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**PlantWatch**

# Teacher's Guide

by Elisabeth Beaubien



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by Elisabeth Beaubien

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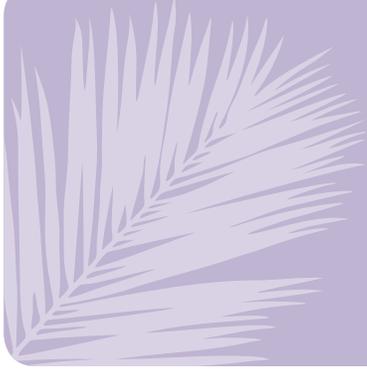
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## Introduction to PlantWatch

### HOW TO USE THIS TEACHER GUIDE:

1. Read the introduction.
2. Select a likely plant species for observation (see list of indicator plants following).  

This will ideally be a plant species that can be found within a 5-10 minute walk of the school, so that it can be checked at least every 2 days by students.
3. Read the plant description.
4. See the key activities and the observation form to get ready for blooming season.
5. Check the activities and select which ones may suit the students' level/ interests.

### YEAR AT A GLANCE

*(all the following can be done in springtime, but it is better to spread the stages out)*

#### In the fall:

1. select a plant to observe
2. select activities to work on with the class
3. print the species' description and review with students
4. locate plants near school and tag up to 5 numbered individuals (e.g. 5 saskatoon or lilac shrubs, or 5 patches of dandelions)

#### In late winter:

1. for poplar, test branches in water to ensure trees are males, not females
2. determine latitude/ longitude for the tagged plants, and record other environmental details concerning their position

3. register for PlantWatch, and record your observer number

#### In spring:

1. check plants every 2 days once flower buds start swelling
2. become familiar with the definitions of first and mid bloom (and for some plants, leafing) for your selected plant
3. *optional*: do sketches, or take photos of the same plant or branch before, during and after bloom
4. check your chosen plants: when first bloom happens, note date, weather for week before flowering, etc. (see the observation form in Key Activities, page 22) and report on the web observation form using your registration number
5. do the same when mid bloom occurs
6. check the web to see your school's data posted in tables and maps, as well as other observers' data
7. know that your contributions to this environmental monitoring network are greatly appreciated!

### WHAT IS PLANTWATCH?

PlantWatch is a phenology program.

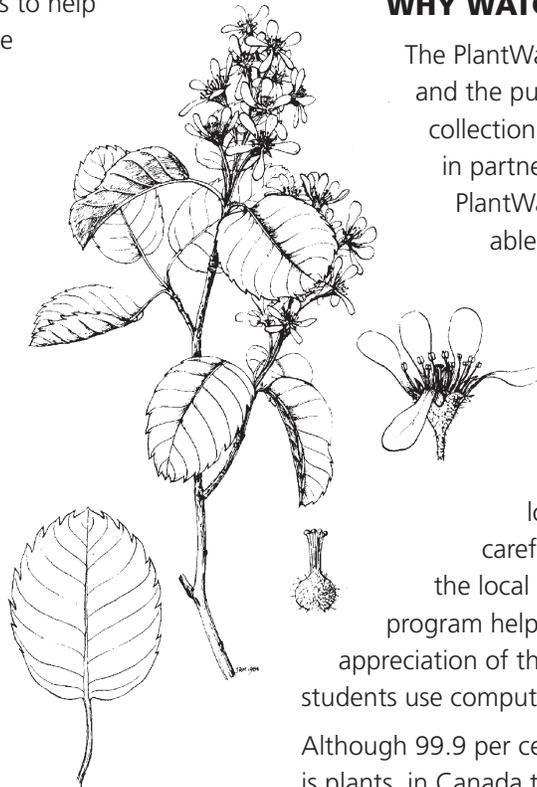
Phenology is the study of the seasonal timing of events in the lives of plants and animals. This program links students and the public as "eyes of science," tracking the green wave of spring. Observers select one or more of the key indicator plants and report their bloom times using the Internet. These flowering dates are posted in tables and maps on the PlantWatch website.

The purpose of this Teacher Guide is to help teachers involve their students in the PlantWatch program. Most of the contents have been written for teachers, but can be used directly in class. This guide provides information on how to observe and report flowering dates. Curriculum connections for each activity for every province and territory for science and math are described in an appended chart on page 98.

### ABOUT PLANTWATCH

The PlantWatch program began in 1995, based at the Devonian Botanic Garden, a research and educational facility of the University of Alberta. This internet citizen science program was an offshoot of a longer-running phenology program, the Alberta Wildflower Survey, which began in 1987. The program has been renamed "Alberta PlantWatch".

The program has expanded rapidly. In 2001, Environment Canada, Nature Canada, and E. Beaubien partnered to develop a national PlantWatch program. Most provinces and territories now have volunteer coordinators. Common plant species that are useful indicators across much of Canada have been identified as well as regionally-relevant plant species. This teacher guide was written over the years 1996-2001 for PlantWatch, then updated to better help classes across Canada in 2009.



**Saskatoon**  
DEVONIAN BOTANIC GARDEN,  
UNIVERSITY OF ALBERTA

Alberta survey

### WHY WATCH PLANTS?

The PlantWatch program engages students and the public as active participants in the collection of scientific data. By working in partnership with research scientists, PlantWatch students and teachers are able to contribute their observations to the development of new scientific knowledge.

The process of scientific inquiry here is linked to an important real-life issue: the effect of climate change on local plant life. By encouraging careful observation of plants within the local environment, the PlantWatch program helps students develop a lifelong appreciation of the natural world. It also helps students use computers in a meaningful way.

Although 99.9 per cent of all living material on earth is plants, in Canada there are very few people who specialize in studying native plants. We need to show more students the excitement of plant biology to encourage future work on the challenges facing our forests, prairies, and tundra!

To be useful as key indicator species for spring phenology, selected plants must have certain qualities. These include: perennial growth, widespread distribution, ease of recognition by the public, lack of look-alike species and a short spring bloom period.

There are 38 species tracked through the PlantWatch program. For this teacher guide we have included information on 16 plant species. Two species below (lilac and dandelion) are plants introduced to North America when settlers from Europe arrived. The others are native<sup>1</sup> (or wild) plant species, which means they were here long before the settlers arrived.

<sup>1</sup> Many terms or words in this guide are defined in the glossary (Appendix 2).

We suggest that a teacher and class begin PlantWatch by selecting one of the following plants, or other PlantWatch species, for observation. Check the map or text on distribution with each plant description on the PlantWatch website ([www.plantwatch.ca](http://www.plantwatch.ca)) to see which indicator plants are observed in your province or territory. A full list of PlantWatch species and the provinces/territories in which they are monitored is shown in Appendix 1.

### The Indicator Plants

#### **Aspen poplar** (*Populus tremuloides*)

tree, widespread across Canada. Flowers very early in spring.

#### **Bearberry** (*Arctostaphylos uva-ursi*)

low shrub, across Canada, prefers sunny sites on infertile dry soils. Flowers early.

#### **Bunchberry/Crackerberry** (*Cornus canadensis*)

herb, found in boreal or broad-leaved forests. Flowers later.

#### **Cloudberry/Bakeapple** (*Rubus chamaemorus*)

herb, low arctic, moist tundra

#### **Cranberry/Partridgeberry/Lingonberry**

(*Vaccinium vitis-idaea*)

herb, distributed across Northern Canada.

#### **Dandelion** (*Taraxacum officinale*)

introduced herb, common in lawns, disturbed areas

#### **Dryad, white/White mountain avens**

(*Dryas octopetala/integrifolia*)

mat-forming low shrub, arctic and alpine tundra. White dryad prefers open sunny areas.

#### **Labrador tea** (*Rhododendron groenlandicum*, *Ledum groenlandicum*)

shrub, grows in damp areas in boreal forest.

#### **Larch/Tamarack** (*Larix laricina*)

tree, across Canada, common in wet muskegs and forests. Flowers early, but after aspen.

#### **Lilac, Common Purple** (*Syringa vulgaris*)

cultivated shrub, common in gardens

#### **Prairie Crocus** (*Anemone patens*)

herb, occurs in sandy soils in the west and northwestern parts of the continent, often in open pasture that has never been ploughed. It is a harbinger of spring, often starting bloom the same time as the aspen.

#### **Saskatoon/Serviceberry** (*Amelanchier spp.*)

tall shrub, across North America, often found along the sunny edges of forest

#### **Saxifrage, purple** (*Saxifraga oppositifolia*)

herb, arctic-alpine, found high in the mountains or arctic tundra. Purple saxifrage is one of the earliest blooms to appear after the snow.

#### **Starflower** (*Trientalis borealis*)

herb, common in Eastern Canada. Found on the coniferous forest floor.

#### **Strawberry, Wild** (*Fragaria virginiana/vesca*)

herb, across Canada

#### **Trillium, White** (*Trillium grandiflorum*)

herb, deciduous forests in eastern North America

Participants can observe those native plants in their gardens or wherever they occur.

### HOW IS THE DATA USED?

The timing of flowering and leafing in spring is largely in response to how warm the weather has been before these events. Studies have been started to see how much warmth (measured in heat units) is needed to get different plant species to flower. Spring phenology data for plants is essential to help answer the question, "With the predicted global warming, is spring arriving earlier?" Some exciting trends have already been discovered. In Edmonton, Alberta the flowering of aspen poplar trees is happening about a month earlier now than it did a century ago!

**By collecting long-term phenology data, we can track plant responses to changes in climate.**

Phenology can also help farmers more accurately time their activities. As plants and insects are both

developing in response to spring temperatures, it will be very useful to use bloom times to predict the best timing for control of pests. By treating weeds or insect pests at their most vulnerable stage, farmers can be more effective and boost their profits while minimizing environmental impacts. Research scientists have begun to look at the link between flowering times and the appearance of agricultural pests such as woolly elm aphids (which infest the roots of saskatoon plants) and grasshoppers (which consume cereal crops and rangeland).

PlantWatch's flowering information can also help ranchers protect rangeland and maintain maximum plant growth. For example, the best time in southern Saskatchewan to put cattle on the range is when wild rose starts to flower, usually 50 days after prairie crocus appears.

In addition, foresters can use the data to correctly time seed-collection field trips, or to treat insects with a biological control. Spring flowering dates can help wildlife managers by answering such questions as, "Will the deer population increase this year?" We know

that in the aspen parkland, more deer fawns survive in years with early springs. In the field of human health, pollen warnings can help those with allergies prepare in advance. For tourism and parks departments, these flowering dates can be used to predict the best times to photograph flowers, or to predict the behaviour of bears and other animals whose movements depend on the growth stage of their plant food. Because plant and insect development are linked, bloom times can even provide information on when to go fly-fishing!

### **PARTICIPATION IS FREE**

There is no charge to participate in PlantWatch. The PlantWatch website has all the basic information on how to participate, register, recognize plants and flowering stages, and how to report when the plants bloom. New flowering dates are posted in tables and maps.

Interested teachers please visit: [www.plantwatch.ca](http://www.plantwatch.ca)

There you will find contact details for your territorial or provincial coordinator, who can provide more information.

JOIN US FOR PLANTWATCH! ANYONE IS WELCOME TO PARTICIPATE.



Grasshopper  
ISTOCKPHOTO.COM

As plants and insects are both developing in response to spring temperatures, it will be very useful to use bloom times to predict the best timing for control of pests.

## Quick Reference Table to Curriculum Links by Activity and Grade

	NWT/ NUNAVUT	BC/YUKON	ALBERTA	SASK.	MANITOBA	ONTARIO	QUEBEC	ATLANTIC
<b>Activity</b>	<b>Grades with Curriculum Links (of Gr. 6, 7, 8)</b>							
<b>Key Activity 1</b>	None	None	None	None	6, 7	7	None	6
<b>Key Activity 2</b>	7	None	7	6, 7, 8	6, 7	6, 7, 8	Cycle 3, Sec. I	6, 7
<b>Key Activity 3</b>	6, 7	7	7	6, 7, 8	6, 7	6, 7,	Cycle 3, Sec. I	6, 7
<b>Key Activity 4</b>	6, 7	6	6, 7, 8	6, 8	6, 7, 8	6, 7	Cycle 3, Sec. I, Sec. II	6, 7
<b>Key Activity 5</b>	6, 7	8	7	8	None	6, 7, 8	Cycle 3, Sec. I, Sec. II	6, 7, 8
<b>Key Activity 6</b>	7	6	7, 8	6, 8	6, 7	6, 7, 8	Cycle 3	6, 7, 8
<b>Science 1</b>	6, 7	6, 7	7	6, 8	6, 7	6, 7	Cycle 3, Sec. I	7, 8
<b>Science 2</b>	6, 7	6, 7, 8	6, 7, 8	6, 8	6, 7, 8	6, 7	Cycle 3, Sec. I	6, 7, 8
<b>Science 3</b>	None	None	None	6, 7	None	None	None	None
<b>Science 4</b>	7	6, 7, 8	6, 7	6, 8	7	6, 7	None	7
<b>Science 5</b>	6	6, 7, 8	None	Ga	None	6, 7	Cycle 3, Sec. I	6, 7
<b>Math 1</b>	6, 7, 8	6, 7, 8	6, 7, 8	6, 7, 8	6, 7, 8	6, 7	Cycle 3, Sec. I	6, 7, 8
<b>Math 2</b>	7	7	7	6, 7, 8	6, 7	6, 7, 8	Cycle 3	6, 7, 8
<b>Math 3</b>	6, 7, 8	6, 8	6, 7, 8	6, 8	6, 7, 8	6, 7, 8	Cycle 3, Sec. I, Sec. II	6, 7, 8
<b>Math 4</b>	7	7, 8	7	6, 7	6, 7	7, 8	Cycle 3	6, 7, 8
<b>Social Studies 1</b>	7	7, 8	7	6, 7, 8	6, 7	6, 7	Cycle 3, Sec. I	6, 7, 8
<b>Social Studies 2</b>	7	None	7	None	6, 7, 8	6	None	6, 7
<b>Social Studies 3</b>	None	8	6	6, 7, 8	6, 7, 8	None	Cycle 3, Sec. I	6, 7
<b>Language Arts 1</b>	6, 7	6, 8	6, 7	6, 7, 8	6, 7, 8	6, 7, 8	Cycle 3, Sec. I	6, 7, 8
<b>Language Arts 2</b>	7	None	6, 7	6, 7	6, 7	6	Cycle 3, Sec. I	6

