

**CURRICULUM CONNECTIONS**

# **GRADE 1 MODULE**



# GRADE 1 MODULE

**Lesson #1** Growing Plants in your classroom

**Lesson #2** Recognizing Greenhouses

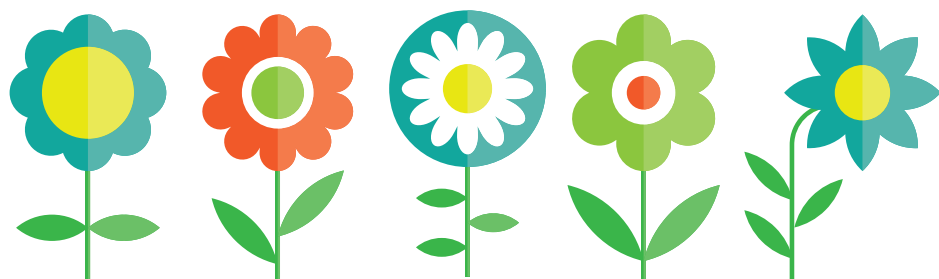
**Lesson #3** Building a Flower Garden

## Introduction

Grade 1 is such an exciting year for young students, especially with its emphasis on the local environment, learning about the methods associated with scientific analysis, and applying skills and knowledge to students' personal experiences. Trying to understand how things work in their local area is a natural pathway for students. Creating a sense of excitement related to inquiry and exploration is the key to getting young minds in tune with the environment, its characteristics, needs and issues.

Depending upon their background, students will bring a variety of personal and cultural experiences to the classroom; drawing on students' prior knowledge and encouraging engagement both inside and outside the classroom is a key step to a fuller understanding of science and technology and their roles in our lives.

The natural environment of the school and the community is the perfect launching pad for learning through hands-on experiences.



## Curriculum Expectations

The science curriculum expectations for grade 1 provide many opportunities for hands-on experiences for students. Some of these expectations include:

- Identify personal action that they themselves can take to help maintain a healthy environment for living things, including humans;
- Describe changes or problems that could result from the loss of some kinds of living things that are part of everyday life (e.g., if we lost all the insects, all the bats, all the trees, all the grasses), taking different points of view into consideration;
- Identify the physical characteristics (e.g., size, shape, colour, common parts) of a variety of plants and animals (e.g., sunflowers are tall, with a long stalk, leaves, and big, round, yellow flowers with hundreds of seeds);
- Describe how showing care and respect for all living things helps to maintain a healthy environment (e.g., leaving all living things in their natural environment; feeding birds during cold winter months; helping to plant and care for plants in the gardens that attract birds and butterflies; caring for the school and the school-yard as an environment);
- Assess the impact of daily and seasonal changes on human outdoor activities (e.g., farming, gardening, swimming, skating, playing soccer) and identify innovations that allow for some of these activities to take place indoors out of season (e.g., greenhouses allow farming and gardening to happen in cold weather).

# LESSON #1

## Growing Plants in your Classroom



### Lesson Overview

Growing plants in the classroom can help students to appreciate the role that flowering plants can have on our lives by setting up a mini-garden in the classroom; obviously, this is probably most suited to a springtime activity, but it could be carried out at almost any season as long as the conditions in the classroom are favourable. It will help students to answer questions such as:

- What are some of the living things we see every day? Which are plants? What makes them important to our environment?
- What are some of the things we can do to show that we care for living things and appreciate what they do for us and for the environment?
- What can we do to keep our environment healthy – at home, at school, and in the community?

### Curriculum Expectations

Through these experiences, students will:

- identify the physical characteristics (e.g., size, shape, colour, common parts) of a variety of plants and animals;
- describe how showing care and respect for all living things helps to maintain a healthy environment (e.g. helping to plant and care for plants).

### Background Information

Some of the suggested flower seeds that tend to grow quickly include nasturtium, morning glory and sunflower. However, others may also be used. (Wisconsin fast plant).

Some teachers may wish to use “growing spheres” to illustrate the process of seed germination; this should be a demonstration only. The spheres are widely available and there is even a YouTube video which illustrates the process. The spheres are found under a number of different names such as Jelly Marbles, Ghost Eyeballs, or simply “Growing Spheres”. The crystals are placed in water and expand to up to 300 times. Students love the slippery feel of the spheres. They can be used in a variety of ways including starting seeds. Because they diffract light at the same angle as water, they are virtually invisible when placed in water. They are recyclable – simply let them dry out and re-use them. When ordering, order the large size; there are fewer in a package but are much easier for little hands to handle.

# LESSON #1

## Growing Plants in your Classroom



### Lesson Plan

This does not follow the traditional path of a lesson plan, but merely identifies some of the things that the teacher should do to develop a small “garden” in the classroom. Many schools in urban areas may have little space and teachers may have had limited exposure to growing plants. Keeping it simple will ensure success.

Some suggestions for a small “garden” in the classroom :

- Use peat pots to plant the seeds; often, teachers use potting soil, but using peat pots to start the seeds will help to guarantee success for the students by optimizing moisture content and air availability. Once seeds are germinated it is beneficial to transfer the entire plant, in the peat pot, into a larger container containing soil. If you are not using peat pots, have containers with at least 8 cm of depth (3”) to allow the roots to grow. Containers should have holes in the bottom to allow water to drain.
- Do NOT give each student a seed to grow; this exercise is more successful if groups of students are given a number of seeds (a larger number than the number of students in the group).
- Beside the window is NOT the best place to germinate seeds and grow small plants. Typically, seeds do not need light to initially germinate but should be moved somewhere bright once the seedling emerges. A general rule is to start the seeds somewhere warm but grow seedlings cool. Putting the seed trays on top of a water heater or refrigerator will keep the soil warm.
- Seeds need to be constantly moist to germinate. Moisten the soil before planting. After the planting, cover the container with plastic wrap to slow evaporation.
- Check on the seeds daily for signs of germination and remove the plastic wrap as soon as a sprout is visible.
- Make sure that your seeds/seedlings have enough light; lack of light will cause the seedlings to “stretch” to find light and become “spindly”. 12 – 14 hours of light for growth and 8 hours of darkness to process their food. Seedlings will be pale and weak if they have not had enough light.
- Consider using growing spheres for a few seeds to show students how roots develop (paperwhite narcissus bulbs are really good for this). Growing spheres are available from some educational suppliers, some florists and floral accessory stores, and even occasionally in “dollar” stores. As well as for this project, they have a myriad of other uses ... and, are re-useable.

# LESSON #1

## Growing Plants in your Classroom



### Assessment Suggestions

Use the following as a basis for assessment of student progress, applying the knowledge and skills as appropriate for the class.

Category	Level 1	Level 2	Level 3	Level 4
	The Student			
Knowledge of how to plant and care for a flower in the classroom	Demonstrates limited knowledge of the processes related to planting and growing a seed to develop a plant	Demonstrates some knowledge of the tools, materials and processes related to planting and growing a seed to develop a plant	Demonstrates considerable knowledge of the tools and materials required and the processes involved in planting a seed and having it develop into a plant	Demonstrates thorough knowledge of the types of seeds that grow well, how to plant, the tools and materials required and the processes involved in plant development
Observing, performing and recording, gathering evidence and data.	Demonstrates limited ability in using skills of observation and recording data	Demonstrates some planning skills with some effectiveness	Demonstrates considerable effectiveness in planning and processing the skills related to the task	Demonstrates a high degree of effectiveness in using processing skills and strategies related to the task

# LESSON #2

## Recognizing Greenhouses

### Lesson Overview

Many students, particularly those in urban environments, may not have had much contact with greenhouses. This simple lesson will give them an introduction to structures and the materials that are used to make simple structures and will help to deal with some of the curriculum expectations related to structures as outlined in the curriculum expectations develop by the Ministry of Education.

### Curriculum Expectations

#### Students will:

- Describe objects as things that are made of one or more materials
- Describe structures as supporting frameworks
- Identify the materials that make up objects and structures
- Describe the properties of materials that enable the objects and structures made from them to perform their intended function.



# LESSON #2

## Recognizing Greenhouses



## Background Information

### Flowers in an Artificial Environment - How Greenhouses Work

Greenhouses create an artificial environment, sheltered from the "outside" environment that may be too cold, too hot or too variable for the growing of plants. Greenhouses use their glass enclosures to trap solar radiation; the radiant heat enters through the glass or plastic covering and warms the air, soil and plants inside. This warm air rises and is replaced by cooler air that in turn is warmed up; this cycle raises the temperature quickly. The heat created by the plants and from the soil is "trapped" by the glass. Sometimes, the air inside can be overheated and has to be vented out. As you drive by a greenhouse, you may see the glass panels on top open to vent out the warm air vertically. Venting can also occur horizontally through side fans and vents. The venting also keeps the air in the greenhouse moving, allowing for a more even temperature throughout and cycling the carbon dioxide that plants need to grow. Most modern greenhouses have automated systems to regulate the temperatures inside.

The "heat" which is generated often comes from the sun. However, in really cold climates, heat is added to the air or to the soil.

In addition to the "heat component", plants in greenhouses also require water. Many greenhouses use an automated irrigation system to keep the growing media moist and flowering plants supplied with needed water. Hydroponic systems supply water directly to the roots on a more frequent basis.

Although a greenhouse may appear to be a simple structure, the key components of any human-made structure are present; in a greenhouse, these include ....

- a strong foundation,
- a sturdy frame to maintain the glass (or plastic) panels,
- flooring that varies from simple dirt to concrete, wood or stone,
- "glazing" - glass or other synthetic covering to allow in solar radiation and to help to provide insulation,
- a system for irrigation of the plants and flowers.

A virtual tour of a greenhouse is provided on the website; this is an alternative to going to a greenhouse which can be costly and time-consuming for the teacher and students. Since greenhouses are working operations, there are insurance considerations as well. This virtual tour will help you and your students to understand more about these structures and the plants grown in them.

# LESSON #2

## Recognizing Greenhouses



### Teacher Preparation and Materials

This lesson focuses on a number of different structures. Photographs are provided at the end of this lesson to illustrate the structures in the left-hand column and the item in the right-hand column.

You can reproduce these photographs and ask the students to link a photograph from Group A (left-hand column) and Group B (right-hand column).

Photographs of different types of structures and people or things associated with them. Please feel free to adjust the number of photographs used ... but please use the photo of the greenhouse and the plants as one of the pairs of photographs.

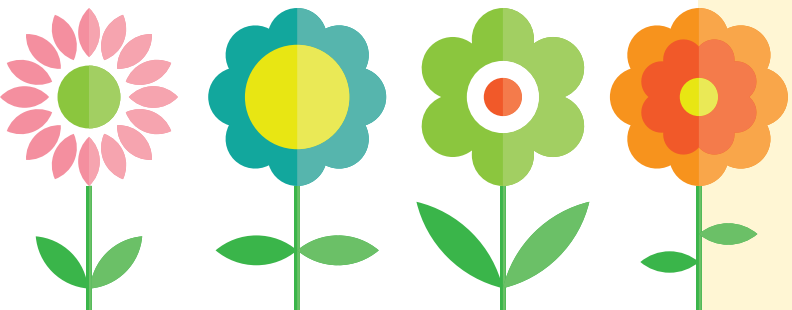
GROUP A	GROUP B
Greenhouse	Plants
House	Family
Firehall	Fireman or Firetruck
Garage	Car to be fixed
Apartment	Family
Doghouse	Dog
International Space Station	Astronaut
Ship	Captain of a ship
School	Teacher

### Questions

1. Identify the main material(s) used to build the structures in Group A.
2. How is the person or thing from Group B connected to the structure in Group A (for example ... the family lives in the apartment).
3. What are the main materials used in the building of the greenhouse?
4. Why is the building called a GREENhouse?
5. What things are grown inside a greenhouse?
6. How do greenhouses help us to enjoy potted plants and flowers throughout the year?
7. Greenhouses are usually made of glass or plastic. Why do you think this material is used?
8. The greenhouses in the photographs are large and used by companies to grow flowers and potted plants all year round. What materials would we need to build a small version of the greenhouse in the school yard? What would we need to put inside the greenhouse in order to grow plants there?

# LESSON #3

## Building a Flower Garden



### Lesson Overview

Building a flower garden will enable students to develop both knowledge and skills related to the needs and characteristics of living things.

Building a flower garden will help students to learn about the value of these spaces, and the significance of pollinators such as birds, bees, butterflies, bats, beetles, and flies as well as other natural forces such as wind.

### Curriculum Expectations

#### Students will :

- Identify personal action that they themselves can take to help maintain a healthy environment for living things, including humans;
- Describe changes or problems that could result from the loss of some kinds of living things that are part of everyday life (e.g., if we lost all the insects, all the bats, all the trees, all the grasses), taking different points of view into consideration;
- Identify the physical characteristics (e.g., size, shape, colour, common parts) of a variety of plants and animals (e.g., sunflowers are tall, with a long stalk, leaves, and big, round, yellow flowers with hundreds of seeds;

Describe how showing care and respect for all living things helps to maintain a healthy environment (e.g., leaving all living things in their natural environment; feeding birds during cold winter months; helping to plant and care for plants in the gardens that attract birds and butterflies; caring for the school and the school-yard as an environment).

### Background Information

Building a flower garden on the school property – or as part of a garden at home – can be a very meaningful experience for students. There are many different organizations that can provide initial assistance in terms of actually building a sustainable flower garden. These include:

Canadian Gardening  
[canadiangardening.com](http://canadiangardening.com)

Gardening Know How  
[gardeningknowhow.com](http://gardeningknowhow.com)

Better Homes and Gardens  
[bhg.com](http://bhg.com)

Flower Gardening Made Easy  
[flower-gardening-made-easy.com](http://flower-gardening-made-easy.com)



# LESSON #3

## Building a Flower Garden



### Teacher Preparation and Materials

Background information about types of flowers and the value of flowers will help students understand the importance of a flower garden, particularly in an urban setting. For the amateur home gardener, the rewards of growing flowers can be both recreational and emotional. Growing flowers is one of the most popular pastimes – from “urbanites” who grow flowers in window boxes to individuals growing house plants, to individuals or groups of people developing a garden in a vacant lot.

Flowers are considered as symbols of both grace and elegance; as well as being used for birthday and religious holiday presents and wedding adornment, flowers are used to cheer up people who are ill and are often used at funerals. What makes them so attractive in these many situations is their beauty and fragrance; consequently, people who grow flowers can benefit greatly from their results. Recent studies from Rutgers University have shown that flowers have a significantly larger effect on happiness than previously thought, suggesting that if you want to be happier, having flowers in your life is one possible way.

### Gardens & Pollinator Health

Flowers are probably any garden's best friend! Not only do they add beauty and colour to a garden area or to a newly planted area, but they also play an important role in the overall health of plants.

The flower, of course, is the reproductive organ of a plant. Following pollination, it produces even more seed so that more of the same plant will grow in the future. The nectar and pollen produced by the flower is what is eaten by many insects – especially bees, but also birds and bats. A “pollinator-friendly” flower garden provides an opportunity for us to help to turn around the loss of pollinator habitats and promote the health and vitality of all manner of pollinators. A well-planted and maintained flower garden will attract beneficial insects including pollinators, but also ones that eat other harmful insects; for example, lacewings and ladybugs are helpful in reducing the number of aphids in a garden.

It is difficult to overestimate the importance of pollinators to our society. Not only do bees pollinate flowers, but they are also significant for our food supply. Although much of our grains are pollinated by the wind, it has been estimated that bees perform nearly 80% of all pollination on a global scale. A single bee

colony may visit up to 250 000 flowers each day. They are also important for the pollination of vegetables, fruits and nuts.

In recent years there has been a decline in the number of bee colonies world wide, including in Canada. It is not yet evident what the exact cause of these pollinator problems is, however, it is likely a combination of several different factors including parasites, weather, disease, pesticides, in-adequate nutrition and a loss of habitat. It is with the problem of declining habitats that you too can help. With increasing urbanization, parks and backyard gardens often become the sole source of food for pollinators in urban areas. A small pollinator garden in every back yard would go a long way towards restoring pollinator populations across the province.

In summary, then, the development of a flower garden may be of real significance to the restoration of bee colonies in the area. In a small way, a flower garden could be an individual's contribution to the continuance of a vibrant agricultural economy in this province. A garden of diverse flowers will provide the bees with a habitat that provides both pollen and nectar to feed the bees themselves and the hives in which they live. For an easy to use guide to pollinator friendly flowers, please visit <http://www.flowerscanadagrowers.com/pollinator-poster>

# LESSON #3

## Building a Flower Garden



### Where to Plant?

Flower gardens can be planted at the school, at home, or in association with local community gardens. One of the problems associated with school gardens is proper care during the hot (and often dry) summer months.

### When to Plant?

Plan, Plan, Plan ...

Teachers are encouraged to research the growing of flowers and identify what is needed. This is especially important when developing a flower garden for the first time. The websites identified in this section are particularly helpful in terms of providing guidance for the actual development of the garden site. Although not overly complicated, the emphasis still remains on the need to plan for the garden well in advance.

Most sites recommend beginning the development of a flower garden in the late summer or early fall for planting the following spring. This lends itself well for the school year – “build” the garden site in the fall and plant the flower gardens in the spring of the same school year.

### What to Plant?

Some of the best flowers for both beauty and usefulness include marigolds, nasturtium, chamomile, morning glory, sunflower and Wisconsin fast plant. A full list of pollinator friendly flowers, as well as helpful tips, is available at <http://www.flowerscanadagrowers.com/pollinator-poster>.

### How to Plant?

When the garden has been established, seeds should be sprinkled loosely on top of the soil, watered lightly and covered with a shallow covering of soil using either hands or a small rake. Try and keep the soil loose (not compacted down) as this will allow excess water to drain away after some has been absorbed by the seed. Seeds need water to germinate! This is the critical element for a garden. Too much water will encourage the growth of mould and fungus and can also “drown” the roots of the plant.

How to tell if seeds need water is the most difficult part of the growing process ... but it can be quite simple. Poking a hole about 2 – 3 cm deep should indicate the amount of water in the soil. If the soil at the bottom is dry, it needs more water.

# LESSON #3

## Building a Flower Garden



### The Size of the Garden

The preparation for this “lesson” and the materials required will vary tremendously with the commitment to develop a flower garden either for the school or for a home setting. Size, of course, will be a major consideration as the garden could be anywhere from a “mini-garden” made up of several flower pots to a large plot. If the flower garden is to be in a home setting, an area of 1 metre x 1 metre might be a good size for the students. It can, of course, be attached to a vegetable garden and can be beneficial for vegetables in that the flowers will attract pollinators.

On average, honey bees can travel up to 8 km to find food. If we build more gardens in our communities, the more bees will be fed. Several factors can affect the health of honey bees including:

- the weather (long cold winters)
- parasites (the varroa mite)
- viruses
- pesticides
- INADEQUATE NUTRITION
- Monoculture food sources (food diversity is important for pollinators)
- Loss of Habitat

By planting a diverse flower garden, individuals can help to keep the bee population of Canada healthy; this, in turn, has tremendous advantages for agriculture.

A new diverse flower garden can have a tremendous influence on the way students perceive their local environment, and may help students to understand the significance of flowers and the “creatures” that pollinate our flower gardens.

### Where can I get help?

There are many different organizations that can provide initial assistance in terms of actually building a sustainable flower garden. These include:

**Canadian Gardening  
Gardening Know How  
Better Homes and Gardens  
Flower Gardening Made Easy  
Bees Matter**

**[canadiangardening.com](http://canadiangardening.com)  
[gardeningknowhow.com](http://gardeningknowhow.com)  
[bhg.com](http://bhg.com)  
[flower-gardening-made-easy.com](http://flower-gardening-made-easy.com)  
[beesmatter.ca](http://beesmatter.ca)**