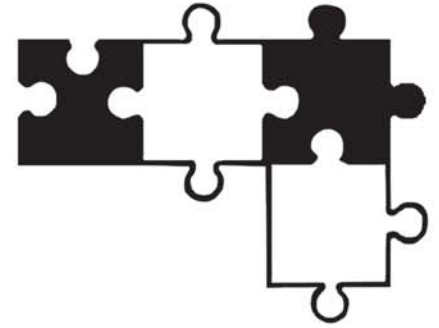


ACTIVITY 12



What About Weeds?

Activity:

Students discover weeds during a field hike: identification, characteristics, and adaptive functions of weeds. They will also consider the impact of weeds on crop yields.

Curriculum Fit:

Grade 1 Science:

- Classify some common local plants and animals into groups on the basis of visible characteristics; e.g., adaptations for survival, such as claws, beaks, prickles.
- Identify examples of plants and animals that are normally under human care (domesticated) and those that are normally independent of human care (wild).

Grade 4 science:

- Describe common plants, and classify them on the basis of their characteristics and uses

Agriculture Concepts:

Production, processing and marketing systems

Cognitive Level:

Application, Analysis, Synthesis

Materials Required:

For Introduction to the Activity:

- a wildflower and a flowering weed

For the Activity:

- cardboard (8 1/2" X 11" approx)
- stapler
- flag tape
- marker
- 2 pilons
- magnifying glasses
- rulers
- small bags
- sticky photo album paper, or plain paper and clear wide tape
- activity sheets (sample provided)

For the Conclusion:

- paper
- Weed Identification Resource Sheets
- permanent markers

Time Required:

Four or five class periods.



Background — For the Teacher

What is a weed? A weed could be any plant that is growing in an area you don't want it to be.

Weeds take up nutrients, light, space and moisture intended for other plants. A serious problem in agriculture is the continual invasion of crop fields by unwanted pioneer species, which we call "weeds." Weeds will compete with monoculture crops unless they are controlled with herbicides, biological control, or other management strategies.

Weeds are an agricultural concern because they reduce a farmer's crop yield or cause harvest or seed contamination problems. It is important for students to realize that weeds threaten the source of livelihood for farmers.

This lesson should allow students to understand the concerns weeds bring to agriculture. The activity will be an opportunity for the students to observe weed characteristics and their adaptations, namely that they are hardy plants that can survive and, indeed, compete with key crops. Understanding weeds is the first step towards understanding crop protection.

The field hike component of this lesson allows students to become aware of what it is about a weed that makes it so difficult for farmers to control.

Procedure

Preparation

1. Obtain one flower and one flowering weed. Bring both into the classroom potted in soil.
 2. Obtain a video, a selection of slides or pictures featuring weeds (see "Resources").
 3. Choose an area best suited for a field trip. Refer to the Teacher Resource Sheet for possible locations of weeds.
 4. Stake out a path for students as an awareness stretch using pilons or tape.
 5. Gather materials together to be used for the field hike. The students should only have to bring a pencil and eraser. The sheets of cardboard will be used for the backs of writing pads onto which paper and student data sheets will be secured with staples. Cut the flag tape into strips (long enough to tie to a weed) and write each student's name on one strip.
 6. Copy Student Resource Sheets. Have sheets of paper and clear, wide tape or sticky album pages on hand.
-

NOTE

Students could design their own data and research sheets using the same headings.

7. Duplicate enough copies of the Weed Resource Sheets for class use. You may require an additional resources on weeds depending on the weeds in your area.

****RECOMMENDED RESOURCE:**

"Weeds of the Prairies" Agdex 640-4
(see Resources section at end of activity)

Introduction

8. Introduce the lesson by showing the flower and flowering weed. Ask the students to look at both plants carefully and pick which one they think is the weed. Discuss with the students the question "what is a weed?"
9. Brainstorm with students about weeds and write up a list of all the characteristics of weeds.
10. After brainstorming, take the ideas the class has given and divide them into categories with a common heading based on what the students have brainstormed. Use the leading questions suggested below to help find distinguishing features of weeds. These questions should promote more ideas and discussion. It is important that the discussion prepares the students for the field trip and following activities.



Leading Questions:

- What do weeds look like?
- Where do weeds grow?
- What characteristics should a weed have?
- What do weeds need for continual survival?
- When do weeds grow?
- What do weeds compete with?
- Why are weeds a concern to farmers?
- How would you spot a weed?
- What weeds have you seen or know of?
- How could you decide if a plant is a weed or not?
- Why do we not want weeds in our garden, lawn or crops?- Are there different types of weeds?
- Why would a horticultural plant suddenly become a weed?

11. Show a video or a selection of slides or pictures featuring weeds. Discuss the importance of knowing and understanding more about weeds.
12. Students are made aware of the field trip and its activities. The students will be discovering a weed, investigating it, collecting data on it, and later bringing it back to class to be pressed.
13. Expectations and rules of behaviour are clearly explained to students. Students need to bring a pencil and eraser. The material gathered for the field hike will be taken with you and distributed at the site of exploration.

Activity

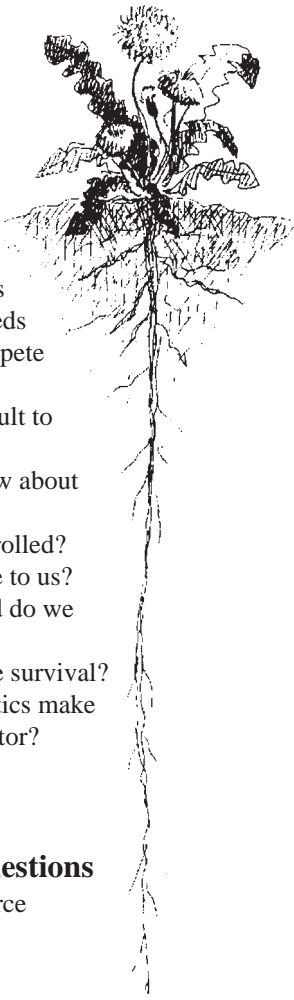
14. The field hike begins on the route you have pre-planned. At the marked points on the awareness stretch, students are given the task to see how many weeds they can spot before reaching the end marker just before the next area to be explored.
15. Upon reaching the selected area of weeds, further instructions are given. The students are to find a weed of their choice. When they have selected their weed, they receive their named flag to be tied to the weed and their data sheet with a writing pad. The students are instructed to identify their weed.
16. Have students notice the texture, smell, color, size and shapes of the different parts of the weed. Make available magnifying glasses, rulers and your assistance. The students are expected to decide on a name for their weed, write a description of the weed so others would be able to identify it, and lastly draw the weed and its surrounding area noting where they found it.



17. After the data sheet has been completed, students should return the completed sheet with the writing pad to you. They will be given a bag in which they can put their weed to take back to class. The students should be careful when pulling their weed not to break or destroy it. It might be wise to pull the weed up for them.
18. Collect all the materials distributed and return to the classroom. You might choose to return to the school on a different path than you came to encourage greater awareness of other weeds in the area and provoke questions.
19. Have students press the weeds they have collected. Distribute clear wide tape and paper or sticky photo album pages for pressing the weeds. The weed is placed on white paper and clear wide tape is carefully put over the entire weed sealing it to dry through the back of the paper. If sticky photo pages are used, the students simply place the weed in between and make sure the clear page fits over the weed and seals it. Place these pressed weeds in a safe place to await drying.
20. If time remains, a discussion of the field activity is a good idea.

Conclusion

21. Students identify their weed using the Weed Resource Sheets or other resource material. The identified name should be written on the pressed weed specimen with a permanent marker.
22. Hand out the Student Research Sheet and read through it. Students will be expected to research their weed using the Weed Resource Sheets or other supplementary materials. Through research, the students will gain information on habitat, description, agricultural concern and weedy characteristics.
23. After students research their weed they should label it with the characteristics and adaptive functions referred to on the resource diagram.
24. Next, the students get the opportunity to design their own ideal weed using all the knowledge and understanding of weeds they have gained. The students are given certain specifications for the weed creation as outline in the Teacher Resource Sheet.
25. Now the students can compile their work into one booklet on weeds. Bring the students together to share their weed booklets and discuss what they have discovered to be the agricultural concerns of weeds. Utilize the discussion questions below to enhance the discussion.



Discussion Questions

1. What special adaptations or characteristics do weeds have to survive and compete with other plants?
2. Why are weeds so difficult to control?
3. Why do we need to know about and understand weeds?
4. How can weeds be controlled?
5. Can weeds be of any use to us?
6. What categories of weed do we have?
7. How does a weed ensure survival?
8. What weedy characteristics make a weed a strong competitor?

Further Discussion Questions

(Use in reviewing resource information sheets):

1. What is a weed?
2. Why are weeds a concern in agriculture?
3. How does a weed ensure continued survival?
4. Where do weeds grow?
5. When do weeds grow?
6. How could you decide if a plant is a weed?
7. What weeds have you seen before?
8. Why do farmers not want weeds in their crops?
9. What does a weed need to survive?
10. What categories of weeds do we have?
11. How do we control weeds?
12. Why do we need to understand and know more about weeds?
13. What characteristics do weeds have?
14. What are some of the adaptations weeds have that make them strong competitors with other plants?
15. What does a weed look like?
16. What makes a weed a weed?
17. Can weeds be of any use to us?

Related Activities

1. Make weeds a topic for a Science Fair or have them make a display on a weed and its effect on agriculture.
2. Make wild oat cookies to demonstrate a new way of looking at weeds. Discover and discuss more weeds that have a value or use for us.
3. Have students collect a seedling or seed from a weed and grow it in class. Investigate the weed's responses to its environmental conditions.
4. Demonstrate how a herbicide will affect a weed. Discuss approaches to weed control and what is being done in the way of research on crop protection.
5. Using a dichotomous key, identify or classify weeds.
6. Consider four typical weeds with notably different characteristics and identify situations or crops that would help or hinder the growth of the weed.

Resources

For further information on weeds and weed control, go to:

<http://www.agric.gov.ab.ca/navigation/pests/weeds/index.html>

For information on videos that can be borrowed at no charge, go to:

<http://www.agric.gov.ab.ca/ministry/comdv/video/loan/index.html>

For information on publications available at no charge, go to:

<http://www.agric.gov.ab.ca/navigation/publications/freepublications/index.html>

Videos and publications may also be obtained by contacting:

Information Packaging Centre
Alberta Agriculture, Food and Rural Development
Main Floor, 7000 - 113 Street
Edmonton, Alberta T6H 5T6
Phone: (780)422-3951 Fax: (780)427-2861

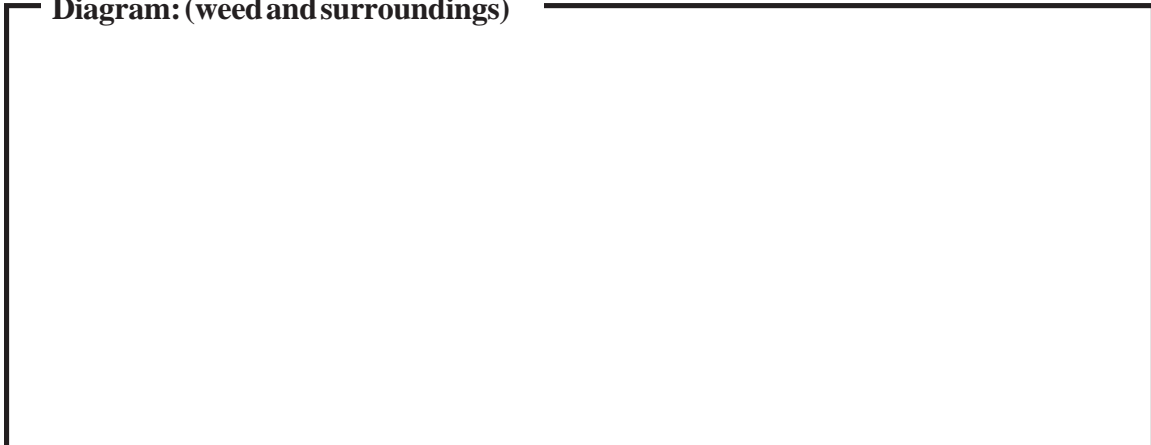
*Original lesson idea by Lisa Wilson
Modifications by AITC*

Student Resource Sheet #1

Data Sheet

Name: _____

Diagram: (weed and surroundings)



Weed Name: _____

Description of Weed: _____

Where did you find the weed? _____

Name of weed identified: _____

Other names: _____

Habitat: _____

Description:

- stems _____

- leaves _____

- flower _____

- seeds _____

Agricultural Concerns: _____

Weedy Characteristics: _____

Teacher Resource Sheet #1

Weeds

* Top Weeds by Crop

Crop	Weeds
Barley	Wild Buckwheat Chickweed Stinkweed Wild Oats Lamb's Quarters
Oats	Wild Oats
Canola	Stinkweed Lamb's Quarters Shepherd's Purse Wild Buckwheat Chickweed
Wheat	Wild Buckwheat Green Foxtail Russian Thistle Stinkweed Wild Oats

*** Habitats

(possible area for field hike on weeds)

cultivated fields
pastures and rangeland
roadsides and ditches
rights-of-way
waste areas
forage crops
gardens
lawns or yards
river bank or along irrigation ditches
along railways and fencelines
any disturbed ground
abandoned lots
farmyards and townsites
lanes and power lines
low areas
back alley
cropped fields
schoolyard and park

** Creation of Your Ideal Weed

Suggested Details to be Included:

Name
Type of Weed (life cycle)
How to Identify (description)
Agricultural Concern
Habitat (where to be found)
Weed Characteristics
(labelled and function stated)
Other Uses for the Weed

NOTE: Choice of hike area will depend on location of school and safety of the area.

Student/Teacher Resource Sheet

Weed Resource/Information Sheet



Wild Oats
(*Avena fatua* L.)



Green Foxtail
(*Setaria viridis*
[L.] Beauv.)

Other Names: oat grass, poor oats, wheat oats.
Origin: Eurasia.
Habitat: Cultivated fields.
Description: An annual grass reproducing by seed.

Stems: smooth, erect, hollow, to 1.5 m tall.

Leaves: broad and flat to 1.5 cm wide, with a prominent membranous ligule at the base of the blade

Inflorescence: an open panicle similar to tame oats, usually with 2 to 3 seeds per spikelet.

Seeds: about 1 cm long, light yellow to almost black in colour, hairy at the base, awned with a usually blackish awn, with a circular scar, sucker mouth, at the point of attachment. Tame oats can be separated from wild oats because their seeds are hairless, unawned, and do not have the sucker mouth.

Agricultural Concern: The most serious weed of annual crops in Alberta. Yield reduction depends on the degree of infestation, the time of removal of wild oats, and the competitive ability of the crop.

Weedy Nature: The seeds mature and ripen over an extended period of time and are dormant when first produced. Seeds can remain in the soil for several years before germinating.

Other Names: bottle grass, green bristle grass, wild millet, pigeon grass.
Origin: Europe.
Habitat: Grain fields, gardens, roadsides and waste places.

Description: An annual grass with a tufted growth habit the reproduces by seed.

Stems: erect to 1 m tall, usually less in Alberta, several from the base of the plant.

Leaves: the sheath clasping the stem is smooth and hairless, the ligule at the base of the leaf blade is a fringe of hairs, the blade is flat to 15 mm wide and 25 cm long.

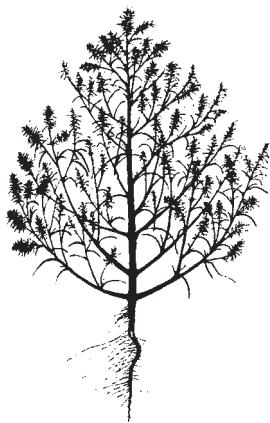
Inflorescence: a spike-like panicle, to 10 cm long, the 1 to 3 bristles attached to each floret give it the appearance of a bottle brush.

Seeds: 1.5 mm long, hard hulled, hull lightly wrinkled, colour yellow or grey brown to occasionally purple and often mottled.

Agricultural Concern: The seed is a common impurity in clover seed where it reduces the grade substantially. The small seeds are readily spread with the chaff by combines so that small patches are rarely found in cereal fields. Infestations of green foxtail usually cover entire fields.

Weedy Nature: A prolific seed producer. The seeds will germinate all summer whenever moisture and temperature conditions permit. The plants are capable of producing seed within 6 to 8 weeks of germination.

Weed Resource/Information Sheet



Russian Thistle

(*Salsola kali* L. var *tenuifolia* Tausch)

Other Names: Russian tumbleweed, Russian cactus, tumbling Russian thistle.

Origin: Eurasia.

Habitat: Cultivated field's roadsides, waste places, along railway tracks and fence lines. More common on dry soils in southern parts of Alberta, but occasionally occurs on south-facing slopes north of its normal range.

Description: Annual, spreading by seeds.

Stems: to 1.2 m tall, much branched, usually spreading as much or more horizontally as vertically, often with reddish stripes.

Leaves: 2 to 5 cm long, alternate - one per node, early leaves dark green and thread-like; later leaves shorter and broader, fleshy, sharp pointed and flattened on the lower side.

Flowers: small and inconspicuous, borne where the upper leaves join the stems, green or pinkish in colour, lacking petals, 2 mm wide.

Seeds: 2 mm in diameter, one per flower, dull brownish colour, with a spiral groove showing the location of the coiled embryo.

Agricultural Concern: Russian thistle is a high user of nitrogen that can compete with crops in the southeast part of Alberta. The dried tops of the plants can be a nuisance by getting caught in fences and hedges.

Weedy Nature: Russian thistle is a prolific seed producer and once the plant matures it dries out and breaks off at ground level and acts as a tumbleweed, rolling along with the wind, spreading seed as it travels.



Leafy Spurge (*Euphorbia esula* L.)

Other Names: wolf's milk, leafy euphorbia.

Origin: Naturalized from Europe.

Habitat: Sandy banks, fields, roadsides, riverbanks.

Description: Perennial spreading by seeds and creeping rootstalks.

Stems: to 1 m tall, hairless or with a few hairs near the top, with a milky greenish-white sap.

Leaves: alternate (one per node), numerous and stalkless 3 to 7 cm long and less than 5 mm wide, a whorl (several leaves from one node) marks the start of the flowering portion of the stem (the inflorescence). The bracts (modified leaves) of the inflorescence are opposite (2 per node) about 1 cm wide and 1.2 cm long with a sharp point.

Flowers: lack petals and sepals, clustered with 1 female (seed-bearing) flower and 3 male (pollen-bearing) flowers forming a group with a pair of bracts (modified leaves) surrounding the cluster so it resembles a single flower; flowering stalks may also be produced from the bases to leaves below the main inflorescence.

Seeds: three per seed capsule, about 2 mm long, smooth, greyish to yellow or brownish, usually with a yellow bump near the base.

Agricultural Concern: The creeping root system stores food reserves and sprouts readily, making leafy spurge a difficult weed to control in cropland. However, it is more of a problem in pastures, particularly on sandy and marginal soils.

Weedy Nature: A deep-rooted perennial that can reproduce from root fragments at a depth of 1 m in the soil. It is difficult to eradicate because of this.

Weed Resource/Information Sheet



Lamb's-Quarters
(*Chenopodium album* L.)

- Other Names:** pigweed, fat-hen, white goosefoot, lamb's quarters goosefoot.
- Origin:** Europe.
- Habitat:** This weed is one of the commonest and most widespread in western Canada. It grows anywhere that disturbed soil may be found (e.g., roadsides, yards, cultivated fields).
- Description:** This weed is very common and abundant. The leaves are widest near the center and have coarse distinct teeth. The flowers lack color as there are no petals.

Stem: erect, grooved, many-branched, sometimes growing as tall as 2 m.

Leaves: stalked, alternate, the lower side of the leaf is pale in colour and covered with greyish-green mealy particles, 2-10 cm long, from narrow and almost entire margined to broader and coarsely toothed.

Flowers: small and greenish, growing in clusters at the stem tip or in the leaf axils from June to September.

Seeds: smooth, glossy black, 1.2 x 0.5 mm, covered by a dull membrane which is easily removed.

Agricultural Concern: Lamb's-quarters is not considered to be the problem it was some years ago, simply because it is easily controlled in cereal crops by means of herbicides. Despite this ease of control, it remains a very common weed and is responsible for competition losses before spraying occurs. It is a nuisance weed in gardens and horticultural crops.

Weedy Nature: Lamb's-quarters spreads solely by seed which is produced in prolific quantity. Left uncontrolled, it can grow so thick that it crowds out other growth. As many as 70,000+ seeds may be produced on a single plant. These seeds possess varying degrees of dormancy in the soil and can remain viable for many years.



Field Bindweed
(*Convolvulus arvensis* L.)

- Other Names:** European bindweed, small-flowered morning glory, creeping Jenny, European glorybind.
- Origin:** Europe
- Habitat:** Infests cultivated and non-cultivated land, in southern Alberta especially.
- Description:** Field bindweed is a long-lived, persistent perennial which spreads rapidly by both seeds and creeping roots.

Stems: vine-like, climbs other plants, fences, etc. by twining around them.

Leaves: one per node - alternate 3 to 5 cm long x 1.5 cm wide, shaped like an arrowhead with a rounded point.

Flowers: bell-shaped or funnel-like, 2 to 5 cm across, pink or white.

Seeds: triangular, brown to dull black in colour, with a rough surface 4 x 2.5 mm.

Agricultural Concern: Field bindweed is a very competitive weed that can seriously reduce crop yields, make crop handling difficult and is difficult to control once established.

Weedy Nature: Field bindweed has a tremendous ability to survive. The roots can grow to depths of 5 or 6 metres and store a 2 to 3 year supply of food. It is also a prolific seed producer and much of the seed has a hard seed coat which enables the seed to survive 20 to 30 years in the soil. This means that an established patch cannot be considered eradicated until many years after the last plant has been killed.

Weed Resource/Information Sheet



Toadflax
(*Linaria vulgaris* Mill)

Other Names: butter-and-eggs, wild snapdragon, yellow toadflax, flaxweed, ramsted, eggs-and-bacon, perennial snapdragon.

Origin: Eurasia.

Habitat: Roadsides, pastureland and waste places.

Description: Perennial spreading by creeping roots and by seed.

Stems: to 80 cm tall, hairless, green, unbranched or nearly so.

Leaves: numerous, one per node, essentially stalkless, 2-10 cm long by 1-5 mm wide, hairless, usually narrowed towards the base.

Flowers: snapdragon-like, 2-3.5 cm long, bright yellow, on stalks about 5 mm long, a backward pointing spur forms about 1/2 the length of the flower.

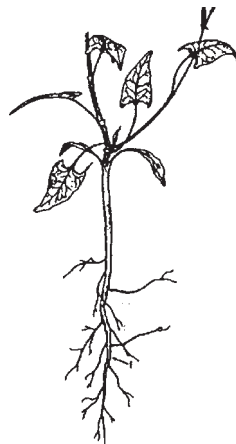
Seeds: 1.7 mm in diameter by 0.3 mm thick, with a winged margin, dull black.

NOTE:

Dalmation Toadflax (*Linaria dalmatica* [L.] Mill.) is a species with a similar growth-form and flowers. It is easily recognized by its broader and shorter leaves which clasp the stem.

Agricultural Concern: Toadflax is an escaped ornamental which invades rangeland, mountain meadows and waste areas. It was once considered a serious weed in cultivated land; however, current tillage and chemical control practices have reduced its impact in this area.

Weedy Nature: The prolific production of strongly winged, readily dispersed seeds and tenacious creeping root system make toadflax a potential menace in non-cropped areas and poorly tilled soils.



Wild Buckwheat
(*Polygonum convolvulus* L.)

Other Names: black bindweed, dullseed cornbind.

Origin: Europe.

Habitat: Cultivated fields, gardens, roadsides, any disturbed ground.

Description: An annual, tap-rooted weed spreading by seed. The seed leaves are narrow, 2-3 cm long, true leaves have an arrowhead shape.

Stems: weak and twining, growing along the ground or climbing over other plants, fences, rocks.

Leaves: alternate - one per node, heart-shaped, green to olive in colour, stalked and 2 to 5 cm long, the base of the leaf stalk gives rise to a papery sheath surrounding the stem.

Flowers: small, greenish and drooping.

Seeds: three-sided with sharp angles, 3 mm long by 2 mm wide, dull black colour.

Agricultural Concern: Wild buckwheat is a problem weed in many crops. It has increased mainly because it is resistant to 2,4-D. As the use of 2,4-D became widespread, less attention was paid to other methods of weed control and wild buckwheat increased.

In addition to crop competition, wild buckwheat causes problems because of its vine-like growth habit. It tangles in equipment (particularly at harvest) and causes plugging and pick-up losses. The seeds are quite large and often are found in cereal grain.

Weedy Nature: Wild buckwheat propagates only by seed. It is probably quite often spread by the use of uncleaned or improperly cleaned seed.

Weed Resource/Information Sheet



Quack Grass
(*Agropyron repens* [L.] Beauv.)

- Other Names:** twitch, quitch, scutch, quick or couch grass.
- Origin:** Europe
- Habitat:** Cultivated fields, pastures, roadsides or anywhere soil moisture is adequate and disturbance of existing vegetation allows it to become established.
- Description:** A perennial spreading by seeds and rhizomes.

Stems: smooth, hollow, to 1.2 m tall.

Leaves: flat, 5 to 10 mm wide, slightly hairy on the upper surface, clasping auricles at the bases of the leaf blades, leaf sheaths of lower leaves often have downward pointing hairs.

Inflorescence: a spike with one row of spikelets on each side of the stem.

Seeds: 3 to 7 per spikelet, 10 mm long, pale yellow, often with a short awn on the end.

Agricultural Concern: The long running root stalks, the rhizomes, sometimes amounting to 7 to 9 tonnes per hectare, make quack grass a serious pest. The tremendous mass of rhizomes produced makes control by any means extremely difficult. The seeds are a serious contaminant in forage grass seed and may seriously discount the value of this seed, as well as being responsible for yield reduction in the crop itself.

Weedy Nature: The seeds produced are very viable and may lie dormant in the soil for several years before germinating. Portions of the rhizomes, even pieces as short as 1 or 2 cm are capable of developing into new plants.



Scentless Chamomile
(*Matricaria maritima*
L. var. *agrestis*
[Knaf.] Wilmot)

- Other Names:** false chamomile, scentless mayweed.
- Origin:** Europe.
- Habitat:** Predominantly found in headlands, rights-of-way, waste areas and forage crops. Becoming an increasing problem in cultivated fields, particularly in areas having solonetzic soil.
- Description:** Chamomile can act as an annual to a short-lived perennial.

Stems: erect, smooth, multi-branched, and 15 to 60 cm high.

Roots: many and fibrous, but not creeping.

Leaves: alternate, very finely divided into many thread-like segments. Leaves have almost no smell when crushed, hence the name "Scentless."

Flowers: daisy-like with white ray florets around the margin and numerous yellow tubular flowers in the center. Flowering occurs from June to October.

Seeds: 2 mm long, dark brown and slightly grooved.

Agricultural Concern: Although its main habitat at present is forage and non-cropland, chamomile is increasing as a weed in croplands, particularly on solonetzic soils.

Weedy Nature: Chamomile can produce up to 300,000 seeds per plant. Seeds are light, float readily on water and hence the first infestations of chamomile in a district are around slough edges and in water courses. Seeds survive for longer periods in undisturbed soil than in cultivated land.

Under Alberta conditions, chamomile acts as a biennial or short-lived perennial. During the year of germination, mainly vegetative growth is produced. Only a small percentage of the plants will flower. If allowed to over-winter, the result will be a large, bushy, multiple-branched plant which is extremely competitive to crops.

The fibrous roots of chamomile allow it to cling to large soil clumps, enhancing its chances of survival in heavy and in particularly solonetzic soils, following cultivation.

Weed Resource/Information Sheet



Dandelion
(*Taraxacum officinale*
Weber)

- Other Names:** blow ball, faceclock, common dandelion.
- Origin:** Europe
- Habitat:** Lawns, rights-of-way, pastures, forage crops, and waste places.
- Description:** A tap-rooted perennial that spreads by seed.

Stems: to 50 cm tall, unbranched, without leaves, with a single flower head, several on each plant, hollow, with a milky sap.

Leaves: all basal, to 30 cm long, margins coarsely toothed or the leaves divided into pointed lobes, lacking hairs, have a milky sap.

Flowers: bright yellow, in a head resembling a single flower at the end of a stem.

Seeds: one per flower, grey to brown, 3.5 x 0.8 mm, longitudinally ribbed, the ribs smooth below the middle of the seed and spiny above, each seed is attached to a parachute of white hairs, enabling it to drift with the wind.

Agricultural Concern: Dandelions are a problem in forage crops and pastures, particularly on soils of low fertility where they can almost completely crowd out the more desirable grasses and legumes.

Weedy Nature: They are prolific seed producers that start producing seed early in the spring. The ease of seed dispersal by the wind enables dandelions to spread into uninfested areas quickly.



Chickweed
(*Stellaria media* [L.] Vill.)

- Other Names:** common chickweed.
- Origin:** Naturalized from Europe.
- Habitat:** Moist shaded areas.
- Description:** Annual or winter annual spreading by seed and by the stems rooting at the nodes.

Stems: mostly prostrate and spreading to sometimes almost erect, 5 to 50 cm long, with lines of fine hairs, and swollen nodes.

Leaves: in pairs on opposite sides of the stem at each node, the lower and middle leaves are stalked and the stalk often has a fringe of hairs along each edge, upper leaves are stalkless and are oval with pointed tips and usually about 1 cm wide.

Seeds: 1.2 mm in diameter, reddish brown to tan coloured, covered with regular rows of small bumps.

Agricultural Concern: Becoming a major problem in fields in northern Alberta where rainfall and soil organic matter is high.

Weedy Nature: Because of its tolerance of shade, it competes well with cereal and oilseed crops.

Weed Resource/Information Sheet



Stinkweed
(*Thlaspi arvense* L.)

- Other Names:** Frenchweed, fanweed, pennycress, field pennycress.
- Origin:** Eurasia.
- Habitat:** Cultivated fields, gardens, waste land and bare soils.
- Description:** An annual or winter annual that spreads by seed and has a strong foetid odor.

Stems: erect, simple or branched from base, to 60 cm tall, hairless.

Leaves: a rosette of stalked basal leaves is produced first, they are up to 10 cm long, with a few teeth on the margin; the stem leaves are generally smaller, stalkless, and clasp the stem, all leaves lack hairs.

Flowers: clustered at the ends of the stems, 4 white petals 3 to 4 mm long. As the seed pods develop the stem elongates so they are spread out along the stem.

Agricultural Concern: Stinkweed starts growth early in the spring often before the snow is gone and because of this it can cause serious moisture loss prior to the seeding of crops, particularly in the brown and dark-brown soil zones.

The plants can cause off-flavors in both meat and milk when they are eaten by livestock. The seeds contain poisonous mustard oils which make them unpalatable to livestock and even small amounts of them in livestock feed will cause the feed to be rejected by the livestock.

Weedy Nature: The plant is a prolific seed producer and because it starts growth from an established root system very early in the spring it can produce seed very early in the summer.



Shepherd's Purse
(*Capsella bursa-pastoris* [L.] Medic.)

- Other Names:** pepper plant, shepherd's pouch, pick pocket, mother's-heart, St. James weed.
- Origin:** Europe.
- Habitat:** Gardens, yards, cultivated fields, roadsides, etc.
- Description:** An annual or winter annual that spreads by seed.

Stems: erect, simple or branched at the base, to 80 cm tall, covered with grey hairs.

Leaves: the basal leaves are 4 to 5 times as long as wide, to 10 cm long, vary from almost entire margined to deeply lobed. The stem leaves are smaller with toothed margins and lobes that clasp the stem.

Flowers: with 4 white petals 2 to 4 mm long, sepals shorter, borne singly on short stalks clustered at the ends of the stems. As the seed pods mature the stem elongates so the seed pods are spread out along the stem.

Seeds: less than 1 mm in diameter, light brown, borne in small triangular or heart-shaped pods with the stalk at the pointed end. Many of the common names of this plant make reference to the distinctive shape of the seed pods.

Agricultural Concern: This is an easy weed to control and exists mainly as a nuisance rather than a serious problem.

Weedy Nature: Shepherd's-purse spreads only by seed. Plants which start growing in the spring or summer will flower and produce seed the same year. Plants which start growing in the fall over-winter as a rosette of leaves and produce seed early the next spring.

Weed Resource/Information Sheet



Canada Thistle

(*Cirsium arvense*

[L.] Scop.)

Other Names: creeping thistle, field thistle.

Origin: Eurasia.

Habitat: Cultivated fields, pastures, roadsides, rights-of-way, waste areas.

Description: A perennial, reproducing by seed and by freely sprouting horizontal root stalks.

Stems: erect, hollow with clear sap, to 1.5 m tall, branching only at the top.

Leaves: are alternate, oblong or lance-shaped, slightly clasping, deeply and irregularly cut into segments with sharp spines.

Flowers: develop in heads resembling single flowers at the ends of the branches. Colour varies from purple through pinkish to occasionally white. Male and female flowers usually occur on different plants. The male flowers produce no seed. The flower heads are relatively small - about 1/2 inch across.

Seeds: tan in colour, 3.5 mm long, slightly curved, with a tuft of loosely attached downy white hairs.

Agricultural Concern: The freely sprouting root stalks store large amounts of food enabling the plant to survive relatively long periods of intensive cultivation so that Canada thistle is hard to control in both cultivated fields and pasture and hay crops.

Weedy Nature: Thistles grow vigorously and have extensive underground root systems that spread below the normal cultivation depth and from which shoots develop rapidly. They produce many seeds which are widely scattered and germinate over an extended period.



Teacher Resource Sheet #2

Classification of Weeds

Plants are grouped by life cycle - annuals, biennials and perennials.

Information contained on this page appeared in Backyard Pest Management, available from Alberta Agriculture, Food and Rural Development (see "Resources").

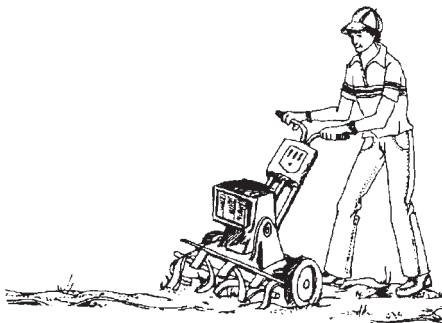
Annuals

There are two types of annual weeds - summer and winter annuals. Summer annuals germinate in the spring, produce seed during late summer or fall, and then die. Examples are chickweed, purslane and pineapple weed. Winter annuals germinate in late summer or fall, producing rosettes that over-winter and grow early the following spring. Seeds are produced in the early summer. Examples are stinkweed and shepherd's-purse. Some weeds are both winter and summer annuals.

Since annual weeds reproduce only by seeds, control is simple. Kill the plants before seed production occurs and encourage seed germination when the seedling weeds can be easily destroyed. This strategy can be thwarted by the tendency of these weeds to grow and mature very quickly. Winter annuals can often flower before all the spring snow is gone.

General control recommendations are:

- Till or hoe between rows of vegetable crops.
- Rake or harrow to control weeds before garden plants emerge.
- Use pre-seeding tillage to get annual weeds to germinate before seeding.



Occasional light tillage will break up and scatter root pieces producing new infestations. Intensive tillage or mowing throughout a season will strain the root energy reserves. Timing of tillage is critical. Since food reserves are generally low from the end of May until mid-July, starting to cultivate or mow at the end of May will cause new shoots to emerge from dormant buds and the stand will appear thicker. This flush of new growth uses more energy than it produces so the overall food reserves are diminished. After three to four weeks, the weed stand should be mowed or tilled again, further depleting the root reserves.

Weed control is accomplished by the gradual starving of the root system. Fleshy root perennials like dandelion can also be controlled by tillage. When the top growth is cut off, the root will starve.

Biennials

These weeds require between 12 and 24 months to complete their life cycle. In the first year a taproot and shoot are produced. The root survives the winter and in the spring the shoot bolts, producing flowers and seeds. Biennials are controlled by fall or spring tillage. Biennials can be a problem where cultivation has not been used.

Perennials

These weeds persist for more than two years and have either fleshy tap roots, eg. dandelions, or creeping root systems, e.g. Canada thistle. Both root systems store food throughout the season. Fleshy rooted perennials reproduce mainly by seed. Creeping rooted perennials grow in patches and spread both by seed and roots.

To control perennial weeds two possible strategies can be used:

- 1) prevent seed production and
- 2) deplete the food reserves in the roots.

Repeated mowing and/or cultivation may help to achieve control of perennial weeds.

Teacher Resource Sheet #2

Additional Information on Weeds

Weed Biology

Understanding the biology of weeds is critical in developing weed control strategies. The main strategies in controlling annual weeds are to prevent seed production and reduce the number of seeds existing in the soil. With perennials, destruction of the root system is the key. Non-chemical weed control techniques exploit the biological differences between the crop and the weed and are accomplished through cultural practices, such as mowing, hoeing and tillage.



Seed Dormancy

Dormancy is the characteristic of weed seeds that enables them to survive for long periods in the soil without germinating. Weed seeds in the primary dormant state can remain alive in the soil and do not germinate even though adequate temperature and moisture conditions exist. Dormancy is broken naturally by the effects of microorganisms, alternate freezing and thawing, and drying-wetting cycles. The length of time seeds remain alive in the soil is called seed longevity. Longevity of weed seeds varies with species. A weed problem will be around as long as its seed can survive in the soil.

Weed seeds remaining in the soil are not the only source of new plants. Top-soil, manure, or soil around nursery stock that is brought into the home grounds may contain weed seeds or stolons (stems that grow along the ground and produce new plants from buds at the tips or nodes).

Time of Flowering

Knowing the approximate time of year that a weed flowers enables one to control the weed or harvest the crop before viable seed is produced. Viable seeds are produced at varying stages of plant maturity, depending on the species.

Time of Germination or Emergence

Germination of weed seeds or emergence of perennial shoots is influenced by temperature, moisture, depth of burial and dormancy of the seed. Knowing the date of the expected emergence is helpful in timing cultivation, seeding and spraying.

Herbicides

Even when used according to recommendations, herbicides are not always 100 per cent effective. The action of herbicides depends upon several factors, such as stage of the weed, the temperature at which the herbicides are applied, the fertility of the soil and the amount of available moisture. If it rains or irrigation water is applied within 6 hours after herbicide application, the activity may be reduced and reapplication may be necessary.

