Lesson 6 Package, Row Agronomy Alternatives

Enough is Enough: Glyphosate Curriculum

Teacher Instructions

Overview

Focus, Safer alternatives to glyphosate in row agriculture, including cover crops, flame weeding, electric weeding, and inter-row mowing. Glyphosate is a plant killer used to control weeds. It is sprayed on forests and is sold in most hardware stores as products like Roundup. Students learn scientific concepts, Traditional Ecological Knowledge, and practical design skills.

Learning Goals

- Explain how cover crops, flame weeding, electric weeding, and inter-row mowing reduce weed pressure without glyphosate.

- Connect alternatives to the teaching of bimaadiziwin, the good life, and to the Three Sisters system, niswi shishigwanensag.

- Design a small row-crop weed management plan that balances yield, soil health, and pollinator protection.

- Use evidence, data tables, and cost reasoning to support a recommendation.

Success Criteria, student can

- Describe at least three non chemical weed control methods with accurate pros and cons.

- Show where ashkibag, cover crops, fit in a rotation or interseeding schedule.

- Present a simple plan for a 10 m by 10 m plot that is realistic and safe.

- Use correct vocabulary and cite both a scientific idea and a teaching from an Elder or story.

Safety and Ethics

Do not handle or bring glyphosate or any herbicide to class. Do not perform flame weeding at school. Use demonstration videos or visit a farm with approved safety controls. If using heat for a plant science demo, use teacher controlled equipment only, follow school policy, and keep a fire extinguisher available. Respect local teachings, do not harvest plants without permission.

Time and Materials

Time, 60 to 90 minutes, can be split into two sessions.

Materials,

- Student Handout 6A, Row Agronomy Alternatives Reading Sheet

- Student Handout 6B, Plot Design Planner and Data Tables

- Chart paper or projector for class notes

- Two shallow trays, potting soil, fast sprouting seeds for a cover crop demo, rye or radish, optional

- Rulers, masking tape, markers

- Access to short videos on cover cropping and mechanical weeding

Vocabulary

- Ashkibag, cover crops

- Niswi shishigwanensag, Three Sisters system, corn, beans, squash

- Bimaadiziwin, the good life, balance and care

- Inter row mowing, cutting weeds between crop rows

- Flame weeding, using heat to kill small weeds without chemicals

- Electric weeding, using electricity to kill weeds

Curriculum Alignment

Ontario Grade 7 to 8 Science, ecosystems, sustainability, human impact, solutions. Geography, land use and resource management. Math, proportional reasoning and cost comparison. Language, oral communication and argument writing. Arts, visual communication of designs. TRC Calls to Action, education for reconciliation and land based learning. UN SDGs, Life on Land, Responsible Consumption and Production, Climate Action.

Lesson Sequence

1. Opening narrative, play the Lesson 6 audio or read the narrative below, 5 minutes.

2. Quick prior knowledge check, What do you already know about Roundup, glyphosate, and weeds, 3 minutes.

3. Mini demo or video, what cover crops do for soil, 7 minutes.

4. Jigsaw reading, students read Handout 6A and become table experts on one method, 10 minutes.

5. Expert share, each student teaches their method to the table, 10 minutes.

6. Plot Design task, in pairs, complete Handout 6B to design a 10 m by 10 m row crop plan that replaces glyphosate with alternatives, 20 minutes.

7. Gallery walk, post designs and give warm feedback using Two Stars and a Wish, 10 minutes.

8. Exit ticket, write one decision you would make on a farm and one teaching that supports it, 5 minutes.

Differentiation and Supports

- Provide sentence frames and word banks for English learners.

- Offer a sketch first option for students who prefer drawing before writing.

- Allow oral explanations recorded on a device for students who need it.

- Challenge option, add a simple cost comparison to the design, hours of labour, seed price, equipment rental.

Cross Curricular and Home Connection

Math, estimate labour hours per method, compute cost per 100 square meters. Language, write a brief recommendation to a farmer. Home, interview a family member about gardening or farming practices and share one change they would consider.

Lesson 6 Narrative Script, Niswi Shishigwanensag, Three Little Bells

I walk through the garden with my grandfather. Corn rises above me, beans climb their stalks, and squash spreads wide across the ground. He smiles and says, These are our niswi shishigwanensag, three little bells. Corn, beans, and squash. Sisters who live together, each helping the other.

He shows me how the corn gives the beans something to climb. The beans give food to the soil. The squash covers the ground so weeds cannot take over. This is balance, he says. This is respect. Nothing sprayed. Nothing wasted.

My grandmother joins us and shows me another teaching. She scatters seeds of rye and clover between the rows. She calls them ashkibag, cover crops. They are blankets for the soil, holding her through winter, feeding her with life. She lifts a handful of soil and shows me earthworms twisting in the dark. Healthy soil means healthy people, she whispers.

Later, my uncle tells me of another way, fire. He explains that some farmers carry torches, walking carefully down the rows, letting the flame take the weeds but leave the crops. He reminds me that fire has always been our teacher. Too much destroys. Just enough brings renewal. Fire, when guided with knowledge, clears a path for life.

One day I see a farmer with a strange machine. It hums like a storm and sends a crackle of electricity into the weeds. At first I laugh, but then I realize, people everywhere are searching for ways to grow food without poison. Each attempt is another lesson, another seed of knowledge.

In our language there is a word, bimaadiziwin, the good life. It is more than survival. It is living well, with balance, with care, with respect for the circle of life. When I think of bimaadiziwin, I know it cannot come from bottles of glyphosate stacked on shelves. It comes from the wisdom of the land, from old teachings like the Three Sisters, and from new practices that do not break the circle.

I remember what my grandfather said, Every choice is a seed. You can plant poison, or you can plant balance. What grows will feed your grandchildren, or harm them.

I look at the corn, beans, and squash shining in the sun. I look at the rye sprouting between the rows, the earthworms curling in the soil, the fire flickering in my uncle’s stories. I understand. There are many ways forward, but only some lead to the good life.

And so I carry these words in my heart, niswi shishigwanensag, three little bells. Ashkibag, cover crops. Bimaadiziwin, the good life. These are more than words. They are teachings. They are seeds for the future.

Student Handout 6A, Row Agronomy Alternatives Reading Sheet

What is the problem,

Farmers often use glyphosate to control weeds in fields. It is fast and common, but it harms soil life, water, pollinators, and health. It is also sold in most hardware stores. There are safer options.

Alternatives,

- Cover Crops, ashkibag, rye, clover, radish. Blanket the soil, reduce erosion, feed soil life, and shade weeds.

- Flame Weeding, heat kills small weeds without chemicals. Requires safety training and dry weather control.

- Electric Weeding, machines send electricity through weeds. Avoids chemicals. Requires trained operators.

- Inter row Mowing, cut weeds between crop rows to reduce competition, protects soil structure.

Key idea, Healthy soil grows healthy food. Choose balance over poison.

Student Handout 6B, Plot Design Planner and Data Tables

Task, In pairs, design a 10 m by 10 m row crop plot that avoids glyphosate and protects soil and pollinators. Use the table to compare options, then make a final plan.

Method	How it works	Pros	Cons or limits	Labour hours per 100 m^2	Notes for our plot
Cover Crops					
Flame Weeding					
Electric Weeding					
Inter row Mowing					

Sketch your plot, add rows, cover crop strips, and access paths

Final Plan

1. Our main crop,

2. Our primary weed control method, why,

3. Our backup method for problem spots,

4. How we protect bees and water,

5. One teaching that guides our choices, for example, bimaadiziwin or Three Sisters,

Assessment and Evaluation

Use the rubric below to evaluate the Student Plot Design task and the table notes. Weighting can be adjusted to local needs.

Criteria	Level 4, Exceeds	Level 3, Meets	Level 2, Approaches	Level 1, Beginning	Weight
Scientific Understanding	Explains all four methods with accurate detail, soil processes, pollinators, timing.	Explains at least three methods correctly with some detail.	Explains two methods with limited detail or minor errors.	Explains one method or has major errors.	25%
Design Quality and Feasibility	Plot plan is realistic, complete, and shows seasonal timing and safety.	Plan is realistic and mostly complete, includes key steps.	Plan has gaps in timing or safety.	Plan is unclear or unrealistic.	25%
Evidence and Reasoning	Uses data estimates, labour hours, and clear pros and cons to justify choices.	Includes reasons and some estimates to support choices.	Gives reasons with little or no data.	Minimal reasoning or off topic.	20%
Cultural Integrity and TEK Connection	Integrates teachings like bimaadiziwin or Three Sisters, cites Elder or narrative insight with respect.	Mentions at least one teaching and shows respect.	Vague or token reference to teachings.	No cultural connection or inappropriate use.	15%
Communication and Collaboration	Clear tables and sketch, neat labels, both partners contribute, strong oral share back.	Mostly clear work and collaboration.	Some unclear sections or uneven collaboration.	Work is hard to follow or collaboration is weak.	15%

Formative Assessment Checks

- Thumbs, fist to five, confidence on methods, before and after reading.

- Quick write, one benefit of cover crops and one question about mechanical weeding.

- Teacher circulates during design, uses a two minute conference per pair.

Exit Ticket

Answer on a sticky note or in your journal,

1. Which method would you try first and why,

2. Which teaching supports your choice, bimaadiziwin, ashkibag, or Three Sisters,

Teacher Notes and Extensions

Consider inviting a local farmer who uses cover crops or mechanical weeding to speak with students. If possible, plant a small strip of rye or clover at school to observe soil cover and moisture over two weeks. For math integration, compare approximate labour hours and seed costs for two methods and write a short recommendation.