

Invasive Plant Field Guide Page

Grade levels: 4, 5, and 7

Area of Learning: Science

Duration: 1 – 2 class periods

Description: Students will create a page for a unique field guide for their classroom.

Learning Objectives:

- Students learn the difference between native, introduced, and invasive plant species.
- Students will learn to recognize some invasive plant species.
- Students learn the harmful environmental, social, and economic effects of invasive plants.
- Students engage in discussions about biodiversity, habitat loss, impacts on natural resources, impact on their own lives and places.
- Students use their senses and tools to measure the plant and identify characteristics.

Directions:

1. Discuss the difference between native, introduced, and invasive plants. Use examples of animals that they know; for example, elephants and tigers vs. bears and cougars. Which animals belong here? Introduce the concept of native and invasive plants with similar examples they might recognize.
2. Select an invasive plant from your region and make a page for a *Local Invasive Plant Field Guide*.
 - Fill in the 'Invasive Plant Guide' page with the information requested:
 - Draw a picture of the plant and include its colour, size, shape, where it came from, where it is found, how it spreads or disperses its seeds, how many seeds it produces a year, if it has any predators or pests that feed on it, and what native species and environments it impacts. Also include any safety hazards that the plant might possess: e.g. if it has spines or burrs, if its sap is toxic or dangerous to touch.
4. In your new field guide page, include examples of what to do if you find the invasive plant species.
5. When everyone has completed their page, compile all the pages together into a booklet and make a Field Guide for your area.

Extensions and alternatives:

1. If the season is right, take students outside to inspect plants and fill in the information in their guide.
2. Alternatively, substitute drawing with digital media or pressing live plant specimens.
3. Add additional information to your field guide: maps of known areas; look-alike species; traditional First Nation use (if any); interesting facts.
4. Once the pages for the field guide have been completed, develop, compile and publish a field guide (e.g. using a computer program to scan/insert/layout each page and print them).
5. Invite a local First Nation member to discuss the impacts of invasive species on their community.

Materials Needed

- Paper
- Magnifying glasses and measuring rulers
- Markers or pencil crayons
- Information and photos about invasive plants (either a field guide or from the internet, live specimens, etc.)

INVASIVE PLANT GUIDE

| | |
|---|---|
| Common name: | Scientific name: |
| Sketch of plant: | Leaf or bark rubbing: |
| Identifying characteristics (eg: flower colour, type of fruit, shape of leaves and seeds, how seeds spread): | Where it likes to live (eg: shady areas or direct sunlight, damp or dry areas, on the coast or in the mountains): |
| What it needs for survival (eg: temperature range, type of soil – acidic or basic, amount of water & sunlight): | |
| Predators or pests that feed on it: | Native species or environments that it impacts: |
| Safety hazards (eg: spines, burrs, if it's sap is toxic): | Directions on what to do if you find this plant and how to remove it: |

Example Field Guide Pages

Taken from the "Invasive Plants of the Thompson-Nicola Region of BC" field guide.



Spotted Knapweed (*Centaurea biebersteinii*)

SK CENT BIE

Biennial to short-lived taprooted perennial growing to 1.5 metres tall.

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
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| <i>Larinus minutus</i> | | | Overwintering Adult | | Adult | Adult/larva | Larva/pup | Adult | | Overwintering adult | | |
| <i>Cyphodeonus achates</i> | | | Overwintering | Larva | Pupa | Pupa/adult | Adult | | | Overwintering | | |



Distribution

Found extensively throughout the Southern Interior.

Quick ID

Pinkish-purple flowers.

Grayish-green stems and leaves.

Floral bracts have brown, triangular tips with comb-like fringe.

Seed head persists until following year.

Interesting Facts:

Exudes a chemical called catechin into the soil, which prevents the germination of neighboring plants.



Piper, G. "Larinus minutus." Photo. Noxious Weed Control Board. 10/03/2008. 23/01/2013. <<http://www.spokanecounty.org/WeedBoard/content.aspx?c=1462>>

Manual Treatment: Cutting, mowing, or pulling spotted knapweed before the plant sets seed can be effective on a local basis for small populations. However, spotted knapweed seeds can remain dormant in the soil for long periods, so follow-up treatments will be required to make sure the plant has been controlled. Attempt to remove the entire root system so the plant will not re-sprout from the crown or remaining roots.



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| Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
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Flowers: One pinkish-purple (sometimes white), urn-shaped flower head, comprised of 30 to 50 disk flowers, develops on the end of each stem branch.



Leaves and Stems: Coarse; covered with translucent resin dots and fine hairs. First year basal rosette has deeply-lobed leaves. Flowering stalks with deeply-lobed, alternate leaves grow from rosette in second year. Short, narrow upper-stem leaves. Stems on mature plants have many branches. Bitter to taste.



Seeds: Brownish or black seeds, 3 mm long. Seeds are notched on one side of the base and have a short tuft of bristles at the tip. A single plant can produce up to 40,000 seeds.

Roots: Deep, stout taproot that helps plant compete for water and nutrients.

Reproduction and Dispersal: Primarily by seed. Seeds that do not germinate form a seed bank in the soil and may remain viable for eight or more years.

Habitat Preference: Found in disturbed areas, fields, roadsides, and other open areas. Prefers well-drained, light textured soils that receive summer rainfall and ample sunlight. Does not tolerate dense shade.



Piper, G. "Cyphocleonus achates." Photo. Noxious Weed Control Board. 10/03/2008. 25/01/2013. <<http://www.spokanecounty.org/WeedBoard/content.aspx?c=1462>>

Curriculum Connections

Grade 4

BIG IDEA:

All living things sense and respond to their environment.

LEARNING STANDARDS:

| Curricular Competencies | Content |
|--|---|
| <p><i>Students are expected to be able to do the following:</i></p> <p>Questioning and predicting</p> <ul style="list-style-type: none">• Demonstrate curiosity about the natural world• Observe objects and events in familiar contexts• Identify questions about familiar objects and events that can be investigated scientifically• Make predictions based on prior knowledge <p>Planning and conducting</p> <ul style="list-style-type: none">• Suggest ways to plan and conduct an inquiry to find answers to their questions• Safely use appropriate tools to make observations and measurements, using formal measurements and digital technology as appropriate <p>Processing and analyzing data and information</p> <ul style="list-style-type: none">• Experience and interpret the local environment• Sort and classify data and information using drawings or provided tables. <p>Evaluating</p> <ul style="list-style-type: none">• Make simple inferences based on their results and prior knowledge• Identify some simple environmental implications of their and others' actions <p>Applying and innovating</p> <ul style="list-style-type: none">• Contribute to care for self, others, school, and neighbourhood through individual or collaborative approaches• Co-operatively design projects <p>Communicating</p> <ul style="list-style-type: none">• Represent and communicate ideas and findings in a variety of ways, such as diagrams and simple reports, using digital technologies as appropriate | <p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none">• sensing and responding:<ul style="list-style-type: none">– humans– other animals– plants• biomes as large regions with similar environmental features |

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| <ul style="list-style-type: none"> Express and reflect on personal or shared experiences of place | |
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| Big Ideas – Elaborations | SCIENCE Grade 4 |
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Sample questions to support inquiry with students:

All living things sense and respond to their environment.

- How do invasive plant species respond and adapt to their environment?
- How do native plants sense and respond to invasive plants?
- What will happen to an ecosystem/biome if invasive plant species are allowed to take over?

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| Curricular Competencies – Elaborations | SCIENCE Grade 4 |
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- Questioning and predicting:** Order is a pattern that can be recognized as having levels—big to small, simple to complex—or as a process with a sequence of steps.
Key questions about order:
 - How is order apparent in the adaptations of invasive and native plants in BC?
 - How does the order of seasons impact local plants and animals?
- Place:** Place is any environment, locality, or context with which people interact to learn, create memory, reflect on history, connect with culture, and establish identity. The connection between people and place is foundational to First Peoples perspectives of the world.

Key questions about place:

- How does what you know about place affect your observations, questions, and predictions?
- How does understanding place help you analyze information and recognize connections and relationships in your local environment?
- How does place connect with stewardship?
- How can you be a steward in your local environment?

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| Content – Elaborations | SCIENCE Grade 4 |
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- humans:** e.g., the five senses
- plants:** e.g., response to light, touch, water, gravity, pollution, etc.
- biomes:** biomes are regions grouped by similar temperature and precipitation (e.g., climate: long-term weather patterns)
 - terrestrial biomes
 - aquatic/marine biomes
- local First Peoples perspectives:** teachings and stories about the sun and the moon

Grade 5

BIG IDEA:

Earth materials change as they move through the rock cycle and can be used as natural resources.

LEARNING STANDARDS:

| Curricular Competencies | Content |
|--|---|
| <p><i>Students are expected to be able to do the following:</i></p> <p>Questioning and predicting</p> <ul style="list-style-type: none">• Make observations in familiar or unfamiliar contexts• Identify questions to answer or problems to solve through scientific inquiry• Make predictions about the findings of their inquiry <p>Planning and conducting</p> <ul style="list-style-type: none">• Choose appropriate data to collect to answer their questions• Observe, measure, and record data, using appropriate tools, including digital technologies• Use equipment and materials safely, identifying potential risks <p>Processing and analyzing data and information</p> <ul style="list-style-type: none">• Experience and interpret the local environment• Identify First Peoples perspectives and knowledge as sources of information | <p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none">• local types of earth materials• First Peoples concepts of interconnectedness in the environment• the nature of sustainable practices around BC's resources |

Big Ideas – Elaborations**SCIENCE**
Grade 5

Sample questions to support inquiry with students:

Earth materials change as they move through the rock cycle and can be used as natural resources.

- How do we interact with water, rocks, minerals, soils, and plants?
- How can we act as stewards of our environment?

Curricular Competencies – Elaborations**SCIENCE**
Grade 5

- **Questioning and predicting:** A system is a set of interacting or interdependent pieces or components that come together to form a whole. A system occupies a physical or a temporal space within a set environment, has a representative form, and possesses a purpose or function.

Key questions about systems:

- How can you observe the concept of interconnectedness within ecosystems in your local area?
- **Secondary sources:** secondary sources of evidence could include anthropological and contemporary accounts of First Peoples of BC, news media, archives, journals, etc.
- **Place:** Place is any environment, locality, or context with which people interact to learn, create memory, reflect on history, connect with culture, and establish identity. The connection between people and place is foundational to First Peoples perspectives of the world.

Key questions about place:

- How does place influence your ability to plan and conduct an inquiry?
- How do the place-based experiences and stories of others affect the ways in which you communicate your findings and other information?
- Ways of knowing refers to the various beliefs about the nature of knowledge that people have; they can include, but are not limited to, Aboriginal, gender-related, subject/discipline specific, cultural, embodied and intuitive beliefs about knowledge. What are the connections between ways of knowing and place?

Content – Elaborations**ARTS EDUCATION**
Grade 5

- **earth materials:** include mineral, rock, clay, boulder, gravel, sand, soil – demonstrate how invasive species use these to move.
- **interconnectedness:** everything in the environment is one/connected (e.g., sun, sky, plants and animals) and we have a responsibility to care for them.

Grade 7

BIG IDEA:

Earth and its climate have changed over geological time.

LEARNING STANDARDS:

| Curricular Competencies | Content |
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| <p><i>Students are expected to be able to do the following:</i></p> <p>Questioning and predicting</p> <ul style="list-style-type: none">• Formulate alternative “If...then...” hypotheses based on their questions• Make predictions about the findings of their inquiry <p>Planning and conducting</p> <ul style="list-style-type: none">• Observe, measure, and record data (qualitative and quantitative), using equipment, including digital technologies, with accuracy and precision <p>Processing and analyzing data and information</p> <ul style="list-style-type: none">• Experience and interpret the local environment• Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information• Construct and use a range of methods to represent patterns or relationships in data, including tables, graphs, keys, models, and digital technologies as appropriate• Use scientific understandings to identify relationships and draw conclusions <p>Evaluating</p> <ul style="list-style-type: none">• Demonstrate an awareness of assumptions and bias in their own work and secondary sources• Consider social, ethical, and environmental implications of the findings from their own and others’ investigations <p>Applying and innovating</p> <ul style="list-style-type: none">• Contribute to care for self, others, community, and world through personal or collaborative approaches <p>Communicating</p> <ul style="list-style-type: none">• Express and reflect on a variety of experiences and perspectives of place | <p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none">• First Peoples knowledge of changes in biodiversity over time• evidence of climate change over geological time and the recent impacts of humans:<ul style="list-style-type: none">– local First Peoples knowledge of climate change |

Big Ideas – Elaborations**SCIENCE
Grade 7**

Sample questions to support inquiry with students:

Evolution by natural selection provides an explanation for the diversity and survival of living things.

- Why do living things change over time?
- How do these changes affect biodiversity?

Earth and its climate have changed over geological time.

- How and why have Earth and its climate changed over time?
- How do people and their practices impact Earth and its climate?

Curricular Competencies – Elaborations**SCIENCE
Grade 7**

- **Ways of knowing:** Ways of knowing refers to the various beliefs about the nature of knowledge that people have; they can include, but are not limited to, Aboriginal, gender-related, subject/discipline specific, cultural, embodied and intuitive beliefs about knowledge.
- **Place:** Place is any environment, locality, or context with which people interact to learn, create memory, reflect on history, connect with culture, and establish identity. The connection between people and place is foundational to First Peoples perspectives of the world.

Key questions about place:

- How does place inform your questions and inquiries?
- How does place influence your ability to plan and conduct an inquiry and make predictions about outcomes?
- How does your understanding of place affect the ways in which you collect evidence and evaluate it?
- As you consider the significance, worth, or value of an outcome or finding, how can you show different ways of knowing?
- How can your understanding of place influence project designs?
- How do the place-based experiences and stories of others affect the ways in which you communicate and collaborate?

Content – Elaborations**SCIENCE
Grade 7**

- **survival needs:** all organisms need space, food, water, and access to resources in order to survive
- **climate change:** change in climate affects:
 - the interconnectedness of plants and animals, and their local environment
 - e.g., changes to harvesting dates, changes to schedules due to early/late ripening and runs, lowered water levels in creeks, rivers and lakes, change in humidity impacts the ability to preserve salmon, etc.
- **impacts of humans:**
 - humans are capable of changing Earth's landscape, climate, and systems
 - efficacy of sustainable practices
- **local First Peoples knowledge of climate change:** oral history, change in traditional practice (e.g., the timing of harvest has been impacted by climate change), etc.