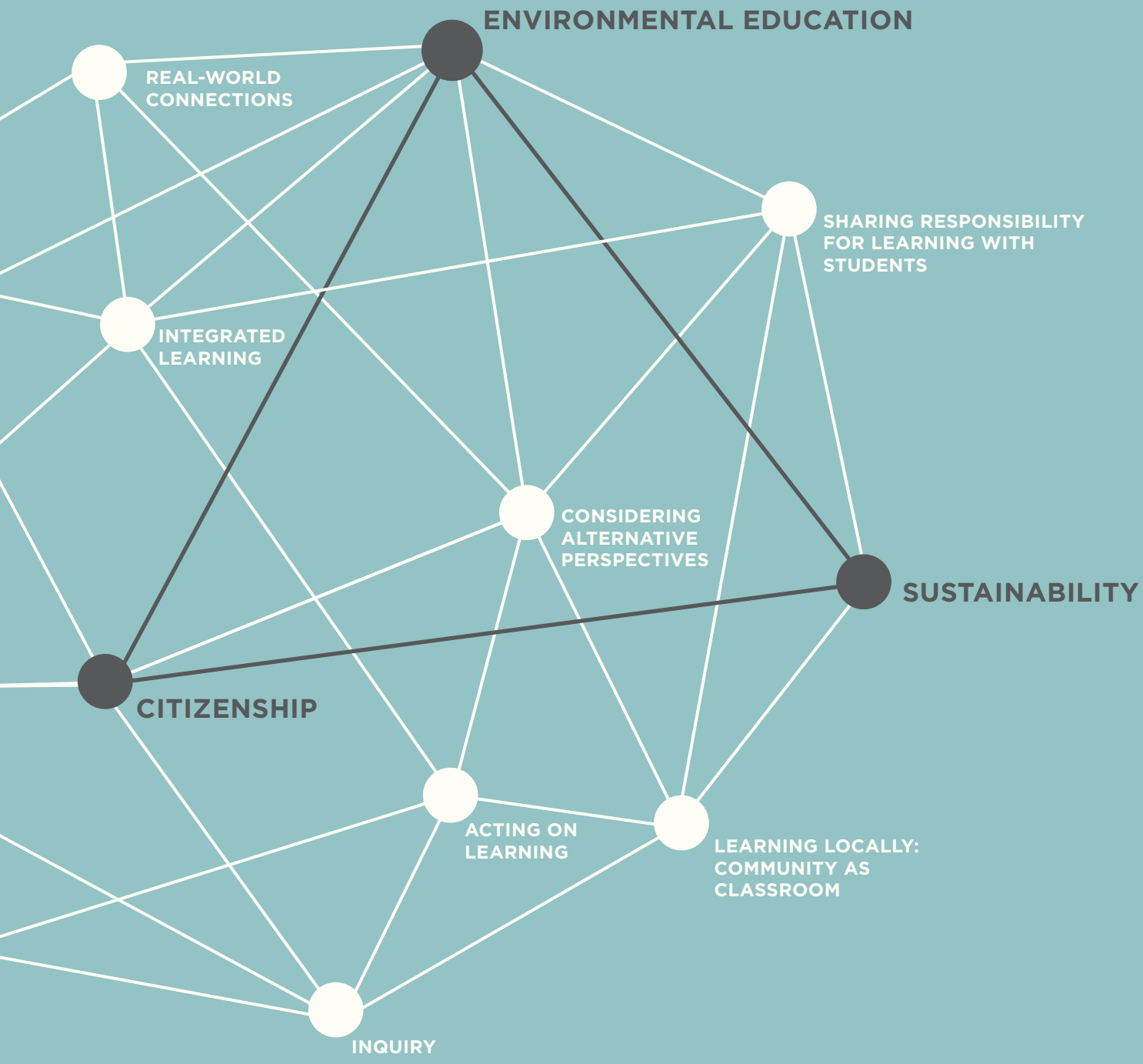


EXECUTIVE SUMMARY

CONNECTING THE DOTS

Key Learning Strategies for Environmental Education, Citizenship, and Sustainability

Stan Kozak and Susan Elliott

Learning for a Sustainable Future
LSF

CONNECTING THE DOTS
KEY LEARNING STRATEGIES FOR ENVIRONMENTAL EDUCATION, CITIZENSHIP AND SUSTAINABILITY

Which learning strategies best contribute to students becoming engaged and active citizens involved in achieving environmental, social and economic sustainability?

Connecting the Dots focuses on learning strategies and the ways of organizing learning experiences; the "how to" of learning. These learning strategies involve students as engaged learners, learning within the context of their communities and addressing relevant, local issues.

The learning strategies advanced in this document are not new. They are common to environmental education and many other fields of educational research and practice. What is new is the means by which these strategies when used together, connect the many dots that are necessary to achieve an interconnected world view. These "dots" include:

- Linking environmental, economic and social issues within subjects and across subjects
- Linking students to each other, their home life, their schools, their environment and their community
- Linking knowledge, skills, and perspectives through student engagement and action
- Providing a meaningful context for the implementation of numeracy, literacy, character and other educational objectives.

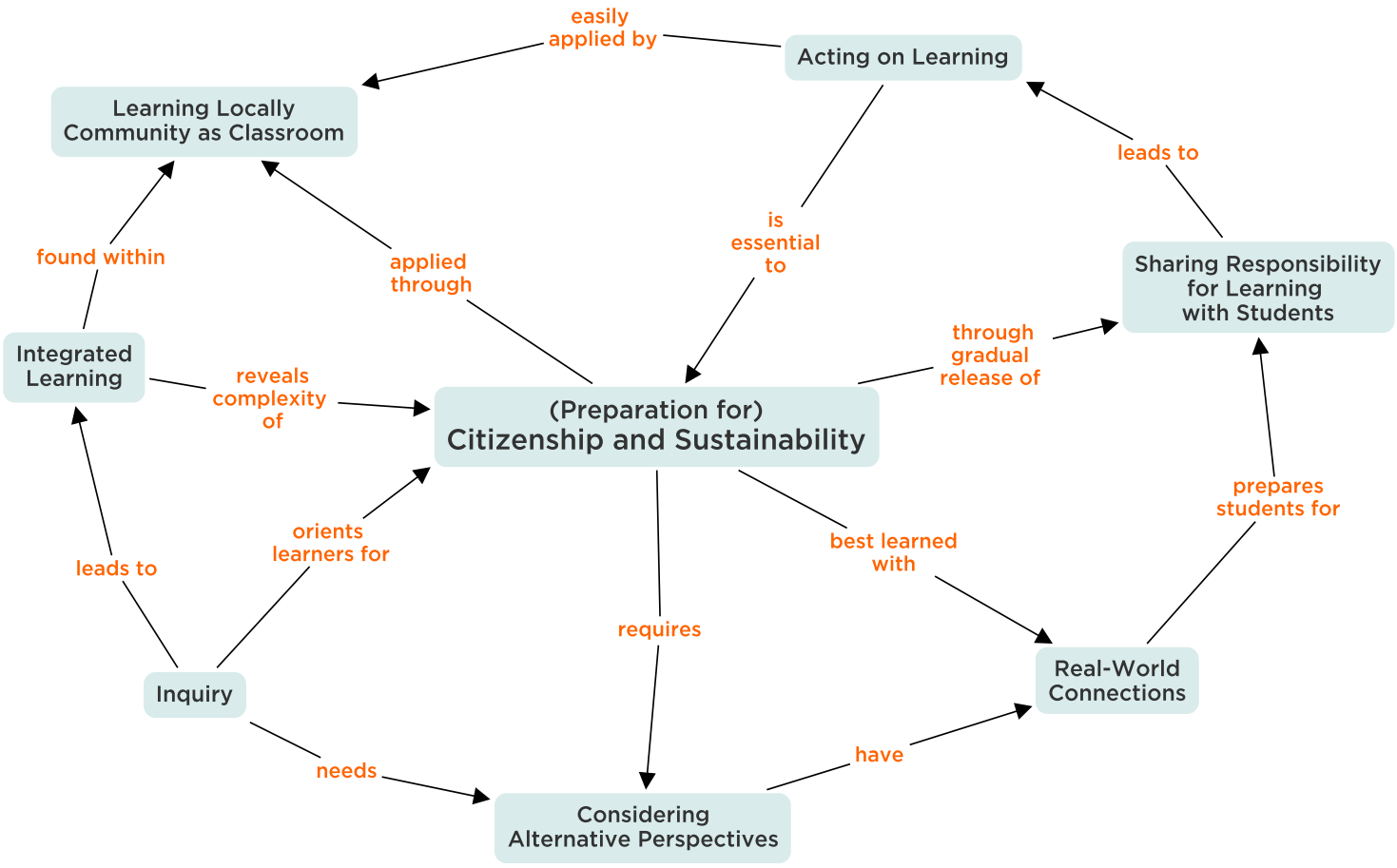
THE SEVEN STRATEGIES

Connecting the Dots: Key Learning Strategies for Environmental Education, Citizenship and Sustainability, Executive Summary 2011

This Executive Summary and the complete document are available online at - http://www.lsf-lst.ca/en/projects/teacher-resources/dots

Authors: Stan Kozak and Susan Elliott
Graphics and Layout: Anita Sekharan

CONNECTING THE DOTS PROVIDES A SYSTEMS VIEW OF LEARNING. EACH LEARNING STRATEGY IS A DOORWAY TO THE CREATION OF LEARNING EXPERIENCES THAT REFLECT THE RICHNESS AND COMPLEXITY OF LIFE.



Many other relationships exist between these strategies. Exploring them reveals the complexity of learning and ways that this complexity can be used in the creation of rich learning experiences.

The strategies identified here interact to transform learning to meet the increasing demands of citizenship in a changing world.

TRADITIONAL AND TRANSFORMATIONAL LEARNING

Traditional learning, directed to employment and post-secondary preparation goals, features information transfer, linear organization and primary use of textbooks as information sources.

Transformational learning, directed to development of engaged responsible citizens, features information manipulation and analysis, active learners, complexity and use of authentic information sources.

>> Access **Chapter 1, Environmental Education - The Great Connector** for a detailed look at how these strategies were identified and why they matter.

1 LEARNING LOCALLY – COMMUNITY AS CLASSROOM

Never globalize a problem if it can possibly be dealt with locally.
- Gareth Hardin

WHAT IS IT?

- Learning locally takes advantage of the natural, built and cultural amenities that exist in the community - just outside the school doors, often a short walk away, regionally or in wilderness areas.

WHAT DOES IT MEAN TO BE A CITIZEN IN OUR NEIGHBOURHOOD

A primary school teacher posed the question to her students, "How do we care for the world and how does the world care for us?" to guide an eight-week neighbourhood unit that included mapping, personal stories, walking trips and service learning, guided by inquiry.

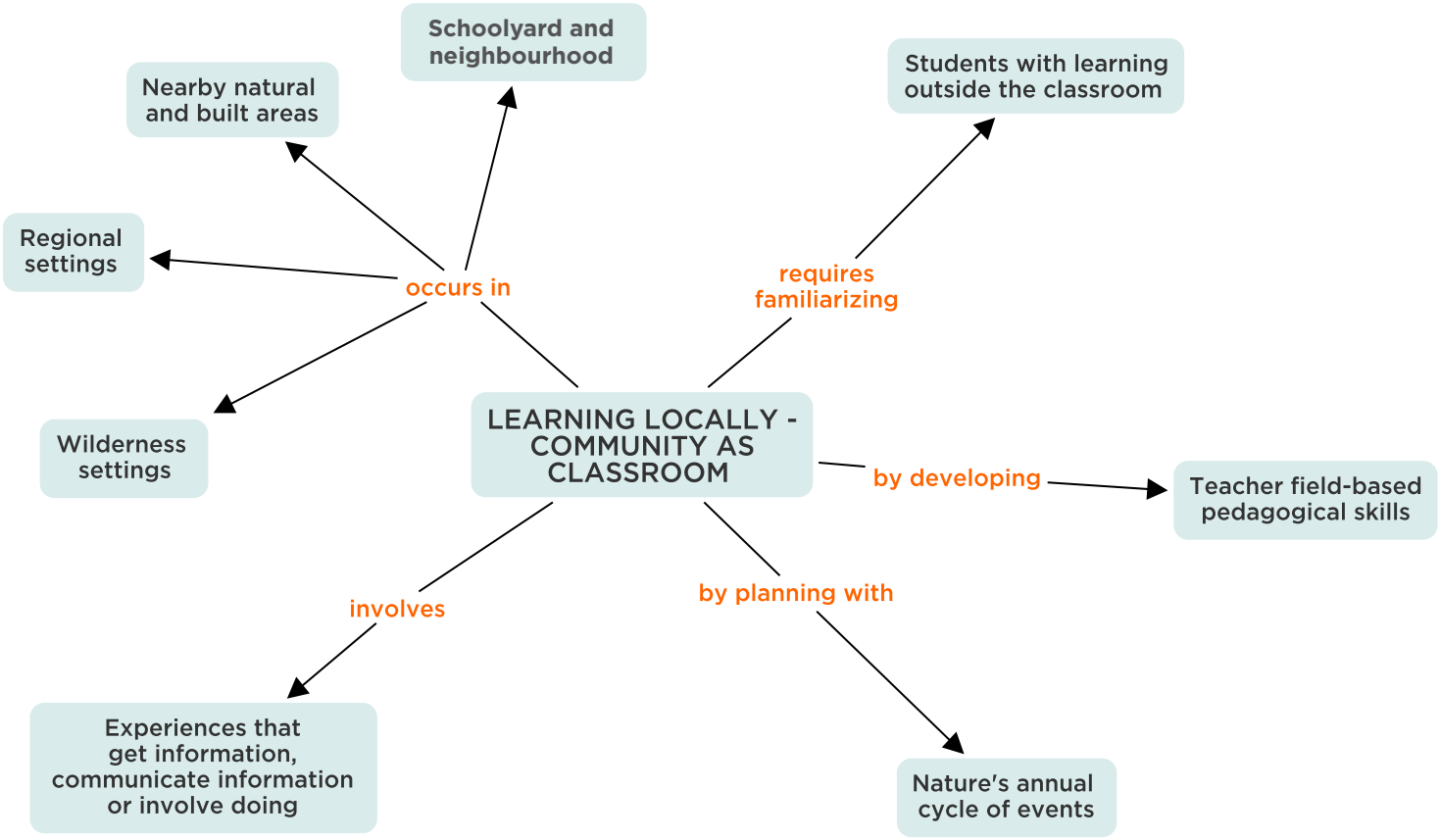
WHY USE IT?

- Learning that takes place in local settings contributes to improved thinking and problem-solving skills. Decision making in authentic contexts is most relevant to learners.
- The world beyond the classroom provides a more inclusive learning environment for all learning styles (e.g., auditory, visual, kinaesthetic).
- Programs with a significant amount of learning time spent outdoors contribute to improved behaviour and physical wellbeing.
- Using local experiences for learning allows students to explore the complexity of the world beyond the classroom.
- Local experiences are accessible every learning day as well as outside of school hours—supporting a view that learning occurs anywhere and anytime.

A WOODLOT ADOPTION

Several secondary school classes focused on an abused but ecologically significant portion of a local park. After finding many examples of ecological relationships, students decided to adopt the site. They prepared postcards for site neighbours outlining their intentions.

LEARNING LOCALLY – COMMUNITY AS CLASSROOM IS A STRATEGY AVAILABLE AT EVERY SCHOOL. THE OPPORTUNITIES VARY ACCORDING TO THE SCHOOL'S LOCATION AND THE TIME OF YEAR, NEVERTHELESS THERE IS A RICHNESS TO ENHANCE LEARNING AT SOME LEVEL OUTSIDE EVERY SCHOOL DOOR.



HOW TO USE IT — EXAMPLES

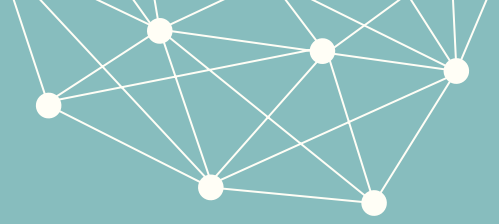
- Creating guided neighbourhood walks
- Using nature's calendar of events
- Developing and using field-based pedagogical skills

SEPTEMBER BRINGS PRAYING MANTIDS

They arrived like clockwork as nature rolled out its annual cycle of life. Students "unexpectedly discovered" these fascinating insects and their egg cases in a field near the school. These unleashed a torrent of exciting learning in math, literacy, science, drama and visual art.

>> Access **Chapter 2, Learning Locally - Community as Classroom** for a detailed look at this learning strategy.

2 INTEGRATED LEARNING[1]



Tug on anything at all and you'll find it connected to everything else in the universe.

- John Muir

WHAT IS IT?

- Pursue any topic or issue and opportunities arise to address expectations across multiple subjects. Following and using these learning opportunities is the essence of integrated learning.
- The learning experience addresses and assesses content and skill expectations from two or more subjects.
- At lower levels of integration distinct subjects are readily identifiable. In fully integrated investigations or projects, subject boundaries are transcended and no longer readily identifiable.

WHY USE IT?

- Makes addressing curriculum manageable by offering a means of addressing many subject expectations in a meaningful way.
- Contributes to achieving deeper understanding of topics and issues, and the interrelationships inherent in complex, real-world systems.
- Provides opportunities to differentiate instruction. The inclusion of multiple disciplines provides students with the opportunity to engage their particular interests or abilities.
- Enables more authentic assessment.

BOOKS LEAD TO BOOKS

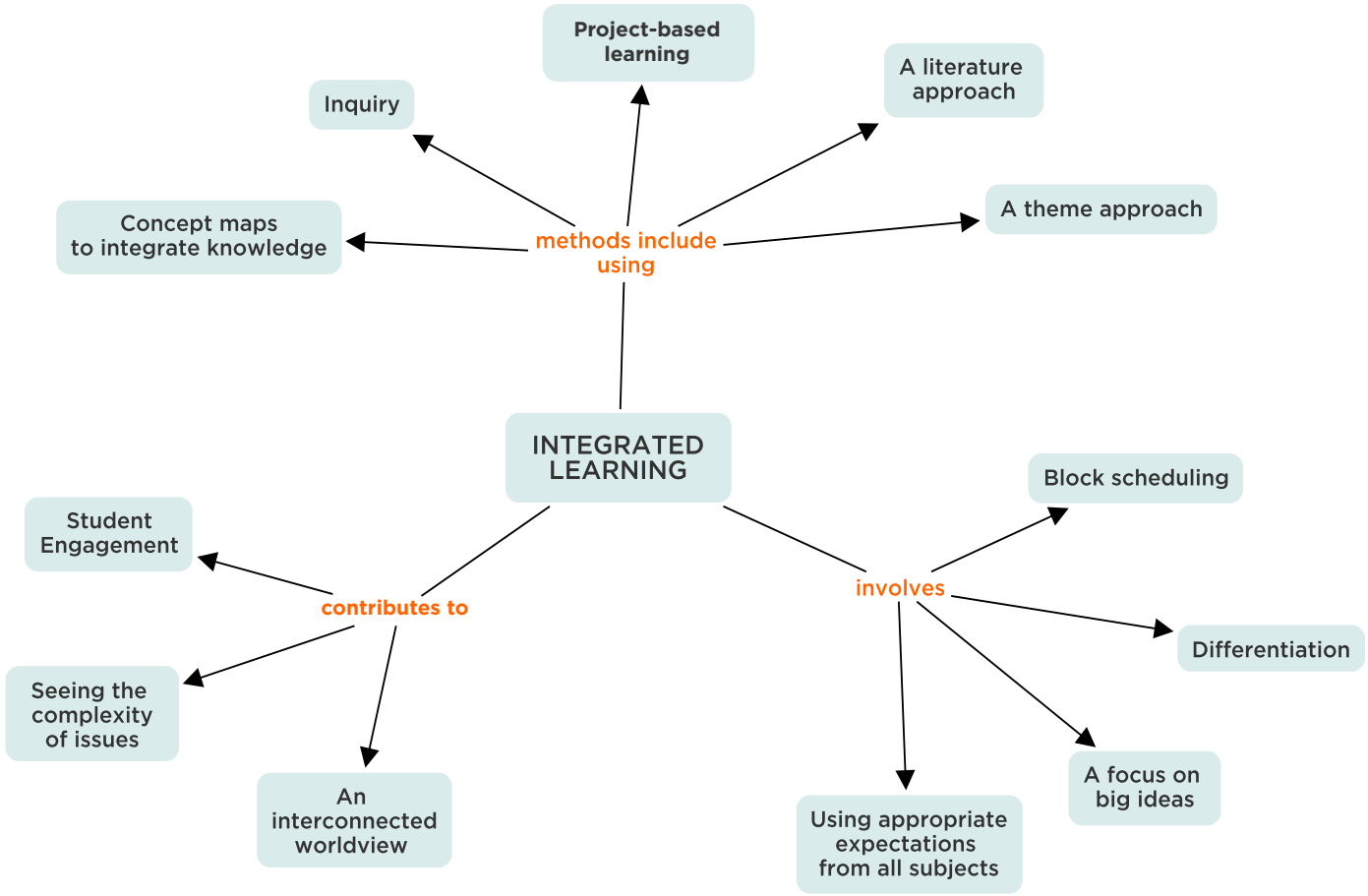
A children's picture book led grade 6 students to learn about biodiversity through local birds. Based on their research they applied art and writing skills to create their own versions. After reading their works to a primary class, groups toured the schoolyard to find real-life examples which they then reflected on through writing.

SECONDARY SCHOOL INTEGRATED PROGRAMS

The Headwaters program involves 24 students who spend the entire semester, all day, together. As they investigate local environmental challenges and natural areas, they address learning expectations from four subject credits. With no bells to interrupt, they have many in-depth learning experiences out in the real world.

[1] *Integrated learning involves the combination of subjects. It may be multidisciplinary, interdisciplinary or transdisciplinary.*

INTEGRATED LEARNING IS A RELEVANT AND IMPORTANT STRATEGY FOR ALL GRADE LEVELS. SUBJECT-BASED ORGANIZATION OF TIMETABLES AND SUBJECT SPECIALIZATION IN HIGHER GRADES CAN MAKE ITS APPLICATION MORE DIFFICULT BUT NOT IMPOSSIBLE.



HOW TO USE IT — EXAMPLES

- Addressing multiple subjects through a common theme
- Using literature to lead integration
- Concept-based integration
- Project-based learning
- Using concept maps as a knowledge-integrating tool

LEADING WITH ART

Illustration was used throughout the day as learning included planning the day, a visit to a local natural habitat, reflecting on the experience and solving math problems that were generated from the experience. The leading with art challenge revealed unknown talents for some and frustration for others – valuable learning experiences for all.

>> Access **Chapter 3, Integrated Learning** for a detailed look at this learning strategy.

3 ACTING ON LEARNING

The great aim of education is not knowledge but action.
- Herbert Spencer

WHAT IS IT?

- Acting on learning moves beyond investigation of an issue to identifying solutions and working towards a desired change—in personal lifestyle, in school, in the community, and on the planet.
- The action projects are practical, real and are relevant to the students. They are not planned simply as a learning exercise.

GRAFFITI NO MORE

Students in Grade 5 identified the graffiti and vandalism-ridden park in their neighbourhood as a problem worth addressing. They came up with plans to clean up the area and initiate a community awareness campaign. Then they implemented them.

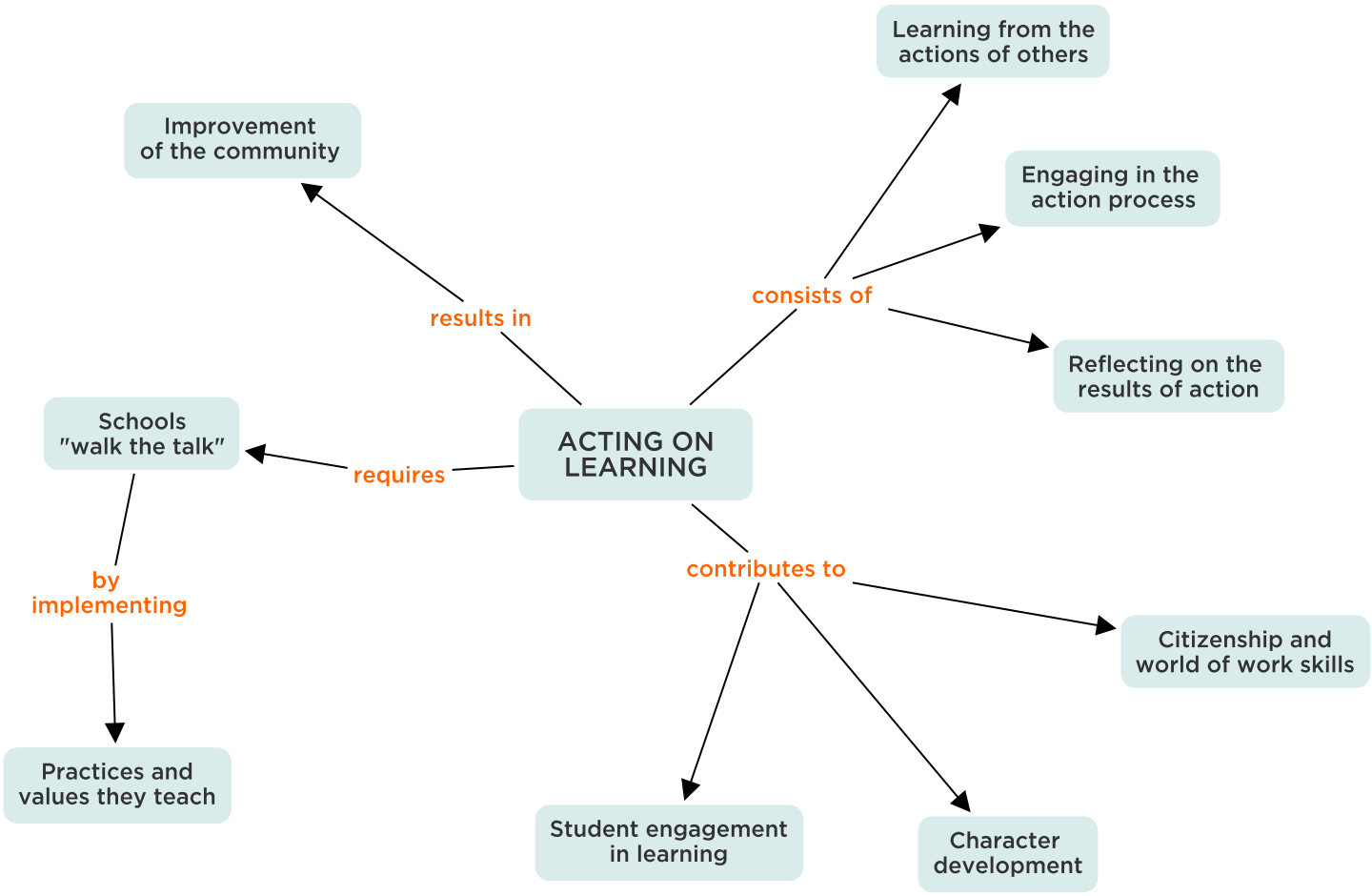
WHY USE IT?

- Students put what they have learned into action and in turn, gain greater understanding through the process. The premise is - if something is worth knowing, it is worth acting upon.
- Student engagement is enhanced as they move from passive detachment to active involvement. The authenticity of the learning stimulates student achievement.
- Benefits accrue to both the students and the community.
- The skills, knowledge and attitudes for active citizenship are cultivated. Students experience that change is possible through their efforts, cultivating a hopeful outlook.
- These experiences provide career insights and prepare students for the world of work. The skills of Acting on Learning overlap the skills of employment.
- Acting on Learning is transformative. It can include work towards social and environmental justice with students involved as active collaborators in complex, multi-disciplinary community action projects, which they themselves initiate and lead.

MONITORING AND COMMUNICATION

Secondary students studied and monitored the local watershed for ecological health. Based on their findings they prepared and presented recommendations for improvement to local councilors.

WHEN STUDENTS ACT ON THEIR LEARNING, THE SCHOOL EXPERIENCE IS MADE RELEVANT AND THE SEEDS OF HOPE THROUGH ACTIVE CITIZENSHIP ARE PLANTED.



HOW TO USE IT — EXAMPLES

- Educate & inform
- Make consumer choices
- Make lifestyle choices
- Persuade others to change
- Raise funds
- Engage in civic action
- Eco-management projects

MEANINGFUL MESSAGES

After studying their community and identifying the changes they wanted to see, Primary students created sidewalk chalk murals to communicate their messages with the neighbours. The local press shared the student insights with the entire community.

>> Access **Chapter 4, Acting on Learning** for a detailed look at this learning strategy.

4 REAL-WORLD CONNECTIONS

We learn if we have something in our hands.
- Jean Piaget

WHAT IS IT?

- Real-world connections draw from, or upon, actual objects, events, experiences or situations to address a concept, problem or issue.
- Allows students to actually experience or practice concepts and skills, rather than being theoretical or idealistic.
- Learning projects that directly relate to, are relevant to, or benefit students, their families or the community.

NEST BOXES FOR FEATHERED NEIGHBOURS

Grade 4 students learned about species that require a cavity in which to nest. They researched and built nest boxes, and monitored their use. The nest boxes were located on a bus route to the school to make them visible for monitoring.

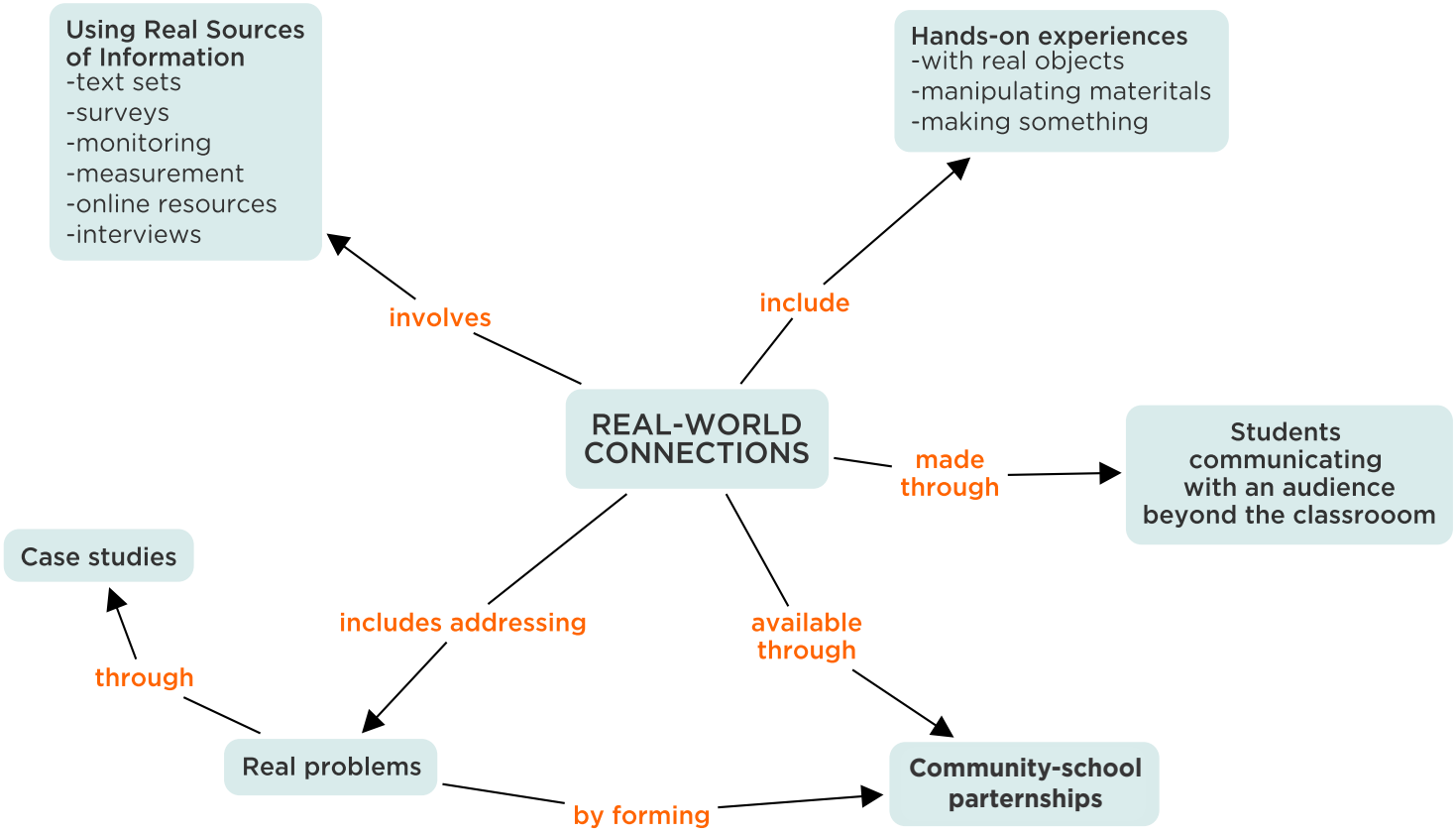
WHY USE IT?

- Addresses concepts, problems, or issues that are similar to ones students have encountered or are likely to encounter in life.
- Brings the relevance, complexity and motivation of the real world to learning.
- Develops sensory experiences thereby appealing to and assisting a wide range of learners.
- Stimulates student achievement through the authenticity of the learning.
- Selects information for learning from real-world sources, not those created specifically for school such as textbooks.
- Directs learning or the results of learning to audiences beyond the school.
- Supports character education as relationships between the community, the school and students are enhanced.
- Acts as a generator of many issues or questions to pursue through inquiry.
- Provides greater opportunity to learn how our communities and society work.

A TRANSIT FIELD TRIP

Small groups of grade 7 students researched and planned a year-end fieldtrip using the local transit system. Class presentations were made; a trip selected and carried out.

STUDENTS WANT TO BE INVOLVED IN IMPORTANT INITIATIVES. BRINGING REAL-WORLD CONNECTIONS TO LEARNING TAKES ADVANTAGE OF THIS STRONG MOTIVATOR.



HOW TO USE IT — EXAMPLES

- Manipulating and experiencing objects
- Making something useful
- Solving real problems or issues
- Getting information from authentic sources–applying relevant skills in numeracy and literacy
- Directing learning to an audience beyond the classroom through various means of communication
- Community partnerships

DATA ON THE AUTOMOBILE

Grade 5 students collected data on the number and time vehicles spent idling in front of the school waiting to pick up students before and after class. They analyzed the information and used it in the preparation of a walk to school campaign.

>> Access **Chapter 5, Real World Connections** for a detailed look at this learning strategy.

5 CONSIDERING ALTERNATIVE PERSPECTIVES

Hear one side and you will be in the dark. Hear both and all will be clear.
- Thomas C. Haliburton

WHAT IS IT?

- Consideration of the different ways of looking at issues, solutions, strategies, experiences, world views and ways of knowing in the process of forming opinions, clarifying values and taking an informed position.

SEEING NATURE THROUGH SCIENCE AND ART

Grade 11 students organized and delivered a field trip for grade 4 students that provided them with interpretations of woodland, field and wetland habitats through the eyes of a scientist and an artist.

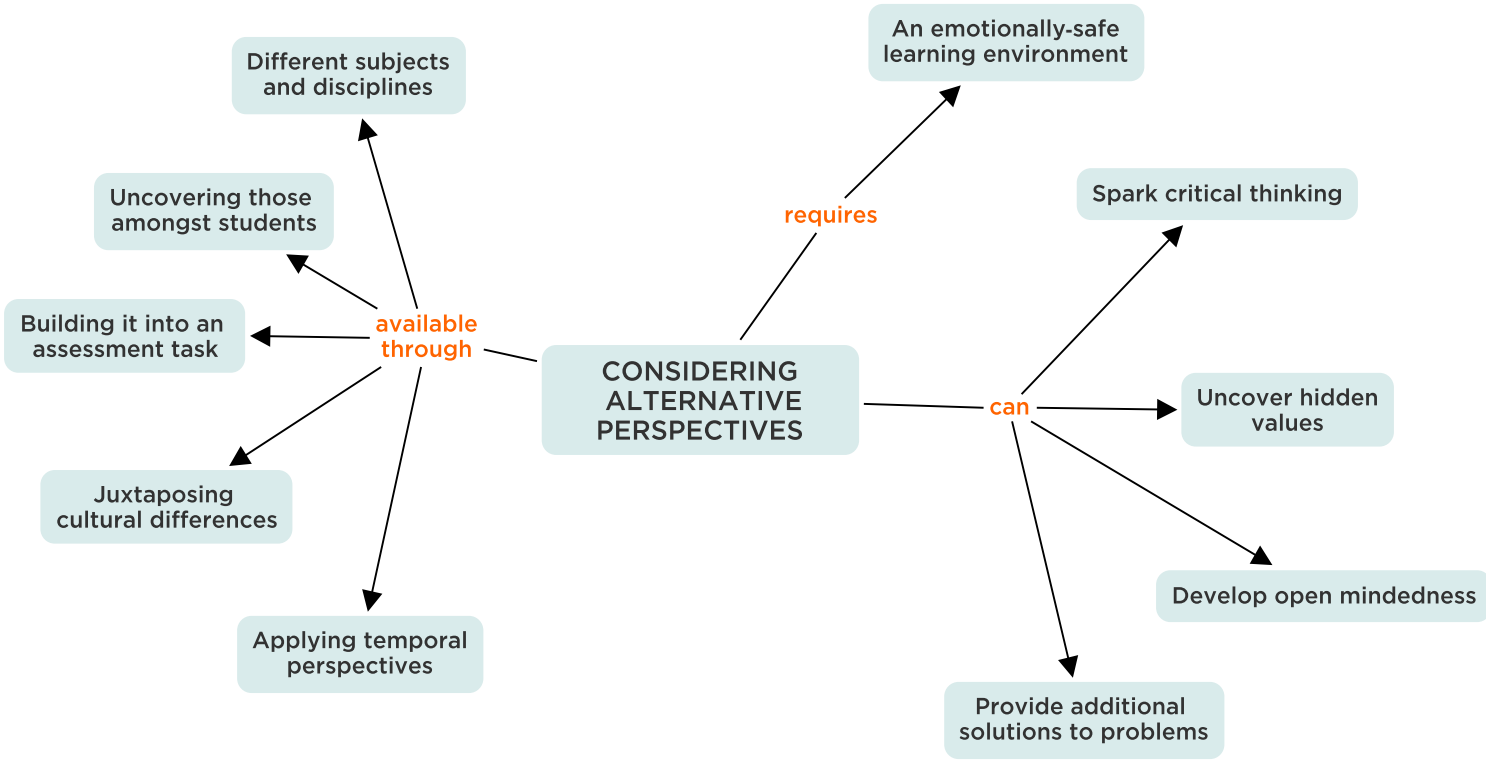
WHY USE IT?

- Exposes the values we have to the scrutiny of critical thinking preparing students to make better decisions as informed citizens.
- Creates a thinking challenge through which critical analysis skills and informed opinions can be developed
- Develops open-mindedness and willingness to take relevant evidence and argument into account in forming or revising our beliefs and values.
- Provides more options for solving problems and addressing challenges.
- Develops "intellectual empathy", the ability to respect and understand other points of view by making students more aware of their own values and biases.
- Respects diversity creating an environment that is emotionally safe for students to learn.
- Can address concerns of bias and indoctrination in the learning process

ALTERNATIVE PERSPECTIVES THROUGH ASSESSMENT

A secondary school essay on climate change required students to preset contrasting views on the issue and use analysis tools to support the position they presented.

BRINGING ALTERNATIVE PERSPECTIVES TO THE ATTENTION OF STUDENTS IS AN INVITATION FOR CRITICAL THINKING.



HOW TO USE IT — EXAMPLES

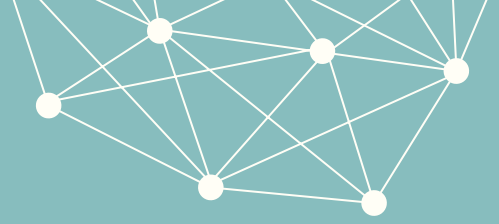
- Using literature and media sources that include different perspectives
- Using differences that exist within a class as a source of perspectives that can help all learners in the group.
- Requiring consideration of alternative perspectives in assessment tasks
- Temporal perspectives –considering the past and future today
- Juxtaposing cultural differences

IDENTIFYING MINORITY PERSPECTIVES

In the study of the conservation of resources the teacher asked the students to identify all the voices, human and non-human, in the community that would be impacted by the issue. Research was then conducted to flesh out each of these voices and bring their perspectives to decision making.

>> Access **Chapter 6, Considering Alternative Perspectives** for a detailed look at this learning strategy.

6 INQUIRY



No longer are we passive receptacles of facts but actively involved explorers, constantly interpreting our experiences.

- J. and S. Awbrey

WHAT IS IT?

- An approach to learning that is directed by questions that individuals and groups of learners work together to address. Both process and products of learning are assessed.
- At its best the learning is driven by student-generated questions. Students, assisted by the teacher, clarify the questions being asked and determine how to answer them. The outcome of the inquiry is shaped by the teacher so as to align with curriculum expectations. In the pursuit of answers unplanned but important learning territory is often uncovered.

BIODIVERSITY INQUIRY THAT STARTED FROM A FIELDTRIP

A grade 6 walking trip to a local woodlot to explore biodiversity led to many student questions about the life forms they encountered. The teacher recorded these and took digital photos of the relevant plants and animal evidence. Back in class these questions and observations became the starting point for individual and small group inquiries linked to the curriculum.

WHY USE IT?

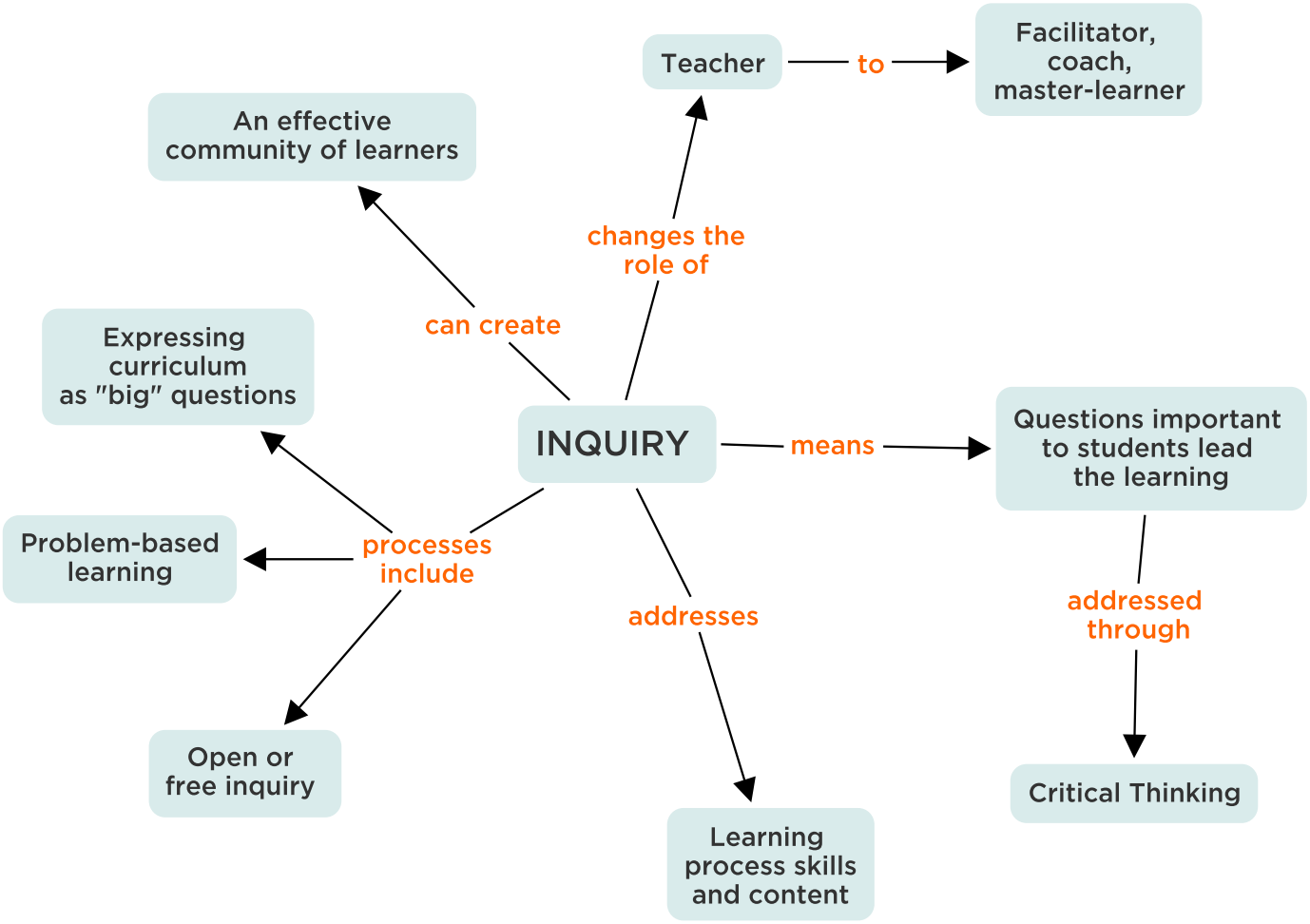
- Connects school learning with students' own knowledge and experiences.
- Provides a context to develop critical thinking skills and encourages problem solving - an important learning strategy for developing engaged citizenship and entrepreneurial, employment, community and interpersonal skills.
- Requires students pull information compared to traditional approaches that push it at them.
- Provides students with opportunities to apply a wide range of reading, writing, talking, listening, and thinking skills.
- Student learning improves when schools adopt a consistent model of inquiry across all grades and subjects.
- Supports the development of a community of learners where group knowledge building contributes to individual understanding.
- Helps students become more creative, positive and independent.

EXPRESSING CURRICULUM IN TERMS OF QUESTIONS

Teachers make a subtle but powerful shift in learning when they express curriculum in terms of critical thinking questions requiring judgment. Some examples:

- *How should we treat other living things?*
- *Can our form of government be improved?*

INQUIRY-BASED LEARNING IS MOST CONSISTENT WITH DEVELOPMENT OF THE SKILLS FOR LIFELONG LEARNING. IT PREPARES STUDENTS TO KNOW WHAT TO DO WHEN THE OPTIONS BEFORE THEM ARE NOT CLEAR.



HOW TO USE IT — EXAMPLES

- Expressing curriculum expectations as key questions
- Using experimental methods to answer scientific questions
- Problem-based learning
- Posing questions that require critical thinking
- Open or free Inquiry

INQUIRY THROUGH MATH PROBLEM SOLVING

Grade 9 math teachers devised an inquiry based on the question "Can everyone on the planet live like North Americans do today?" Location and analysis of data from many sources contributed to the positions students took in formulating their answers.

>> Access **Chapter 7, Inquiry** for a detailed look at this learning strategy.

7 SHARING RESPONSIBILITY FOR LEARNING WITH STUDENTS

Education becomes powerful when everyone has a voice in the decisions and power is shared. When we trust our students to make wise decisions and to take control of their education, they can and do create change. They find their voices; they become empowered and prepared to take a role in maintaining a democratic society.

- Karen Dockstader-Anderson

WHAT IS IT?

- The gradual release of responsibility, from teacher to student(s), in determining what is learned, how it is learned and what is assessed.

MULTIMEDIA CONSERVATION MESSAGES

A community group invited students to examine a local land use issue and share their findings through media. The teacher stepped back and let the students go through the challenging steps of identifying what the project would entail, how they would go about it and determining what the success criteria would be.

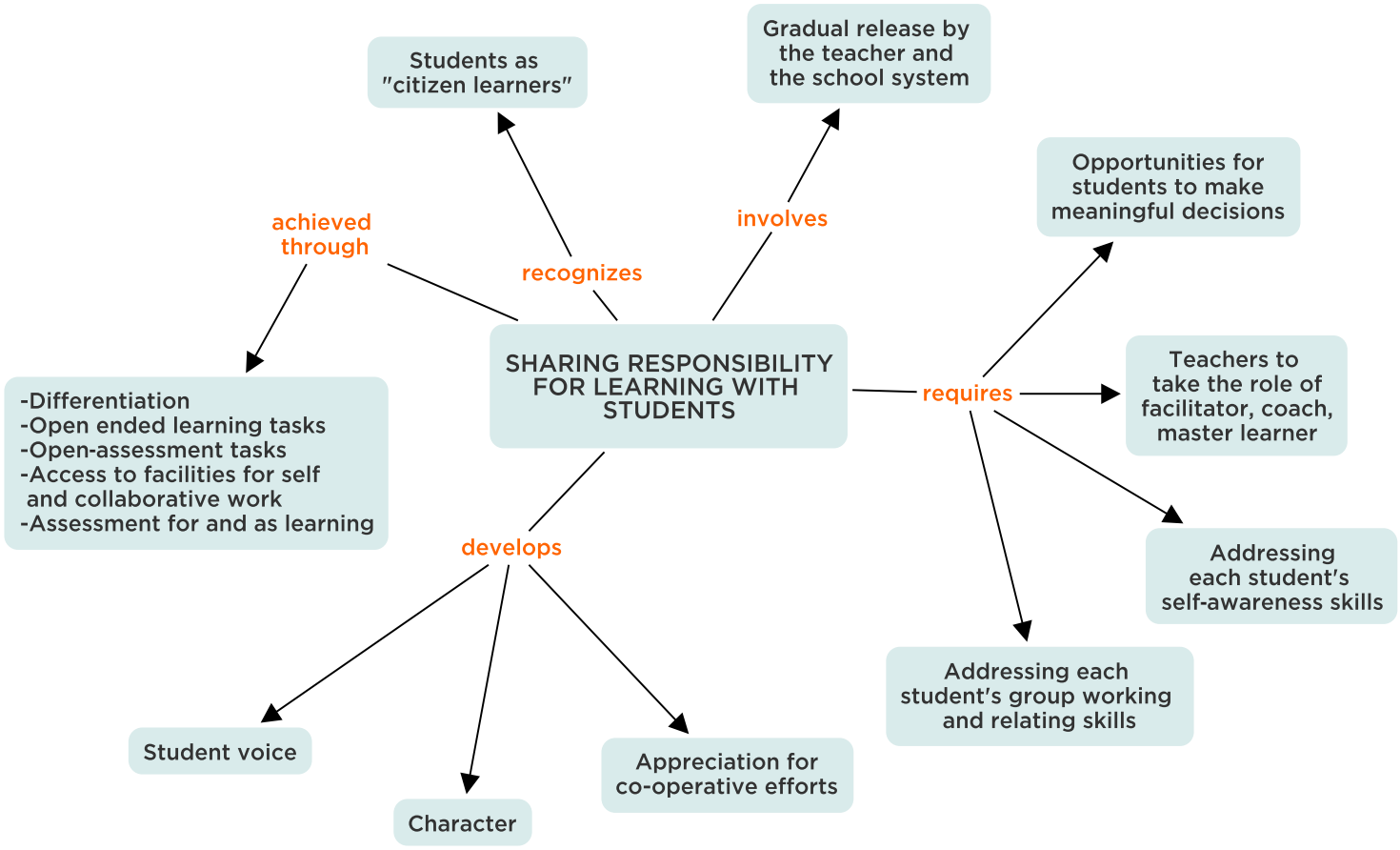
WHY USE IT?

- Addresses the development of self and group awareness skills and habits to prepare students to successfully take greater responsibility for their learning.
- Allows for students to make authentic decisions with consequences, individually and as collaborative learning groups.
- Engages students as active participants in the development and practice of democracy.
- Demonstrates to students the benefits of co-operative actions.
- Contributes to social and character development through the establishment and negotiation of rules, behaviors and actions.
- Contributes to positive learner attitudes and development of student voice.

SELF AND GROUP REFLECTION

Grade 12 students engaged in weekly reflection as they participated in a complex community local food project. Through reflection activities shared frustrations and fears were identified and discussed. Over time the effectiveness of the group to address the challenge of the project greatly improved.

PREPARATION FOR ACTIVE AND ENGAGED CITIZENSHIP REQUIRES EDUCATORS TRANSFER THE RESPONSIBILITY FOR LEARNING TO STUDENTS. STUDENT MOTIVATIONS AND ABILITIES MUST EVOLVE TO INDEPENDENTLY DIRECT THEIR LEARNING AND WE AS TEACHERS MUST GRADUALLY STEP BACK TO TAKE A SUPPORTING ROLE.



HOW TO USE IT — EXAMPLES

- Creating authentic open–ended learning experiences
- Teacher taking the role of facilitator, coach, master learner
- Differentiating instruction to allow for student interests
- Using assessment for and as learning strategies
- Developing productive self-awareness skills and habits
- Developing productive group awareness skills and habits

HOW SHOULD WE LEARN ABOUT EARLY CIVILIZATIONS?

A grade 5 teacher invited the class to help her decide how they would go about learning about early civilizations. She challenged them to include the importance of the environment. The students launched a comparative investigation and pursued the learning to a degree much greater than expected.

>> Access **Chapter 8, Sharing Responsibility for Learning with Students** for a detailed look at this learning strategy.

CONNECTING THE DOTS

KEY LEARNING STRATEGIES FOR ENVIRONMENTAL EDUCATION, CITIZENSHIP AND SUSTAINABILITY

WHAT?	HOW?	WHY?
LEARNING LOCALLY — COMMUNITY AS CLASSROOM	Use learners' local issues and learning opportunities right outside the school door.	• Acknowledges the value of our own places and relates learning to what we are most familiar with in our daily lives.
INTEGRATED LEARNING	Integrate skills and knowledge from all subjects.	• Deepens learning and allows time to practice skills, especially critical literacies and numeracies. • Achieves deep understanding that crosses social, economic and ecological dimensions.
ACTING ON LEARNING	Apply what has been learned for the benefit of others.	• Empowers students and creates active citizens • Doing generates hope. • Action engages all kinds of learners.
REAL-WORLD CONNECTIONS	Connect learning to what is important to the student's life and to the broader community.	• Makes learning relevant. • Links learning to life. • Applies cutting edge technologies and critical literacies.
CONSIDERING ALTERNATIVE PERSPECTIVES	Purposefully bring different points of view to learning experiences.	• Sparks critical thinking and values examination. • Values different points of view, embraces diversity of thought and experience.
INQUIRY	Frame curriculum in terms of questions that require critical thinking.	• Moves from pushing information, to students pulling it. • Engages all kinds of learners. • Drives new ideas and thinking. • Co-constructs curriculum.
SHARING RESPONSBIITY FOR LEARNING WITH STUDENTS	• Authentic assessment designed with students • Teacher as master learner providing feedback • Co-constructing next steps. • Peer teaching • Self and group reflection	• Values learning styles and learning skills and creates independent thinkers. • Supports leadership development, initiative and the skills of working together.

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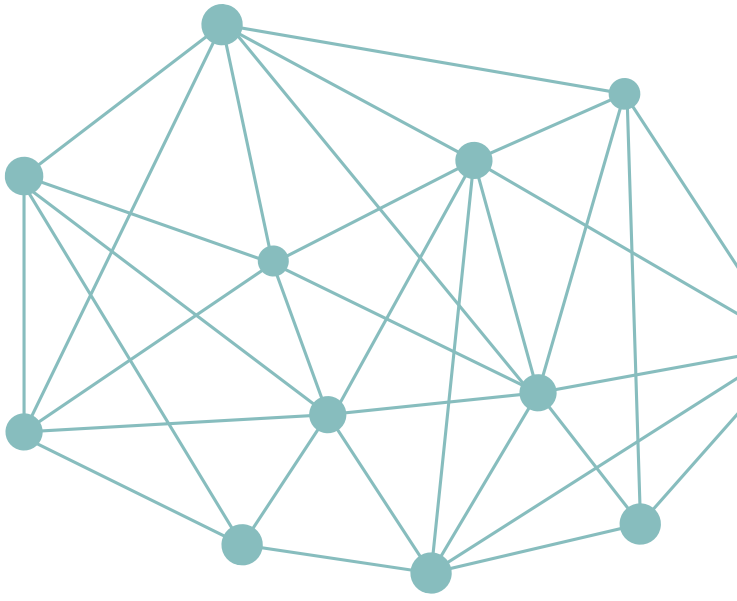

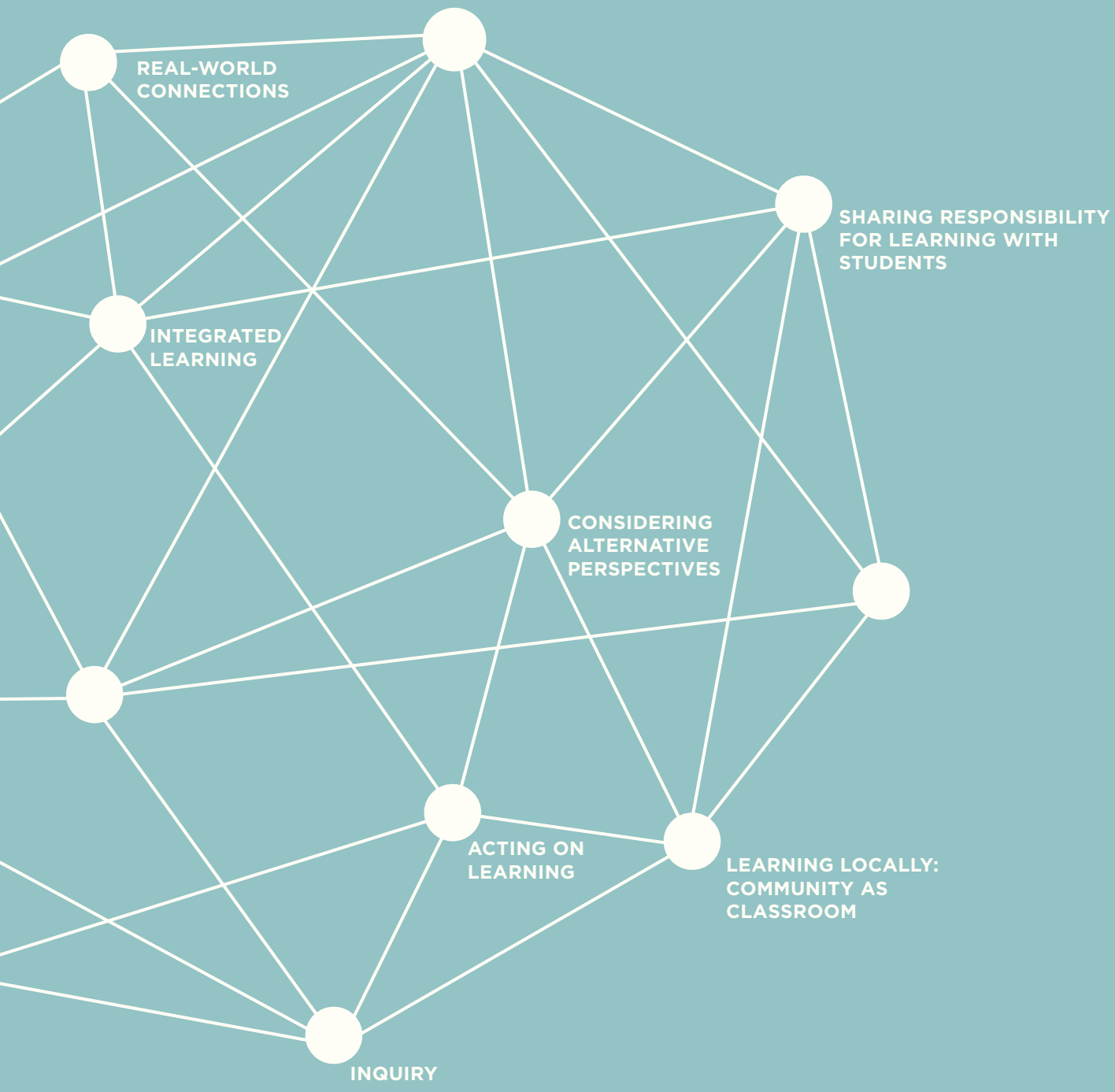
REAL-WORLD CONNECTIONS
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INQUIRY