Pumpkin Curriculum

Developed for the Glover Outdoor Classroom

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Introduction

The Glover Outdoor Classroom Project received a $1000 grant from the Massachusetts Agriculture in the Classroom Project to construct raised beds for a Farm Garden in the Glover Outdoor Classroom. The long-term goal of the Farm Garden is to teach children how food crops are grown. The first food crop the Glover School planted in these raised beds is pumpkins.

As shown in this guide, the study of pumpkins provides for a rich and varied curriculum. Pumpkins are inexpensive and readily available. They are easy to grow and students can interact with them using all five senses. The science of pumpkins, their use in literature, and the many art and culinary projects you can create allow for integration of several curriculum areas. Pumpkins can bring learning to life.

The following curriculum includes lesson plans for K-5 and covers all curriculum areas. Resources, references, a glossary, key terms and concepts along with sheets that can be photocopied are included. The lessons in this curriculum are meant only as a guide as you explore the Farm Garden with your students.

Why Should Science and Other Subjects Should be Weaved Together ?

Science at the elementary level provides an ideal opportunity for exploration and discovery. Students should have the chance to observe, collect, organize and record data. They should be able to ask questions, learn about "fair tests" and whenever possible, use hands-on materials. In doing so, they learn to process information and apply what they learn to new situations.

Whenever possible, science should not be taught as a separate unit, but in context with other subject areas. Reading, writing, math and communication should be incorporated. Weaving the different subject areas together helps a student clarify the learning experience. The use of the Farm Garden provides students with many opportunities to do just that.

Main Goals of Pumpkin Project

The main goal of this project is to teach students about how crops are grown and about the growth cycle of living things. By growing and studying pumpkins, the students will:

- Experience the process of growing something from seed to harvest,

- Understand and appreciate the life cycle of living things
- Realize the importance of nature (e.g., rain, sun, and soil) in the life cycle of living things
- Appreciate the effort required to care for and nurture crops
- Understand how pumpkins are used as a food crop
- Study the history of pumpkins and their use as food, medicine and decoration
- Get to enjoy the fruit of their labor

Questions that Students Will Investigate (Concept Goals):

The students will attempt to address and answer the following questions:

1. What is a pumpkin? Is it a fruit or vegetable? Why?
2. What is the life cycle of a pumpkin?
3. How do pumpkins compare to other vegetables and fruits?
4. What are the different varieties of pumpkins? How do they differ?
5. How big can a pumpkin get? How small?
6. What are the various uses of pumpkins?
7. What is the history of pumpkins? How were they used in the past? How are they used today?
8. Where do pumpkins grow in Massachusetts?

What Types of Learning Processes Will Students Use (Process Goals)?

During the activities outlined in this guide, students will use many types of educational processes, including:

1. Brainstorming
2. Making predictions
3. Drawing conclusions based on observations and experimentation
4. Data collection
5. Observation
6. Cooperative learning
7. Discussion
8. Creative writing

Skills That Students Will Develop (Skill Goals)

As students do the pumpkin-related activities, they will enhance their skills for:

1. Collecting data
2. Problem solving
3. Computing (calculating percentages, making graphs/charts, doing comparisons)
4. Writing (reflection, presentation, conciseness, creativity)

5. Organization (gathering information and using it to draw conclusions)
6. Observation (using the five senses to gather information)
7. Discussion
8. Listening
9. Drawing as a form of recording data
10. Making oral and dramatic presentations

Lesson One
Life Cycle of a Pumpkin

(Ideas for this lesson from http://www.chias.org//www/edu/mitc/wkshp/pumpkin)

Goals:

To appreciate that all living things have a life cycle
To understand how important the life cycle is in agriculture
To appreciate how an understanding of life cycles in plants and animals helps us to grow food, protect habitats, and help people live longer

Objectives:

Students will:

- ✓ Identify the five stages of a pumpkin's life cycle
- ✓ Create a poster depicting the life cycle of a pumpkin
- ✓ Discuss other life cycles and the importance of a life cycle to survival of a species

Key Terms and Concepts:

Cycle
Seed, plant, flower, fruit
Reproduction
Pollination

Materials:

Life Cycle of a Pumpkin by Ron Fridell and Patricia Walsh (available in the Glover Library)
Large piece of paper or whiteboard, pencils, markers
Seeds
A pumpkin

Introduction:

Brainstorm with your students and ask them what they know about plants and seeds. What happens to a seed after you plant it? How does a fruit or vegetable grow? Write down all their ideas on a large piece of paper or whiteboard.

Ask your students to give you a definition of the word "cycle." Can they think of other words that have the word cycle in them? Again, write all their ideas down. Emphasis the idea that a cycle goes round and round, like the wheel on a bicycle.

Presentation:
Read the book with your students. Stop now and then to discuss the story and the pictures they see. If you do not have the book, then you can use the life cycle cards enclosed.

Life cycles are found everywhere in nature. All plants and animals (including humans), go through stages from birth, to young animal, to adult to finally dying. During our "life cycle" we reproduce and the cycle begins again. If we understand how these cycles work, we can grow food and flowers and protect our habitats. We can study how humans age and make it possible for people to live longer.

Now discuss the life cycle of a pumpkin. A pumpkin begins as a seed and grows into a plant. As a plant, it makes two kinds of flowers, male and female. Bees help pollinate the female flower with nectar from the male flower. After pollination, the flower turns into a small green pumpkin, which gets larger and more orange with time. So the five stages of a pumpkin's life cycle are:

1. Seed
2. Plant (vines that spread out)
3. Flower
4. Green, immature pumpkin
5. Orange, mature pumpkin

From the mature pumpkin, we get seeds to plant to grow new pumpkins, and the cycle begins again.

After looking at the book or having this discussion, have the students make posters or time lines, or create some object to depict the life cycle of a pumpkin. If you are going to make a time line, you can look at the number of days to harvest from the time you plant to help students remember how long it takes to grow a pumpkin. (See attached sheets for ideas.)

Conclusion:
Gather the students together and discuss their posters and charts or timelines. How many different ways did they depict the life cycle of a pumpkin? Hang their pictures around the room.

Ask them to think about animals or plants that are extinct. Can they name a few? What happened to their life cycles?

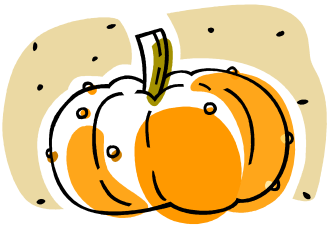
Evaluation:
Can the students identify what a life cycle is?
Were they able to appreciate the "cyclic" nature of a life cycle?
Can they identify the five stages of a pumpkin's life cycle?

Did their drawings or charts depict an understanding of a life cycle?

Extenders for Life Cycle of a Pumpkin:

1. **A Pumpkin Play--**For younger children, a great way to get them to understand a life cycle is to have them create a play about a pumpkin. First discuss the life cycle with them. Then, ask them to think about a story they can make into a play. Children can act out the different parts: farmers, seeds, and pumpkins. The farmer can plant the seeds and pretend to water them. The children that are seeds can then grow into plants, and then into vines. Several children can join together to make a vine. Then, the vines will produce flowers, which will turn into pumpkins. (Some children can pretend to be pumpkins.) You can create words and dialogue or you can have the children act out their parts to music. At the end of the play, you can harvest the pumpkins and sing a song about jack-o-lanterns.

2. **Poems and Stories--**A great way to include literature and writing is to have students write poems or stories about a pumpkin's life cycle. For younger grades, you can write the story together. They can write it from the seed's perspective or from the farmer's perspective. Older students can write a poem or limerick about a pumpkin. Get them to incorporate what they have learned and turn that knowledge into a story or poem or even a song.



Lesson Two
Varieties of Pumpkins

Goals:

Students will learn that pumpkins are vegetables
Students will find out about the many varieties and uses of pumpkins

Objectives:

Students will:

- ✓ Identify the six varieties of pumpkins growing in the Farm Garden
- ✓ Compare the differences between the different varieties of pumpkins

Materials Needed:

Chart (How Do Different Varieties of Pumpkins Compare? Located at the end of this guide) or paper to make charts
Colored markers, pencils or crayons

Key Terms and Concepts:

Leaf size and shape
Texture
Ribs
Variation in size and color

Introduction:

Take a few minutes to review with your students the six varieties of pumpkins we grew in the Farm Garden. (Info sheets are provided at the back of this guide.) You can remind the students that the many different types of pumpkins are called ***varieties.*** With pencil and paper in hand, and working in groups of two, take the students out to the courtyard and ask them to record their observations about the different pumpkins. Have them look at leaf size, growth of the vine, how many pumpkins grew for each type etc. Have them record their observations.

Exploration:

Bring students to the courtyard for this lesson. Working in pairs, have the students make a chart comparing the six varieties. (See chart at the end of this guide—How Do Different Varieties of Pumpkins Compare?) Have them note color, size, shape of leaf, skin texture, number of ribs and any other feature they noticed. They can write or draw their observations depending on

their skill level. It also might be fun for the students to do crayon rubbings of pumpkin leaves, the surface of the pumpkin, etc.

Make sure to point out how the pumpkin vines grew. Which ones grew the most? Which the least? Which pumpkin crop was the largest? Have the students touch the skin of the pumpkins. Is it smooth? Are any rough or bumpy? What about the leaves of the plants? What is the **texture** like? Speak with your students about the meaning of the word texture. Examine the stems of the pumpkins. Is there a smell to the pumpkin leaf or plant?

Have the students count the **ribs** (the lines that move around the pumpkin). Which pumpkin has the most? Which has the least?

Conclusion:
When they are finished, ask the students to compile their observations and thoughts on the chart and have each group share their findings with the rest of the class. You can either make a book of their observations or post them on the walls in the classroom. Save the charts to use later on as you work with your pumpkins.

Evaluation:
Were the students able to work in cooperative groups of two?
Did they demonstrate an understanding of the task by completing the chart and recording their observations?
Did some students draw their findings? Did some write?
Were the groups able to share their findings with the larger class?
Did they add things to the chart you didn't ask them to?

Lesson Three
The Five Senses

Goal:

To appreciate how we use our five senses to come to conclusions

Objectives:

Students will:

- ✓ Work cooperatively in small groups
- ✓ Identify the five senses either orally or in writing
- ✓ Use taste, smell, touch, sound and sight to describe the pumpkin
- ✓ Make an observation journal (see attached ideas)

Materials:

Pumpkins (one whole, one sliced open)
Using Your Senses to Explore Pumpkins (at the end of this guide)
Spoons, paper plates
Pencils, paper, scissors, stapler
Scarves or bandannas for blindfolds
Books on the five senses

Key Terms and Concepts:

The five senses (sound, taste, touch, smell, and sight)
Descriptive words relating to each sense
Blind, deaf, Braille, sign language
Pulp, seed

Introduction:

Begin this lesson by brainstorming with the students. Break the students up into groups of three of four. (For younger groups, you can do this activity as a group.) Ask the students to name the five senses. Write them down as the students name them. If the students are working in smaller groups, they can write them down as they go.

Exploration:

In small groups or in a larger group (depending on how you are running the lesson), talk about the five senses. Ask the students to take a poll among their groups. Which sense do they think is

the most important? Why? Which do they use the most? Talk about what it means to be blind or deaf or both. Ask the students if they know anyone who is blind or deaf. How do people missing one sense compensate with the others? This is a good opportunity to make the students more aware of the challenges blind or deaf people face and how they cope with the challenges. If you have books or examples of sign language and Braille this is a good time to leave them out in the classroom for the students to look at.

Next, have each group work with the pumpkins. Using the uncut pumpkin, ask the students to use their senses and describe the pumpkin. (It's best if they close their eyes when exploring senses of touch and smell.) How does the pumpkin feel, smell, sound? What sense are they using as they come up with a descriptive word? For instance, if they say it is round, ask them what sense they are using (both sight and touch). Have them write down as many words, ideas etc. as they can come up with. You can correct spelling later. Encourage them to sound out the words and help each other.

Then, cut open one or two of the pumpkins. Ask the students to put their hands in the pumpkin and pull out some pulp and seeds (only if they want to). Have them record the sensations. If they will permit you, ask some students to be blindfolded for this part of the lesson. This will give them a different perception of the pumpkin. Again, record their observations.

The observations can be tallied on the sheet called Using Your Senses to Explore Pumpkins (found at the end of this guide).

Conclusions:
Working in groups again, ask the students to cut out the pumpkin shape. (See attached template at the end of this guide.) On one side, there is space for them to draw what they saw. They can draw a whole pumpkin or the seeds or anything else they experienced during the lesson. On the opposite side have them write about what they experienced. For the older students, ask them to write in sentences or a poem. Younger students can just write words.

Have the students gather in a larger group and share their pumpkins with the class.

Evaluation:
Were the students able to identify the five senses?
Did they work well in the smaller groups? Did they share resources?
Were the students able to describe the pumpkin? What was their overall reaction to the lesson?
Were they engaged and did they seek out more information?
Did their final descriptions go beyond saying that the pumpkin is round or orange?

Extenders Using Pumpkin Seeds:
You can use the pumpkin seeds for a variety of activities. (For ideas see the Additional Learning Activities section at the end of this guide.) Take them out of the pumpkin and wash and dry

them. You can roast pumpkin seeds. You might try this with the students or send them home and have a student bring them back. (See recipe in the back of this curriculum.)

Lesson Four
Creating and Testing a Pumpkin Hypothesis (for Grades 3-5)*

(This lesson is based upon ideas from www.sedl.org/scimath/compass.)

*An adaptation for Grades K-2 is found on page 17.

Goals:

Students will:

- ✓ Learn and apply the scientific method
- ✓ Learn how to create and test a hypothesis concerning what pumpkin characteristics (such as weight, height, circumference, and number of ribs) correlate to the number of seeds in a pumpkin
- ✓ Apply estimation skills to project how many seeds are in each pumpkin

Objectives:

Students will:

- ✓ Create a hypothesis about what pumpkin characteristics correlate to the number of seeds in a pumpkin
- ✓ Test their hypothesis by measure the circumference, height, weight, and/or number of ribs of three pumpkins
- ✓ Estimate how many seeds are in each pumpkin
- ✓ Count the seeds in each pumpkin
- ✓ Create a chart outlining their findings
- ✓ Determine the mean of the seed counts, weights, heights, circumferences, and/or number of ribs
- ✓ Make conclusions about whether or not their hypothesis was correct
- ✓ Work in cooperative groups

Materials:

3 pumpkins of the same variety (but of different sizes) for each group (5 students/group)
Data Sheet for Pumpkin Hypothesis Activity (at the end of this guide)
Scale for measuring weight
String and ruler or flexible measuring tape (like those used in sewing)
Instrument to cup open pumpkins
Paper, pencils, markers

Key Terms and Concepts:
Hypothesis
Weight and height
Circumference
Ribs
Average or mean
Predicting, estimating
Division
Correlation

Introduction:
Split your students up into groups of 5. Try to make the groups as diverse as possible. Explain to your students that they will be working with three pumpkins. They will be trying to determine if there is any correlation between the number of seeds in each pumpkin and other variables such as the circumference, the height, the weight and the number of ribs. Do the pumpkins with the largest circumference have the most seeds? Do the pumpkins that weigh more have the most seeds? (This lesson plan can be scaled back for the younger students and be made challenging for the older students.)

The Scientific Method:
The scientific method is the process that scientists use to discover the answer to a question. It involves thinking about possible solutions to the question (or problem) and testing each possibility to find the solution. The scientific method involves the following steps:

1. Problem--Identify the problem (the scientific question to be solved)
2. Hypothesis--State a hypothesis (an idea about the solution to the problem)
3. Procedure-- Design and perform experiments to test the hypothesis
4. Conclusions--Reach a conclusion (Summarize the results and state how they relate to the hypothesis. Is the hypothesis correct? Why or why not?)

Exploration:
Give each group their pumpkins. Give them time to "play" with the pumpkins. Have them label the pumpkins (1, 2, 3 or A, B, C etc.) Record this information.

Attached you will find an experiment form for the older students. You can give them this form and spend some time going over it. These are the steps involved:

Problem or Question—In this case, the problem will be the same for everyone: Is there is any correlation between the circumference, height, weight and/or the number of ribs of the pumpkin and the number of seeds in the pumpkin?

Hypothesis--Have the students make a hypothesis. Remember that the hypothesis is a statement that they believe might be a possible solution to the Problem. Examples might be: "I believe that the heaviest pumpkin will have the most seeds" or "I believe that the pumpkin with the most ribs will have the most seeds." Explain to them that it is okay if their hypothesis is not correct. The point is to experiment and gain experience when looking at a problem.

Project Design and Testing—The next step is to test their hypothesis (do tests to find out if the hypothesis is correct or not). You can give each group a copy of the Data Sheet for Comparing Pumpkins chart (found at the end of this guide) to use to record their data or you can ask the students to organize the information and create their own chart to record the information.

The steps that the students can use to test their hypothesis may include the following (depending on what their hypothesis is). For example, if they think that the number of pumpkin seeds correlates to circumference, they would only need to measure circumference and count the seeds. Possible steps might be:

- Test the Weight--Pick up the pumpkins and guess which is the heaviest? The lightest? Then they can weigh the pumpkin and record the data in their charts.
- Test the Height and Circumference--Measure the height and circumference of the pumpkins. Have them use yarn or string and then transfer the string to measure against a yardstick or ruler (or use a flexible measuring tape). Is the heaviest pumpkin the one with the largest circumference? Record the results.
- Observe the ribs on the pumpkin.
- Estimate the number of seeds in each pumpkin. Will the heaviest or lightest have the most? Hollow out the pumpkins and then count the seeds in each one. Record the results.
- Calculate the mean of all the calculations and record them on the chart.

Conclusion: Summarize the results relevant to the student's hypothesis and draw a conclusion. Does the data support the hypothesis? In other words is the hypothesis correct or not? Why or why not?

Conclusion:
Have each group present their results. What were the findings? Post the charts and compare data.

Evaluation:
Did the students grasp the concept of the scientific method?
Did they have trouble making a hypothesis?
Were the students able to draw conclusions based on their findings?
What new things did they discover?
Were the students able to work in groups?

Extenders:

There are many other questions that you can explore as extensions to this activity. For instance, is there a relationship between the weight and circumference? Do bigger pumpkins have bigger seeds? Does the original seed size determine the ultimate size of a pumpkin?

Worksheet for Pumpkin Hypothesis Activity

Student's Name:_____

Step 1: Question or Problem (What are you trying to find out?)
Is there is any correlation between the circumference, height, weight and/or the number of ribs of the pumpkins and the number of seeds in each pumpkin?

Step 2: Hypothesis (Your idea of a possible solution of the question)

_____

_____

_____

Step 3: Procedure (What will you do to test your hypothesis?)

1. _____

2. _____

3. _____

4. _____

5. _____

Step 4: Summarize Results and Make a Conclusion (Make a chart to show your results. Was your hypothesis correct? Explain.)

Creating and Testing a Pumpkin Hypothesis

Grades K-2

This is an adaptation for the younger grades (K-2). The goals and objectives are the same, but you can alter the activity to the appropriate age of the students.

You should attempt to teach the students the same vocabulary. Explain to them what a hypothesis is and how scientists use them to come to make new discoveries. You can only use one variable if you like. For instance, you might find out the relationship between the weight of a pumpkin and the number of seeds. You might choose to use only two pumpkins with the younger grades, or you can use the circumference instead of the weight.

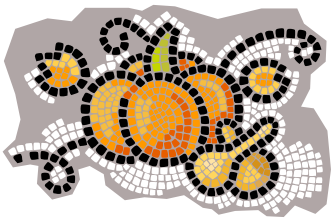
At the end of this guide, you will find a chart they can use to record information (Data Sheet for Pumpkin Hypothesis Activity). Encourage the students to sound out words as they spell them.

To measure the circumference of the pumpkin, give the students string and have them wrap it around and then cut it. Then have them use a familiar object to measure the length of the string (blocks, unifex cubes, shoes, pencils, crayons, etc). Have them record this information in the chart.

You can do the same thing to measure the weight of the pumpkin if you do not have a pound recording scale. Have them use a balance scale and weigh it using items they are familiar with. (A liter of soda, a bag of sugar, blocks, books, etc). Then, if you do have a pound recording scale you can with the items to find out how much the pumpkin weighs in pounds.

Be sure to write down the all the new vocabulary words you discuss on a large piece of paper or on the white board, or you can add them to a word wall. Encourage your students to make a science journal (see learning activity later in the curriculum).

Lesson Five



Comparing Pumpkins to Other Fruits and Vegetables

(Ideas for this lesson came from Teacher Created Materials, 1989)

Goals:

To compare and contrast pumpkins to other fruits and vegetables
To appreciate how pumpkins grow
To understand how Venn diagrams are used to show similarities and differences

Objectives:

Students will:

- ✓ Make Venn diagrams to compare and contrast pumpkins to other fruits and vegetables
- ✓ Use Venn diagrams to compare and contrast other objects of their choice
- ✓ Construct a large Venn diagram bulletin board
- ✓ Identify three vegetables and three fruits
- ✓ Discuss the difference between a fruit and vegetable

Materials:

Pencils, paper, markers or crayons
Colored string or yarn to make Venn diagrams for younger children
Some examples of fruits and vegetables

Key Terms and Concepts

Venn diagrams
Compare and contrast
Similarities and differences
Fruit
Vegetable

Introduction:

Put out a few examples of fruits and vegetables. Some good examples to use would be apples, bananas, potatoes, carrots, cucumbers, and pumpkins. Ask the students the difference between a fruit and a vegetable. Write down all their ideas. Older students can do research on the Internet or using books.

How are Fruits and Vegetables Defined? Sometimes determining the difference between fruits and vegetables is not as straightforward as it seems. Botanists define f**ruit** as the matured ovary of a flower which contains a seed or seeds. After fertilization takes place, the embryo begins to develop around the ovule and becomes the fruit. Using this definition, tomatoes, cucumbers, pumpkins, squash, beans, eggplant and green peppers are all technically considered to be fruit.

Vegetables are considered to be edible roots (like carrots), tubers (like potatoes), stems (like celery), leaves (like lettuce), fruits, seeds (like peas), flower clusters and other softer plant parts. The term "vegetable" is a broader word (not created by botanists). Typically, customs, culture and usage determine how we distinguish between fruits and vegetables. For instance, from the common grocery store perspective, we tend to use the word fruit with respect to fruits eaten as desserts and not to items cooked or used in salads (like tomatoes).

Exploration:
You are going to use a Venn diagram to help students show relationships between objects. A Venn diagram consists of overlapping circles. In the overlapping part, you list the similarities between the objects. In the other parts, you list the objects own unique characteristics. "Venn diagrams are used in mathematics to show relationships between sets. In language arts, Venn diagrams are useful for examining similarities and differences in characters, stories and poems. " (http://www.sdcoe.k12.ca.us/score/actbank/tvenn.htm). They are great tools for helping students organize their thoughts and ideas.

Make a large Venn diagram on the white board or on a large piece of paper. Start by comparing two girls or boys in the class (or a boy and a girl.) Pick two that have similar traits (hair color or eye color) so you can put those in the middle. Then fill up the outer space with their differences. See example at the end of the guide. Now, work with the pumpkins. Take a pumpkin and a strawberry or a pumpkin and a cucumber. An example Venn diagram is shown at the end of the guide.

You can also make big Venn diagrams using string or tape on the floor and compare many different objects.

Conclusion:
Have your students go home and interview several people they know. Ask them if they know the difference between vegetables and fruits. Can they name some of both? Ask the students to record their findings and share them with the class. Have the students make up Venn diagrams of their own choosing. Hang them about the room.

Evaluation:
Can the students use Venn diagrams as intended?
Do they help your students organize their thoughts?

Additional Learning Activities Using Pumpkins

Determine the Volume of a Pumpkin
Have your students determine the volume of a pumpkin. What is volume? How do we measure volume? (Volume is the amount of space occupied by or contained in something.) How would we measure the volume of a hollowed out pumpkin? What units do we use to measure volume? Have your students find examples of volume measurements in the supermarket or at home.

Sink or Float
Do pumpkins sink or float? What other objects sink and float? Does a pumpkin float when it is full or when it is hollow or both? What makes objects float or sink? Does a pumpkin float with the stem up or down? You can use the scientific method to study these questions (students can form and test their hypotheses).

Decaying Pumpkins (from http://www.educationworld.com/a_lesson/lesson028.shtml)
Read the book Mousekin's Golden House, by Edna Miller. After reading the story, place a hollowed out pumpkin in a secure, sealed place (like an empty aquarium) and record what happens each day.

Science Journal
Have your students make a science journal by stapling a few pages of paper together. Younger students can decorate a cover. During the year, as you work on various concepts, they can add new words, drawings, ideas, and conclusions to the journal.

Pumpkin Poems (from Teacher Created Materials, 1989)
Have students write poems about pumpkins. Supply the first line of a poem or a story. Start as a larger group and then break up into smaller groups to make poems, stories and pictures. One common form to use when writing is !) title (one word), 2) describe the title (two words), 3) describe an action (three words), 4) describe a feeling (four words), and 5) refer back to tile.
For example: Pumpkin
Funny face
Looks and grins
Happily spying for goblins
Jack o Lantern

Where do Pumpkins Come From?
Have your students explore the history behind pumpkins. Get a map of Massachusetts and the U.S. and determine where pumpkins grow. Have the students interview local farm stand workers and ask where they get their pumpkins. Have them explore the history of the Jack o Lantern. (A good resource is http://www.urbanext.uiuc.edu/pumpkins/history.html.)

Roast Pumpkin Seeds
Spread pumpkin seeds on a cookie sheet. Bake at 350 degrees until brown. Salt if desired. Let the children eat the roasted pumpkin seeds, and ask them to describe the seeds. How do they taste, smell, look, feel etc.? You can use the Using Your Senses to Explore Pumpkins sense matrix to have them record their observations. How are the cooked seeds different from the raw seeds?

Pumpkin Recipes
There are many great recipes and uses for pumpkins in the book *Kids's Pumpkin Projects Planting and Harvesting Fun (*available in the Glover Library).

Pumpkin Toss
Take a few pumpkins of different sizes and line them up. Give the students rings that will fit over the pumpkin and have them toss the rings and try to get them to go over the pumpkins. You can do this activity with older students and have them record the number of attempts and the number of successes for each student. They can compile these numbers to determine the average number of throws and successful "rings." You could also do this as a bean bag toss using hollowed out pumpkins.

Make a Pumpkin Seed Viewing Chamber
It will take 8 to 10 days for a pumpkin seed to become a young plant. For most of the time, the seed is growing down making roots. To observe this process, you can make a root view chamber. All you need is potting soil, pumpkin seeds, a half gallon milk carton, acetate or clear plastic, waterproof glue, and a wooden block or book.

To make your root view chamber:

1. Cut off the top of the milk carton. Rinse with soap and water.
2. Cut out a window or flap on one side of the carton, leaving the flap attached at the bottom.
3. Cut acetate to cover the window and glue it inside the container.
4. Loosely pack the soil to one inch below the top.
5. Plant one seed, flat side against the top center of the window, one inch deep.
6. Place a block of wood or book under the back bottom edge of the carton so the window tips toward the ground. This encourages the roots to grow close to the window for easy viewing.
7. Keep the flap closed except for viewing times.

8. Check periodically to make sure the soil is moist.
9. Check on the chamber often to observe the roots growing.
10. Keep a daily drawing journal of your observations.

Math Facts Review (From Teacher Created Materials, 1989) See attached sheet on making a math review pumpkin.

Math Facts Book
Younger children can make a number book. Cut out construction paper in the shape of a small book. Put a picture of a pumpkin on each page or have the students draw one. Then have them count out one seed and paste it on the first page. They can write the word one and make the number "1". Then on the next page, do two seeds, etc. You can make this harder by having them count by multiples of 2 or 3.

For older children, you can make a math fact book by putting addition or subtraction problems on each page and then have them write the answer and count out the number of seeds.

You can also set the seeds out on the table and play math games with them. Have the students group them in groups of 2 or 5 or 10. How many groups can they make?

Seed Pictures
Use pumpkin seeds to make pictures. For instance, the studetns could make shapes like squares, rectangles, circles, triangles, etc. Have the students write the words on the bottom of the pictures.

You can also make pattern books. Count out seeds and make patterns 2,1,2,1,or 3,3,2,2,3,3. You can make pattern shapes or numbers etc.

Explore Pumpkins with Jeweler's Loupes and Microscopes
Use the jeweler's loupes and/or microscopes (stored in the Glover Library) to explore pumpkins and all their parts (vines, leaves, pulp, seeds, etc.) up close. Have the children draw what they see.

Pumpkin Facts

1. Pumpkin flowers are edible.

2. Pumpkins are members of the vine crops family called cucurbits.

3. Pumpkins originated in Central America.

4. Pumpkins are 90% water.

5. The name pumpkin originates from the Greek word “pepon” – large melon.

6. Native Americans roasted long strips of pumpkins in an open fire.

7. In Colonial times, pumpkins were used as an ingredient for the crust of pies, not the filling.

8. The original pumpkin pie, during Colonial times, was a pumpkin, its’ tip sliced off, seeds removed and filled with milk, spices and honey. This was baked in hot ashes.

9. Native Americans flattened strips of pumpkins, dried them and made mats.

10. Native Americans called pumpkins “isoquotm squash.”

11. Native Americans used pumpkin seeds for food and medicine.

Source: http://www.urbanext.uiuc.edu/pumpkins/facts.html**.**

Pumpkin Books in the Glover Library

(Partial List)

1. *Life Cycle of a Pumpkin*, Ron Fridell and Patricia Walsh. 2001.

2. *Kids' Pumpkin Projects*. Deanna Cook. 1998. Copies of this excellent resource can be found on the Outdoor Classroom Teacher Resource shelf in the Glover Library.

3. *Pumpkin Soup*. *Helen Cooper.*

4. *The Pumpkin Book.* Gail Gibbons.

5. *Pumpkin Pumpkin. Jeanne Titherington.*

6. *Pumpkin Circle.* George Levenson.

7. *Pumpkin Circle Video.* George Levenson. (We showed this video to all Glover students last spring during the pumpkin planting.)

8. *Mousekin's Golden House.* Edna Miller.

Glossary

Circumference: The measurement completely around a round object
Diameter: Straight line passing through the center of a circle
Fruit: The matured ovary of a flower, containing a seed
Hypothesis: An idea or proposition formed and used to find out information
Life Cycle: The process plants and animals go through from birth as a seed or young animal to growing up to adult and finally dying
Pollination: To place pollen on a flower
Seed: The fertilized ovule of a plant and its covering. Seeds contain a miniature plant capable of independent development into a plant similar to the one which produced it.
Varieties: The different types of pumpkins
Vegetable: The edible roots, tubers, stems, leaves, and other softer parts of plants
Venn Diagram: Tool used to show relationships. It is made up of two or more overlapping circles.

Bibliography

1. *Gardening with Children*. Beth Richardson and Lynn Karlin. 1998. Taunton Press.

2. *In a Pumpkin Shell*. Jennifer Storey Gillis. 1992. Storey Communications.

3. *Gardening*, National Garden Association, Complete Guide. 1986

4. *Life Cycle of a Pumpkin*. Ron Fridell and Patricia Walsh. 2001. Heinemann Library.

5. *Kids' Pumpkin Projects*. Deanna Cook. 1998. Williamson Publishing. Copies of this excellent resource can be found on the Outdoor Classroom Teacher Resource shelf in the Glover Library.

6. *Foods the Indians Gave Us*. Wilma and Vernon Hayes. 1973. Ives Washburn Inc. New York.

7. *American Indian Food and Lore – 150 Authentic Recipes*. Carolyn Mythmaker. 1974. MacMillan Publishing Co., New York.

8. *Teacher Created Materials*. 1989.