, fertilizer, and seeds).



Look back at your answers to steps A through H.

G. Number of pumpkins sold    H. Price of each pumpkin you sold    This is your Income!

1. \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

2. Costs:

Use this space to add up your labor costs:

B. Labor cost of planting \_\_\_\_\_

E. Labor cost of watering \_\_\_\_\_

F. Labor cost of harvesting \_\_\_\_\_

(B, E, & F)	(C)	(A)	These are
the three Labor Costs	Fertilizer Cost	Seed Cost	Expenses
_____	+	_____	+
		_____	=
			_____

3. Which is the larger amount?

Income	Expenses
	or
\$ _____	\$ _____

If you made more (income) than you spent (expenses), you have a profit! Congratulations!

If you made less (income) than you spent (expenses), you have a loss.  
Better luck next time!

## Student Lesson: Harvesting the Garden Review



- Anyone can learn how to harvest their gardens.
- Many farms use large machines, like combines, to harvest their crops.
- The bread we buy in grocery stores and bakeries comes all the way from the wheat fields.
- Most of the food we eat is grown on farms.
- Pests, such as weeds, insects, and other animals can damage our gardens and field crops. There are steps you can take to protect your garden from pests.
- You can eat, store, sell, or preserve the foods you harvest from your garden.
- When a farmer decides to grow and sell a crop, he must consider the cost of the seeds, fertilizers and labor (paying people to plant, care, and harvest the crop).
- The farmer needs to charge more money than he spent on growing in order to earn a profit.

## Student Lesson: Harvesting the Garden

### Test Your Knowledge!

1. Carla paid \$0.75 for tomato seeds. It cost her \$10 to care for and harvest them. She produced 30 good tomatoes. Carla decided to sell her tomatoes for \$0.25 each.

A. Total all the money Carla paid out \$\_\_\_\_\_.

B. Multiply \_\_\_\_ good tomatoes by \$0.25 each. \_\_\_\_\_

C. Subtract the money Carla paid out from the money she made selling tomatoes.

$$\begin{array}{r}
 \text{---} \quad \underline{\hspace{2cm}} \\
 \text{=} \quad \underline{\hspace{2cm}} \\
 \hspace{1.5cm} \text{_____ (Answer)}
 \end{array}$$

D. Is Carla making money (profit) or losing money (loss)? \_\_\_\_\_.

2. The softer the fruit or vegetable, the longer it will keep in a cool, dry place.

\_\_\_\_\_ True \_\_\_\_\_ False

3. Your garden has a pest problem. Rabbits keep eating your lettuce crop. How could you keep the rabbits from eating your lettuce?

\_\_\_\_\_.

4. Number the steps in the journey from wheat to bread.

- \_\_\_ Grain Elevator Company
- \_\_\_ Bakery
- \_\_\_ Wheat Field
- \_\_\_ Your Kitchen
- \_\_\_ Flour Mill

## Student Lesson: Harvesting the Garden

### Vocabulary

Expenses - money spent on items needed to make and sell products

Income - money earned from selling products

Loss - money spent on making products that was not earned back after selling them; when expenses cost more money than the income earned (Expenses are GREATER than Income)

Preserve - to can, pickle, or similarly prepare for future use; keep harvested fruits and vegetables from rotting.

Net Profit - money left over from selling products after you've subtracted the costs of labor and care; when expenses cost less money than the income earned. (Expenses are LESS than Income)

Gross Profit - Money taken in before expenses are subtracted.

Combine - A machine that harvests and cleans grain plants. The result is the seed (such as canola or flax) or grain (such as oats, wheat, or rye); a by-product is loose straw, which is the remaining husk of the plant with all of the nutrients removed.

Harvesting - The operation of cutting, picking, plucking, digging, or a combination of these operations for removing the crop from under the ground or above the ground and removing the useful part of fruits from plants.



# Teacher Information for Student Worksheets

## Student Worksheet 1

What is Harvesting?:

This is the introductory page. Students may read to themselves or you may initiate a group discussion around the essential questions.

## Student Worksheet 2

How Do We Harvest What We Grow?

We recommend students take turns reading this page aloud. Place some emphasis on the first question as later there is a review question based on it about harvesting potatoes. The activity at the bottom is designed to be an art project. We also provided the option for students to use their writing skills to describe what their invention looks like and what it does. Suggest your designers create a harvesting machine that can do amazing things! Remind students that their harvester must be able to do the work of many people working by hand.

## Student Worksheet 3-A

What Does Harvesting Have to Do with Me?

Students may read this story aloud or to themselves. Their reading comprehension skills are tested with the questions on the next worksheet.

## Student Worksheet 3-B.

*Bread: The Journey from the Field to Your Table* Questions

The questions ask students to repeat what they have read in the story. Students should answer these questions on their own. The Wheat to Bread Cycle illustration is available at the back of this teacher guide, in a full page size.

Answers:

1. Kernels
2. September
3. June
4. The seeds were from a stronger and healthier kind of wheat that was resistant to plant diseases
5. It would take them a long time to do it by hand
6. D. Answers A and B

## Student Worksheet 4

What Are Some Harvesting Problems?:

This is a review of earlier lessons pertaining to IPM. Students may read this page alone or aloud. The question would be good for a class discussion. Extension activity 3 relates to this page.

Possible answers: Not enough water, poor soil, too little sunlight, too much water, and frost, etc.

## Student Worksheet 5

What Can I Do with the Food I Grew?:

Some students may not be immediately aware of what they can do with harvested food besides eating it as is. Remind them how rare it is for them to eat fruit or vegetables right after they are picked. Most foods are stored or processed. Extension activity 4 relates to this page. We have also included a page with three recipes that give three ways to preserve fruits and vegetables. Remind students that it has only been in recent history that foods have been processed and available in cans and packages, from a grocery store.

Possible answers: The choices are too large to list on this page. Almost all fruits and vegetables that a student may have eaten have been stored and or sold, if they have not been eaten fresh. Any fruit or vegetable that is in a can, jar or frozen has been preserved.

### Student Worksheet 6-A & 6-B.

#### Growing Pumpkins: A Business Lesson:

It is recommended that students do this activity on their own. The dice or coins are used with this page and the next. The purpose of circling the result is to help students keep track of what event happened to their business. They should record the monetary or numerical amount in the accompanying blank to make referencing easier when it comes to the worksheet. Answers will vary based on a roll of a die or flip of a coin. Extension question 1 supplements this activity.

For a discussion question, ask student for reasons why some of them may not have sold all of their pumpkins in step G. Price was too high? Someone stole them? They donated them? They kept them for their own use? Animals ruined them? Some pumpkins rotted before they could be sold?

### Student Worksheet 7

#### From Seed to Pumpkin:

This activity is mainly a math exercise. As long as students are able to work through the mathematics, it isn't critical they remember the business terms (defined in the glossary). Ask the class what students with a loss should do next time. Ask students with a profit what they will do with the money.

Optional: Practice fractions or percentages with a count of how many had a profit or a loss.

### Student Worksheet 8.

#### Review

This page highlights the key concepts found in the lesson. The class should review this page prior to completing "test your knowledge"

### Student Worksheet 9

#### Test Your Knowledge:

This page is recommended for students to complete independently. It may be treated as a quiz or test grade.

#### Answers

1A. 10.75 ( $0.75 + 10$ )

1B. 7.50 ( $30 \times 0.25$ )

1C. - 3.25 ( $7.50 - 10.75$ )

1D. Losing (loss)

2. False

3. Build a fence around the garden. Check for rabbit holes nearby

4. Grain Elevator Company – 2, Bakery – 4, Wheat Field – 1, Your Kitchen – 6, Flour Mill – 3

### Student Worksheet 10

#### Vocabulary

Provided for student reference

# Lesson Supplements



## EXTENSION ACTIVITIES:

1. Give each student a vegetable, or allow him to pick a vegetable from a basket. Have students make animal characters or faces by gluing various horticulture materials (leaves, flowers, sticks, seeds, etc.) onto their vegetables. Students will use their imaginations to create interesting characters. Optional: take pictures of the students' creations - they'll last longer than the vegetables!
2. Go back through the Pumpkin Game, steps A through H. Looking at the possibilities for each step, pick the least favorable event. Refigure the "From Seed to Pumpkin" worksheet to find out the profit or loss for the worst case of events. Do the same for all the more favorable events.
3. Students pick their favorite cereal, snack, or other food product. Have them research what crops their favorite food came from.
4. Students pick a fruit or a vegetable and then research what kinds of animals (including bugs) that like to eat it. Have them either: a) create a plan for preventing/controlling pest damage, OR b) present their findings to the class.
5. Research a commonly grown garden vegetable that may grow an overabundance (like zucchini and tomatoes). Then, have them find a recipe using it as a major ingredient).
6. Three relish recipes are listed on the next page. You may show them to students to give an idea of what goes into making a relish. Relishes are ways to preserve and use the harvest. Note that making relish is for adults, because it involves using the stove. The harvest season may start at a very warm time of the year. Many older homes used a separate summer or harvest kitchen so that the heat of the stove wouldn't make the rest of the house too hot..



## VIDALIA ONION RELISH

- 1 1/2 gal. ground Vidalia sweet onions (14 to 18 med. onions)
  - 1/2 c. salt
  - 1 qt. apple cider vinegar
  - 1 tsp. Turmeric
  - 1 tsp. pickling spice
  - 1 tsp. pimento, chopped
  - 4 1/2 c. sugar
- Grind onions to yield 2 1/2 gallons and 1/2 cup salt, let stand 30 minutes.
  - Squeeze juice from onion-salt mixture and discharge juice.
  - Add vinegar, spices, pimento and sugar.
  - Bring to boil and cook for 30 minutes, stirring often.
  - Pack both onions and cooking liquid to cover in hot pint jars, leaving 1/2 inch head space.
  - Remove air bubbles, wipe jar rims. Adjust lids.
  - Process 10 minutes in a boiling water bath.
  - Makes 8 pints.

## REFRIGERATOR PICKLES

- 6 c. sliced cucumbers
  - 1 c. slice onion
  - 1 c. green pepper (optional)
  - 1 c. vinegar
  - 2 c sugar
  - 1 tbsp. salt
  - 1 tsp. celery seed
- Combine all ingredients; mix well.
  - Place in jar, refrigerate.
  - The pickles will be ready in 24 hours and will keep up to 1 year.

## HARVEST FRUIT RELISH

This cranberry-apple relish can be served during the holiday season right alongside any poultry or turkey dish.

- 2 c. cranberries
  - 2 apples, peeled, cored and chopped
  - 1 c. water
  - 1 c. granulated sugar
  - 1/2 c. raisins
  - 1/4 c. chopped candied ginger
  - 1/2 tsp. ground nutmeg
  - 1/4 tsp. dry mustard
  - 1/4 tsp. cayenne pepper
- In a microwave-safe bowl, combine cranberries, apples, water, sugar, raisins, ginger, nutmeg, mustard and cayenne pepper.
  - Microwave on HIGH for 30 minutes, stirring every 10 minutes.
  - Refrigerate before serving.

Student Lesson: Harvesting the Garden  
What can you do with your harvest?

