Teaching/ Learning Strategies

Assessment Strategies

Writing Organizers
- Teaching a New Text Form
- Primary Organizers
- Junior Organizers
- Intermediate Organizers

Book Levelling
Activity Based Strategies

- **Activity/Learning Centres p.2**
  Learning centres describe specifically assigned spaces where learning activities are provided which promote exploration and interaction with other students. Learning centres foster both independent and collaborative learning and can include permanent organizational structures such as listening, reading, science, painting or music centres or flexible centres related to specific topics or curriculum areas. The variety of resources and types of information sources available in such centres can support achievement of curriculum expectations through different modes of learning. Rotation through the various activities allows for students to actively explore areas of interest in greater depth. Learning centres enhance student motivation by providing choices and develop interpersonal skills and independent work habits. Centres can be set up in the classroom, the school library information centre and other areas of the school.

- **Carousel p.3**
  Carousel is an information strategy that allows for each student to share a project, a summary of an article or research report with several groups in the classroom. One student in each group is designated to share the information and remains, while the rest of the group rotates to listen to the designated speaker from another group. This occurs in a rotational sequence with all the groups in the class.

- **Debate p.4**
  Debates are formal verbal presentations of opposing sides of an issue by two teams/individuals before an audience or judge. A debate follows a clearly defined format (e.g. who speaks first and last, how long each team speaks, parliamentary conventions). Debating is used to strengthen and extend understanding of an issue and to demonstrate and develop cognitive thinking, research and public speaking skills. It requires a level of expertise or comfort in a range of oral skills (e.g. logical argument, thinking quickly on your feet, clear expression of ideas and arguments) while it promotes risk-taking and problem solving. Debating can also be used to examine unfamiliar contexts or to explore a current, historical or social issue in depth. Students are likely to analyze information more carefully if they are required to provide proof to substantiate their arguments.

- **Docudrama p.5**
  Docudrama is a dramatization based on fact that combines documentary and fictional elements. Docudrmas are representations of historical events or lives of historical characters in order to present a particular point of view from within the event or from the perspective of an outsider looking in. The performers often use historical costumes and authentic dialogue to enhance the dramatization. The process strengthens understanding by transforming knowledge about a person or event in to a new creative form.

- **Field Trip p.6**
  A field trip occurs when students, teachers and volunteers leave the school building in the pursuit of learning. A field trip is used when active exploration and investigation away from the school will best promote learning by seeing things in authentic contexts. Field trips are relevant when teacher plans require students to apply learning in real settings or when field trips create a real-life experience related to classroom curriculum expectations. Field trips provide concrete, experiential learning opportunities and motivate students to gather data. Field trips can involve the exploration and investigation of a variety of resources by students (e.g. natural settings, museum, factory, community settings) and may be facilitated by guides/specialists in partnership with teachers and volunteers.

- **Game p.7**
  Games are challenging activities, simulations, or contests (competitive and cooperative) played according to a clear set of rules that provide students with opportunities for increased factual knowledge, decision making and interpersonal skills. Game rules help participants realize that their decisions have consequences for themselves as well as for the other participants in the game. Games are designed to achieve clearly defined expectations such as teamwork, skill development or improved communication. Games, whether print, media or electronic are meant to be fun and when run within a protected environment can motivate and build enthusiasm in students for their learning. As cooperative activities, games can foster mutual support within a group and increase self-confidence, as students become increasingly capable and competent. They can also be an effective way to bring people together by building trust and breaking down barriers between individuals and groups.
Oral Presentation p. 8
An oral presentation involves the formal or informal presentation of material to an audience. Oral presentations can vary greatly both in content and format. To be effective, students must select a suitable topic, organize the presentation in a clear and logical format, and use appropriate language. It is important to engage the audience by maintaining eye contact, using appropriate body language, and communicating ideas with clear diction and good grammar. An appealing opening, colourful anecdotes and audience participation are other ways of ensuring the effectiveness of the presentation. An oral presentation is an effective way for delivering reports, new material, facts, questions and suppositions about a topic.

Panel Discussion p.9
A panel discussion involves a group of participants presenting a topic before an audience and a moderator introducing and facilitating the discussion. A panel discussion provides opportunities for students to examine controversial issues from different perspectives. The moderator introduces the topic and the panel members then each present a prepared statement of three to five minutes representing various viewpoints. The moderator facilitates audience participation and allows panel members to clarify previous statements or provide new information. After a discussion period has occurred, the moderator asks each panel member for some general conclusions or summary statements. Topics chosen for a panel discussion should engage students intellectually and emotionally, allowing them to use higher order thinking as they make reasoned and logical arguments.

Rehearsal/repetition/practise p.10
Rehearsal/repetition/practice is a strategy whereby students engage in repeated encounters with facts, rules, patterns, skills, or procedures that need to be recalled and applied during current or future demonstrations of learning. This strategy may include self-cueing or self-talk throughout a process or may involve doing a task repeatedly. Rehearsal/repetition/practice can be applied across all curriculum areas and all ages to help students build a repertoire of readily available essential skills and knowledge (e.g. multiplication tables). The strategy helps students recall the order or details of a procedure or strategy they frequently use in learning (e.g. what to do when they come to an unknown word in reading), thus building confidence and independence in learning.

Retelling p.11
Retelling is a recollection of what has been heard, read, understood or experienced that can take many forms (e.g. drama, written, oral) and may involve sequencing (e.g. first, then, after that). It is a comprehension strategy that can examine a student's assumptions and understandings and lead to further reading and responding activities. Planned or spontaneous retelling is a sharing of knowledge or information. Retelling verifies information the learner has gained from experience and organizes thinking. It can be used as a study strategy across all grades and subjects.

Simulation p.12
Simulation is a model or set of circumstances that replicates real or hypothetical conditions through which students respond and act as though the situation were real. Simulation is used when learning about complex processes, events or ideas (e.g. global warming, immigration, the judicial system, the Olympics), when learning about systems, machines or phenomena that can be replicated, or when trying to understand the emotions and feelings of others. Simulation requires the manipulation of a variety of factors and variables, allowing students to explore alternatives and solve problems and to incorporate values and attitudes into making decisions and experiencing the results. Simulation can take a number of forms, including role-playing, case studies, skits, historical events, and replicas of processes or systems. Simulation applications create a computer model of a real-life situation and can be particularly effective in developing and sustaining a virtual situation while testing a set of variables.

Surveys p.13
A survey is a research method used to extend understanding of an issue or topic by gathering facts, opinions, interests, and attitudes from a representative sample of a population. Conducting an effective survey involves clearly identifying the research question; determining the instrument to be used (e.g. questionnaire, test, interview or attitude scale); determining the population to be surveyed; collecting the data and tabulating the results. Surveys must be carefully structured and pre-tested and include a high rate of response to be accurate. For validity, surveys must be directed to a representative sample. To ensure a high rate of return certain strategies must be followed including identifying the sponsor, inclusion of a cover letter stating the purpose, clear instructions, objective items, attractive format, minimum length and assurance of anonymity. Questions of confidentiality and ethical considerations must be carefully presented to students prior to administering the survey.
Arts Based Strategies

- **Ceremony p. 15**
  Ceremony is the use of ritualistic and stylistic conventions and practices to depict unique and distinguishing features of historical or social traditions of a culture. Ceremony imposes a formal structure often with prescribed traditional movements, costumes or artifacts. Innovative use of ceremony can provide opportunities for student for creative expression in dance and drama.

- **Chanting p. 16**
  Chanting is a process of exploring words and text through a rhythmical reading. Chanting helps students to interpret meaning of a passage through rhythm and actions while engaging them in a new learning experience. The process also increases rhyme and phonemic awareness as students examine structure and meaning of language. By giving a rhythmic focus for listening, students match text and meaning to sound. This strategy promotes a high level of participation.

- **Choral Reading p.17**
  Choral reading is a rehearsed oral presentation of a text by a group. Choral reading may be used to engage students at the introduction of a learning experience or to aid the interpretation of text. Through choral reading, students explore sounds and rhythms of language and show appreciation of form. The process also provides a purpose for practising reading orally and improves reading skills (e.g. students' eyes have to scan the line to keep up with others). Choral reading requires that voices of the group be arranged to effectively interpret meaning (e.g. solos, groups, whole group, volume, tones, rhythms) and in so doing encourages students to use their voices with greater expression, vocal range and skill. As a group activity, choral reading promotes cooperation and enhances self-esteem by allowing individuals to make positive contributions.

- **Choreography p. 18**
  Choreography is the planning and arranging of the basic elements of dance - space, shape, time and energy - into a finished dance composition. The term is used to describe the actual steps, groupings and patterns of a dance composition. Choreography provides for creative expression through rhythmic motor activity. Choreography can involve using traditional steps of a particular dance structure or it can represent a new composition.

- **Collage p. 19**
  Collage (visual format) is the creation of a new image formed by attaching materials such as paper, fabrics, photos and other objects to a flat surface. A collage is composed of bits and pieces of originally unrelated images, including used commercial materials, to illustrate a theme, story or create a new aesthetic work. A collage can have a strong impact by making a social statement, often using found objects or commercial images. The concept of collage can also be transferred to other art forms through examples such as photomontage, musical collage, dance collage, and multimedia collage. These include similar approaches to design and composition to create a new work in the particular medium chosen.

- **Forum Theatre p. 20**
  Forum theatre is a theatrical activity where a problem is shown in an unsolved form, and the audience (of "spect-actors") is invited to suggest and enact solutions. Many different solutions are enacted in the course of a single forum - the result is a pooling of knowledge, tactics and experience. The action may be stopped at key points to involve the audience in speculating out loud about what the characters are thinking, suggesting alternative actions for the characters to try in order to solve the problem, or to ask characters to assume roles from alternate points of view. Forum theatre is used to work towards desirable attitudes, values and interpersonal relationships and solve real societal problems when personalized understanding is needed. It provides an approach to complex curriculum material that evokes strong intellectual and emotional response in students. Forum theatre also provides experience in appreciating or giving another point of view.

- **Improvisation p. 21**
  Improvisation is a process in which, within predictable structures, students are free to experiment and create in order to stimulate new ideas. It may be used in specific subject disciplines such as drama, art, music, mathematics, science, language, and social studies, or in cross-curricular activities. In drama for instance, improvisation is the creation of scenes and characters without the aid of a script. Improvisation may be used to elicit and develop self-expression, generate new questions, foster team building, resolve conflict creatively and assist students in exploring genre, issues, characters, and ideas freely within a structure. Improvisation may be carefully planned or
can take the form of spontaneous response. It can be used to solve problems based on hypothesis building and hypothesis testing.

- **Mask Making p. 22**
  Mask making is the creation of a shell-like structure that covers or adapts to the face and is embellished with paint, graphics, feathers or other materials. The intent is to create a functional work of art that enables a performer, with minimal costuming, to take on a different appearance or role, mimic an animal, bird or assume a god-like persona. Masks are often deemed to have religious or cult-like attributes and are believed in some cultures to have powers to fend off evil spirits.

- **Puppetry p. 23**
  Puppetry is a process in which students and/or the teacher manipulate puppets to explore and respond to story, characters, issues and information. The rich cultural traditions of puppetry (e.g. marionettes, shadow puppets, glove-puppets) offer many opportunities in predicting, planning, organizing, entertaining and problem solving. Puppetry may be used to engage students in storytelling or to explore story and character possibilities in the precomposing stage of writing. It can use role-play to explore different contexts and points of view for conflict resolution. Through puppetry, students are presented with new information and can use puppets to communicate understanding with less risk than with other approaches. Puppetry engages students readily by encouraging physical involvement, promoting social interaction, developing communication skills, and supporting role playing, improvisation, and story telling.

- **Reader’s Theatre p. 24**
  Reader’s theatre is a technique that allows students to dramatize narration selected from novels, short stories, picture books, and poems. Reader’s theatre may be used to highlight aspects of text such as difference in narrator and character and to enhance literal and interpretative understanding. This strategy promotes a sense of audience and purpose and requires a high level of group collaboration. Individuals and groups use voices, facial expressions, and gestures to bring meaning to the text. Although this technique does not require memorization, it does require rehearsal.

- **Role-Playing p. 25**
  Role-playing is a process in which one explores the thoughts and feelings of another person by responding and behaving as that person would in a simulated situation. It can involve pairs, groups or the whole class. Role-playing may be used to examine the viewpoints of others and communicate understanding. Role-playing gives the distance and safety of role while it provides an opportunity to explore a current, historical, or social issue. It engages students in a text or problem and allows them to apply personal and group skills in assessment of prior knowledge, decision making and problem solving by examining situations in unfamiliar contexts. Role-playing enhances reflection since feedback and debriefing are integral parts of the process.

- **Sketching To Learn p. 26**
  Sketching to learn is a strategy whereby students visually represent the ideas they hear, read or think about in pictorial/graphic form during or immediately following a presentation. Sketching to learn is used as a form of note making during story reading or reading of informational texts. It is often used to help students follow a listening, viewing or reading experience in order to process new and complex ideas or concepts.

- **Story Theatre p. 27**
  Story theatre is a technique for telling stories in dramatic format. A narrator may tell the story with other students acting it out through the use of dialogue or mime or the various characters may also provide the narration. Story theatre provides a variety of experiences such as reading the play, assuming roles, memorizing lines, creating costumes and sets, practising music and choreography and finally, performing before an audience. Story theatre develops cognitive skills through organization of thoughts and analysis of the parts and whole of the production, rehearsal and performance. It provides a concrete experience in collaboration as students work with others towards a common goal.

- **Storyboard p. 28**
  A storyboard is a series of sketches that frame events (e.g. of a story, film, advertisement) in sequential order. It is used as a visual planning tool for larger presentations in a variety of formats. Each frame consists of scenes or figures with commentary that helps those involved in the production to visualize the story and sequence. In a television production, for instance, each frame represents a change in camera shot. Instructions for the dialogue, transitions, special effects and audio have their own unique coding system and are written on the storyboards in
ways that are understood by the production crew. Storyboards can be used for a variety of other classroom activities and give students the opportunity to translate ideas or stories into a different mode of expression.

- **Tableau p. 29**
  Tableau is a purposeful arrangement of a group of people representing a moment frozen in time. Tableau may be used to explore sequence, plot development, characterization by arranging a number of tableaux in a series or to initiate or summarize discussion. Tableau is also used to access prior learning about a character, genre, text, current event, or historical event. A tableau shows the feeling of characters at a particular time and may reveal relationships between characters by promoting interpretation of text, character or a situation. Tableau provides a format for the development of collaborative group skills.

**Cooperative Learning Strategies**

- **Brainstorming p. 31**
  Brainstorming is a group process for generating questions, ideas, and examples and is used to illustrate, expand, or explore a central idea or topic. Brainstorming involves students sharing whatever material comes to mind and recording every idea, without making judgements about the material being generated. When introducing a topic, brainstorming can be used for assessing what students already know or wish to learn, and for providing direction for learning and reflection. Brainstorming stimulates fluent and flexible thinking, and can also extend problem-solving and problem-finding skills.

- **Buddy System p. 32**
  The buddy system involves linking students for peer/cross-age support through a number of curriculum or co-curricular activities. It may be established for one student or an entire class/school of students. The buddy system provides opportunities for mentoring and provides student role models. The buddy system is used for specific purposes with specific activities linked to these purposes. It provides for authentic audiences for reading, writing, listening and speaking activities. Elementary and secondary students can connect within a class or across classes, and with schools, colleges, universities, and countries (e.g. via telecommunications).

- **Community Involvement p. 33**
  Community involvement describes a wide variety of activities that involve members of the community as part of the learning experiences in a school and involve students as learners in partnership with the community. Community involvement is used when resources and expertise in the community support learning thus providing benefits for both school and community. Community involvement can also include student volunteer activities in such places as senior citizen centre or daycare facilities. Community involvement may be initiated by school personnel or community individuals or groups and may involve long-term associations between a school and community. It requires knowledge of community organizations and clubs and their resources in order to develop mutually beneficial programs. Community involvement may also focus on project-based initiatives.

- **Discussion p. 34**
  Discussion is purposeful talk through which students explore thinking, respond to ideas, process information and articulate their thoughts in verbal exchanges with peers and teachers. Discussion is used to promote and clarify understanding of concepts, ideas and information in all subject areas. It places the emphasis on students talking and listening to each other. Students use discussion to make connections between ideas and experience and to reflect on a variety of meanings and interpretations of texts, experiences, and phenomena.

- **Interview p. 35**
  The interview is a conversation or dialogue in which the interviewer seeks to gain information and insights from the person being interviewed. The interview is used to gain personal and practical information and explore ideas (e.g. interview a character from literature or history) from an expert or a person in the role of an expert. Interviews help to focus on significant information or ideas or experiences that yield new learning. The interview can teach students how to probe and follow up questions for further understanding.

- **Jigsaw p. 36**
  The jigsaw is a co-operative learning strategy that provides opportunities for students to gain a variety of perspectives and insights by participating in a specialized group and then by sharing and integrating what they learned in their “home” group. The jigsaw is used to help students acquire an overview of a range of material or
opinions. It enables expertise to be developed, recognized and shared within a group and encourages a high level of student participation. The strategy may provide a review of previously learned material or identify questions or problems within an issue or topic. The jigsaw supports risk-taking and the development of interpersonal skills and abilities.

- **Numbered Heads p. 38**
  Numbered heads is a structure whereby students number off (e.g. four in a group) and the teacher poses a problem and sets a time limit for each group to investigate the problem. The teacher calls a number and the student with that number in each group responds. This strategy has a simple structure with a short time frame and can be used at any point in a learning experience. All participants are involved in thinking and talking as they work collectively to respond to the question and ensure that each member of the group understands the answer. Numbered heads is used as an alternative to whole class question-and-answer and as a way to support all class members simultaneously in review or consolidation of learning.

- **Peer Practice p. 39**
  In peer practice, students help each other to review, drill, and rehearse in pairs or small groups of three or four in order to consolidate their understandings or enhance skill development. Peer practice may be incorporated into direct whole class instruction periods or may be included on a regular basis in classroom learning experiences (e.g. before quizzes, every morning). It is used to reinforce step-by-step skills and to enhance accuracy and effectiveness of performance. It provides a structured process to rehearse or review knowledge within time limits. Students may initiate and establish peer practice themselves, as in study groups.

- **Peer Teaching p. 40**
  Peer teaching is a strategy whereby individuals or groups of students who are competent in a skill, or who are knowledgeable in a particular area, teach what they know to their peers. Peer teaching may be used to individualize a program so students can learn a skill or have information presented when it is required. Peer teaching also creates a community of learners where all strengths are valued. It can be used to reinforce a concept such as instructing “home groups” in a jigsaw. Peer teaching requires students to explain and clarify thinking to communicate learning to other students thereby building confidence and self-esteem. This strategy releases the teacher from being sole expert, but does require that clear expectations be set.

- **Round Robin p. 41**
  Round robin is a strategy whereby students, in small groups, engage in structured discussion which encourages each student, in turn, to contribute ideas and information. Round robin is used to inform and reflect about books, stories, experiences, understandings and to share learning. It may be applied at the beginning of a project (e.g. to explore how to build a pond); during a process (e.g. to share responses to a class read story); or at the end of an activity (e.g. to state evaluation to group science activity). Round robin can be used to develop and suggest solutions to problems or challenges and to share interpretations or understandings of concepts and phenomena. Round robin requires students to prepare or rehearse a first contribution and to build on the preceding ideas or information in subsequent contributions, while maintaining a clear focus.

- **Round Table p. 42**
  Round table is an information sharing strategy that is used to generate multiple answers to a question posed by the teacher. Students respond in writing to a question that requires answers that are factual, not conceptual or controversial. In sequential Round table, one piece of paper circulates and students add information that answers the question as it comes to them. In a simultaneous Round table, each student responds on a separate piece of paper. At the end of both writing activities, the students present their answers to the class. This strategy encourages students to take turns, listen actively to peers, and add information to build on the ideas of others. The next step in the strategy can be to have students develop categories about the topic and organize their answers into the appropriate categories.

- **Think/Pair/Share p. 43**
  Think/pair/share is a strategy whereby students think alone for a specified amount of time (wait time) in response to a question that the teacher poses, form pairs to discuss their ideas, and then share responses with the class. Think/pair/share is used to help students check their understanding during a learning experience and provide opportunities for practice or rehearsal. It provides a simple structure within a short time frame for all students in the class to think and talk (e.g. to pose questions, to respond to an issue, to summarize or synthesize ideas).
Direct Instruction Strategies

- **Advance Organizer p. 45**
  An advance organizer is an outline or pattern that encompasses the elements of a lesson or learning task. It provides organizational structure and support for student planning and learning. Students use advance organizers to focus their learning and to assist with the selection, organization and synthesis of information or to provide a breakdown of the steps required for task completion. Advance organizers demonstrate how knowledge is structured and provide a frame of reference for the lesson so that each part can be more easily understood. The steps presented in an advance organizer are dependent on the learning experience or task (e.g. in science, the steps might be observations, hypotheses, experimental design, experimental results, and drawing conclusions).

- **Book Talks p. 46**
  Book talks are oral presentations that promote reading materials to students. Book talks stimulate interest in reading, create awareness about the variety of materials available on a particular theme or issue, and expose students to new areas of reading. The texts presented can be informational or fictional, related to the curriculum or personal recreation but should act as an invitation for further exploration by students. Book talks can provide opportunities to make connections between real life problems or issues and those encountered by fictional characters. If a single book is featured, a booktalk could focus on a particular element such as plot, character or theme to stimulate further interest.

- **Cloze p. 47**
  Cloze is an activity whereby students fill in unfinished sentences or missing words in text. Cloze involves a systematic omission of letters, words, and phrases from written or oral text which cause students to bring to bear their own knowledge of the text itself, the context and the language involved in order to restore the gaps. Cloze may be used to assess or develop listening skills, reading comprehension skills, and such reading strategies as predicting meaning. The use of these strategies will enable students to develop specific knowledge of language features such as vocabulary and demonstrate understanding of the information in text.

- **Conferences p. 48**
  Conferences are meetings to discuss student work in pairs or small groups in order to facilitate learning (e.g. report on progress, point out strengths, consider problems/solutions, and focus on specific topics). Conferences can be conducted in a variety of formats with the teacher, with other students and with parents/guardians. They may be chaired by the student or the teacher depending upon the purpose. In all cases, conferencing requires an inviting and supportive forum for open, responsive discussion and demands a high trust level between participants. Conferencing provides both an opportunity to guide and support the learner and a forum for students to demonstrate learning (e.g. through written work such as a portfolio or progress log) and express themselves through the ensuing dialogue.

- **Demonstration p. 50**
  Demonstration involves modelling a process, showing how something works or providing an example. Demonstrations give concrete examples of a concept that needs to be learned, a strategy that needs to be practised or knowledge that needs to be acquired. Materials and context are prepared ahead of time. Demonstrations should be manageable, informative, and applicable to the developmental stage of the student and should be repeated to strengthen the impact. Demonstrations respond to the needs of visual learners (if the teacher models) or kinetic learners (if the student models) and promote the development of observation skills. There is a link between demonstration and further learning as students engage in questions and practices that confirm and ensure their understanding.

- **Directed Reading/Thinking Activity (DRTA) p. 50**
  A directed reading-thinking activity is a process in which students are assisted to set purposes for, and make predictions about their reading. Students gain ideas and information and make connections with literature: stories, poems, narratives, and genre. The process assists students in learning how informational texts work in content areas (i.e. science, geography, and technology), in developing fluency and interest, and in focusing their thinking about what they are reading. The process includes: an introductory phase that provides background, new concepts and purpose; individual reading (of the same text); discussion and interpretation; skill development of vocabulary and comprehension; and a follow-up activity. A directed reading-thinking activity provides opportunity to group students according to interest, learning, and needs. The process also allows students of different abilities and backgrounds to successfully find meaning in text.
Expository Text Frames p. 52
Expository text frames provide students with a variety of visual organizers or frames (that show the structure or organization of non-fiction text forms) to assist with reading and writing in content areas. They are applicable in all subject areas, but are particularly useful for reading and writing applications in science and the social sciences. A key purpose of using expository text frames is to ensure that students have included all key elements in their writing and to teach the text features (e.g. signal words, main idea, supporting detail, headings) of various non-fiction text forms in order to accomplish the specific writing task. Text frames also facilitate the search for information and the development of connections and relationships in non-fiction text.

Flash Cards p. 53
Flash cards are double-sided cards used to assist students in mastering key skills and knowledge through drill and practice. One side has the problem, term or issue, the other side has the answer, definition or related information. Flash cards are particularly useful for learning, memorizing or reviewing factual information. They can be made individually as a study aid or involve students in working together as they take turns practising and reviewing. Flash cards are often used in second language learning to teach and review vocabulary or in mathematics to reinforce mathematical structures such as the times tables. They provide positive reinforcement as repetition leads to mastery of the material.

Guest Speaker p. 54
A guest speaker is a speaker, usually from outside the school, who may present ideas, alternative perspectives, opinions, descriptions of real-life experiences and may answer questions generated by students. Speakers may present alone or as part of a panel. A guest speaker can provide alternative resources and experiences for learning and provide opportunities for students to learn detailed content from a primary source. Guest speakers generate interest and provide real-life connections to curriculum.

Guided Exploration p. 55
Guided exploration is a strategy whereby the teacher models or presents a concept or skill that is part of a larger set of skills or knowledge and guides the students as they imitate or practise this first step. The process is repeated until the students master the expected knowledge and skills of the lesson. This strategy is particularly useful for introducing new or unfamiliar skills that build sequentially up to mastery. By assessing and monitoring the progress of the student through every step of the process, the teacher can determine when the students are able to apply the skills independently.

Guided Reading p. 56
Guided reading is a strategy whereby students are grouped according to similar reading abilities or needs in order to have them read more complex texts and to acquire skills to read independently for greater success and enjoyment. The collaborative learning groups will re-group as the students’ individual reading abilities change. Guided reading supports students in learning about and understanding new text through interaction about the ideas, information and interpretation of the reading materials. The process enhances understanding of information and supports understanding of aspects of reading such as: choosing a book; learning reading strategies for different genres; linking prior knowledge; and using meaning, syntax, and phonics to work out unknown words.

Guided Writing p. 57
Guided writing is a process of using a variety of writing experiences to direct student understanding of the process, purpose and form of writing. Guided writing demonstrates ways of creating, describing, recording, explaining and organizing information. It expands the student's repertoire of techniques and modes of writing and introduces writing in unfamiliar contexts (e.g. writing a newspaper article, writing in role), thereby complementing personal writing. Guided writing usually involves small group interaction for analysis and editing purposes. It supports risk-taking by providing structure at the beginning of new learning and builds confidence in writing.

Lecture p. 58
A lecture is an oral presentation of information during which the learner is responsible for taking appropriate notes. A lecture provides an opportunity for students to develop and practise listening and note-taking skills. This teacher/presenter-centred format is well suited to transmit information within time constraints and to provide whole groups with structured knowledge or step-by-step skill instruction. Lectures appeal to auditory learners and, when visual learning aids accompany the oral presentation, to visual learners.
Making Words/Word Sorts p. 59
Making words/word sorts is a hands-on strategy that helps students learn how to work with letters to form words, how to change letters to form new words, and how to look for patterns in words. Making words/word sorts is used when students need to understand how words work and to develop knowledge of common or high frequency words. This activity may be done with pencil or paper or with a predetermined set of magnetic alphabet letters, letter tiles or letter cards. Students are directed to create two letter words, then to add a letter to make a three letter word, and so on, with the aim of reaching a particular target word. Words are then sorted according to common patterns or characteristics such as rhyming words, words that end the same, or words that start the same.

Media Presentation p. 60
A media presentation involves the use of various media to present information and ideas. The presentation could involve audiotape or videotape, presentation slide shows, or multimedia graphics using sound systems, television or computer monitors, overhead projections, or other electronic formats. The presentations can increase interest in a topic by providing currency and variety and by appealing to the visual and auditory learner thereby addressing a number of learning styles. As technology evolves, presentations may become more interactive and involve some form of audience participation. Presentation graphics software automates the creation of visual aids for lectures, skills training sessions and group presentations, often in the form of colourful and animated on-screen slides.

Memorization p. 61
Memorization is a mental, oral or written rehearsal of content or skill that enables the material to be recalled quickly for further development or transfer to other contexts. It is a means of mentally organizing words or concepts in order to connect them to the objects, events, actions or qualities that they represent. Memorization is an individual activity, which is highly dependent upon the learner’s capacity to recollect information. It is particularly relevant when a foundation or base of knowledge needs to be recalled quickly or as a base for further knowledge and transfer (e.g. alphabet for dictionary skills). By memorizing basic facts, poems or lines, the mind can be free to concentrate on oral presentation skills. Memorization includes both short-term and long-term recall and can be improved through practice.

Mnemonic Devices p. 62
Mnemonic devices are short and easy-to-remember cues that trigger the recall of particular information from memory. Mnemonic devices may use rhyme, picture association, alliteration, songs, diagrams and acronyms, alone or in combination. They are helpful in recalling frequently used information and procedures and to recall essential information needed to perform tasks, operations, and processes. By providing a richer mental context through additional associations that anchor the learning, mnemonic devices can aid in studying, checking, classifying and presenting information.

Note Making p. 63
Note making is a method of recording and organizing information in one’s own words from a variety of sources for comprehension and transfer. This skill may be used for a number of purposes such as: recording information acquired in the inquiry process; recording information obtained when listening to a speaker or a teacher-directed lesson; or organizing ideas in the early stages of the writing process. Making effective notes actively engages students in the listening or research process and can use a variety of forms or structures (e.g. maps, webs, and outlines) to make the information personally meaningful. Note making ensures better recall of information, encourages inferences and interpretations, and helps identify and synthesize what is important. It is appropriate at all grade levels and subject areas.

Practice and Drill p. 64
Practice and drill is a method of learning that involves reinforcing what has already been learned by repeating an activity (e.g. doing mathematics problems), recalling information (e.g. scientific formulas), or perfecting a skill (e.g. playing a musical instrument or performing a sport routine). It is commonly used when the learner has developed a preliminary understanding of skills or specific information related to the subject and the repetition increases ability or understanding. Practice and drill is effective to the extent that the learner is motivated. It is a valuable memorization strategy.
Programmed Learning p. 64
Programmed instruction is a structured and individualized system of learning where learners are presented with predetermined information that are completed independently of other materials or programs. Students work with the instructional material by themselves, at their own level and pace. The information is broken down into small units through which students work and respond. They are given immediate feedback as to whether their answers are correct and encouraged to go on to the next step. If the self-instructional material covers familiar content, programmed learning is effective in increasing achievement. Programmed learning can often take the form of computer-assisted instruction.

Prompt p. 65
Prompts are words, phrases, or sentences used to focus, direct or prod thinking (e.g. “The next step is...” or “Why would you...”). This strategy can be used to reinforce the positive aspects of a student’s response and can encourage students to complete an incomplete response or revise an incorrect one. Prompts can nudge students towards critical thinking (e.g. “If this were changed, then...”), facilitate discussion, clarify questions for better understanding or provide direction for the expansion of responses (e.g. “I wonder about...”). Prompts are open-ended and may be used to assess student comprehension.

Read-Along p. 66
Read-along is a practice that engages students in reading a text along with an expert reader (e.g. a teacher, a parent volunteer, another student, a taped reading, or an electronic reading). This strategy can be used with individuals, small groups, or large groups. It provides opportunities to observe the learning of individual students and provides additional reading experience for students who could not read the material independently. The process is used with text that would be challenging for students to read without assistance, thereby increasing the students’ repertoire of stories, literary experiences and other texts.

Read Aloud p. 67
Read-aloud is the practice of the teacher or students reading aloud texts, stories, or poems for a variety of learning purposes. This strategy creates provides ideas and information through listening and it builds the student’s repertoire of stories, language patterns, ideas, and genres. Read-aloud demonstrates how texts work and how they signal particular kinds of ideas and information that enrich the language experience of students. Read-aloud promotes appreciation, reflection and love of reading, introduces new forms (e.g. a poetry anthology on a theme) and provides a shared context for discussions and further learning. It can be used to generate interest and enrich content areas such as history (e.g. anecdotes about well-known historical figures) or science (e.g. stories about well-known scientific discoveries). The reader must pre-read and prepare or rehearse to ensure effective reading.

Reciprocal Teaching p. 68
Reciprocal teaching is a form of dialogue marked by interaction with others used to justify reasons, resolve differences and actively listen to another person's point of view. The teacher models the steps of the process and encourages students to assume the role of the teacher in a group or in pairs. It involves four strategies for improving comprehension: question generation, summarization, clarification and prediction. Reciprocal teaching promotes flexibility to use the strategies, as the situation requires. It engages students as teachers after the strategies are mastered.

Review p. 69
Review is a process used to clarify, consolidate and reinforce previously learned knowledge or skills. The review process can assist in diagnosing learning difficulties and confirming understanding or skill development. Review summarizes previous work and provides reinforcement prior to assessment procedures. It can occur at any point in the learning, but is usually done at the beginning or end of a lesson to form a link between previous learning and further instruction. Review can take many forms, including questioning, reflection, oral, written or physical demonstration.

Seminar/ Tutorial p. 70
A seminar or tutorial is an instructional approach that brings together a small group of students to discuss topics of interest or examine areas in greater depth under the direction of a teacher or discussion leader. Seminars may provide opportunities for students to assume leadership roles in leading the discussion in a small group. Tutorials are directed opportunities for remediation, for discussion of independent projects and for advanced learners to explore more complex topics. Responsibility for the discussion and analysis is vested in the students allowing them to learn from each other and thereby ensuring meaningful discussion and group interaction. These strategies are useful in all subject areas.
Socratic Dialogue p. 71
Socratic dialogue is a method of questioning that leads students to logical conclusions and often, to deeper meanings through a series of questions and answers. It is a collaborative approach that emphasizes helping students discover answers themselves. Students are stimulated to think about, analyze, explore and defend their beliefs. Socratic dialogue often uses analogies to test the logic of the positions put forth by the student. The teacher’s function is to question and probe the students’ opinions, premises, and positions in order for them to demonstrate relevance, clarity and consistency in their thinking.

Storytelling p. 72
Storytelling is the art of telling a story rather than reading it aloud. Storytellers use gesture, voice techniques, rhythm, pitch, and other nuances of language to create dramatic effects and clarify meaning. Storytelling builds a repertoire of story language and literary experiences, creates and extends the meaning of literary selections for students and makes information easier to remember. Storytelling helps students connect ideas and themes across cultures as well as demonstrating the meaning, structures and purpose of stories in life. Telling stories is an entertaining and powerful form of communication that provides insight into history and cultures and reveals the hopes, fears, values and accomplishments of individuals and society.

Task cards p. 74
Task cards are instructional aids that outline specific tasks or experiments in a series of structured activities. While usually created by the teacher, task cards promote independent study and exploration of materials and information connected to a specific unit of study. Task cards may provide opportunities for peer teaching and interaction. Task cards may augment the teaching of any subject and may introduce or reinforce learning. Task cards may be created and shared by students to review learning. They are an appropriate use of limited resources around a theme in the classroom, library or may be used to direct student activity on a field trip.

Textbook p. 75
Textbooks are books for use in classroom instruction and for personal study that are a standard account of a subject or discipline written for a specific audience (e.g. grade, jurisdiction). They are basic tools for teaching many courses. Textbooks present a great variety of information for all students in one resource that is consistent, controlled and often sequential. They are effective in transmitting the content that is considered to provide a foundation of knowledge and skills in a particular subject. Textbooks can also provide some guidance in structuring learning activities. Textbooks may be in print or electronic form and often contain useful sections such as chapter-by-chapter questions, glossaries, indexes and bibliographies to further learning.

Visual Stimuli p. 76
Visual stimuli, as part of a learning strategy, are visual cues or objects used to enhance learning. They promote creative associations and connections that aid in memorizing and recalling information. Interest and excitement in learning can be generated by the visual alteration of colour, shape and imagery in the learning materials used as well as in the classroom environment. Visual stimuli can take the form of illustrations, photographs, real objects or graphics. Students can create their own visual stimuli to assist them in memorizing and recalling information.

Visualization p. 77
Visualization is a process of internally making an object, event or situation visible to one’s mind by mentally constructing or recalling a visual image. Teachers can use visualization as an exercise prior to writing to help students simulate the feeling of being in a particular situation (e.g. what it’s like to trudge through a swamp, to describe your emotions when you hear a flood warning). It allows for individual response, extends thinking and enhances creativity through the use of prompts and drawing on prior experience. It can aid reading comprehension when students are asked to create mental images of what they have read.

Word Cycle p. 78
A word cycle is a vocabulary-building strategy that helps students identify the relationships between and among words. A word cycle is an open-ended activity that encourages students to think in creative ways in order to find relationships between words or phrases and to diagram these relationships in a meaningful way. It is applicable in any situation and in all subject areas where an understanding of relationships among words or concepts is required. A word cycle is used to introduce a new topic or unit, to review newly learned material or concepts, and to give students opportunities to support their ideas with a rationale. It can also be used to assess knowledge of vocabulary and concepts as an alternative to writing definitions.
Word Sort p. 79
Word sort is a strategy whereby students sort words and concepts into different categories. Word sort can be used to introduce a new topic or to ascertain prior knowledge necessary for student understanding of new material. It is also used to examine ways in which words or concepts might be related or connected and to support student discussion around these connections. Word sort is an open-ended activity that requires students to use higher-level thinking skills to find unique or unusual ways to categorize words.

Word Wall p. 80
A word wall is a visual strategy in which new vocabulary or words encountered with high frequency are posted on the wall in the classroom. Words are posted beneath the letter of the alphabet with which each word begins. Students refer to and use these words in activities such as reading, writing, spelling, presenting and storytelling. The word wall can be used to reinforce learning by providing cues to curriculum content. A word wall promotes the use of language in the classroom to enrich literacy and motivate student interest in reading. It may be used in all subjects and may include words meeting varied criteria (e.g. most misspelled words, word-for-today, technical terms, words with etymological interest).

Workbook/Worksheets p. 81
A workbook or worksheets are guided instructional aids with prompts and questions to complete that help students focus on specific content either in classroom activities or in assignments for a course. They can be used to review the knowledge that is expected as a prerequisite for the content of a particular course, provide practice with new concepts and ensure the consistent assessment of student learning. Students can use worksheets to analyze the concepts and information presented and as frames of reference to organize thinking. Students can demonstrate comprehension of newly learned concepts by successfully completing worksheets. Workbooks or worksheets can be teacher-generated or purchased commercially, however, they are most effective when adapted to individual student learning needs.

Independent Learning Strategies

Computer-Assisted Learning p. 83
Computer-assisted learning/instruction describes the use of a computer to learn new material, to practise skills, or to reinforce material already learned through individualized instruction and immediate feedback. Such applications allow students to pace their own learning, retrace the steps if necessary and track their progress. Students can develop problem-solving skills through the use of open-ended software or they can focus on specific skill development, learn new software applications through tutorials or participate in simulations. Computer-assisted learning is a motivating tool that can engage students when doing repetitive tasks and assist in building their self-esteem through successful experiences. Computer-assisted learning is a dominant strategy used in distance learning where students work independently online to meet specific curriculum expectations in courses.

Homework p. 84
Homework is work that is completed by the student outside of class. Homework may be remedial in nature or can involve review and practice of classroom learning. It may be used to encourage students’ responsibility for their own learning and to acquire skills or knowledge. Homework can also serve to encourage students to pursue an in-depth interest in a topic and to generate new thoughts on the topic. Homework may be assigned to individual students or to the class as a whole. Homework may be informal (e.g. personal reading) or formal (e.g. a specific task or set of questions) in nature.

Independent Reading p. 85
Independent reading is a process through which students are given time to read material of their own choice on a regular basis. It is supported by encouraging students to access a wide range of reading materials, forms and genres in and outside the classroom, including school and public libraries on an informal basis. Independent reading may be used to provide students with the opportunity to practise reading, apply strategies, and pursue a favourite author or genre (e.g. mystery). It is an opportunity for teachers to observe students as readers, for students to view themselves and others as readers, for reading to be placed in an authentic context, and to demonstrate that reading is a valued experience.
Independent Study p. 86
Independent study is a strategy that develops, with teacher guidance, the student's ability to plan, explore, organize and communicate a topic of interest independently and in more detail. It is also used to generate thoughts, review or research a topic, and extend personal learning within the framework of curriculum expectations. Independent study may provide opportunities to pursue individual variations to a topic/issue under classroom study or to provide an alternate assignment based on the student's needs and individual learning styles. It makes students active participants in the learning process, thereby enhancing motivation and retention. Through independent study, students learn to make responsible choices and accept responsibility for their own learning. Students may also take school courses independently through distance learning, such as that offered in Ontario by the Independent Learning Centre.

Learning Contract p. 87
A learning contract is a negotiated plan of intent between teacher and student/s to meet the learning needs/interests of an individual, or small group. A learning contract gives students a role and responsibility in shaping learning experience because student(s) and teacher develop it collaboratively. A learning contract outlines clear goals and processes for a learning experience. For example, a learning contract may compact or extend specific learning activities, or modify time frames and learning conditions according to the student's needs, interests and the expectations of the curriculum.

Learning Log / Journal p. 89
The learning log/journal is a sustained, written reflection on the process and content of learning. Learning logs/journals require regular entries but may be used at different points in a unit or topic (e.g. at the beginning of a lesson to focus learning and to make connections to previous lessons or during the lesson to consolidate learning and ensure understanding). They can be used to record observations (e.g. monitoring plant growth, recalling classroom discussions), to track learning through independent study and to assess progress and attitude to learning. Learning logs require the reflective participation of the student in order to make the student's understanding visible to him/herself and others. The teacher may or may not respond to student reflections orally or in writing, in both formal and informal ways.

Portfolio p. 89
Portfolios are authentic collections of student work that demonstrate a student's efforts, progress and achievement over a period of time. Portfolios can have a specific subject or curriculum focus or can be used more generally to collect examples of best performance either in print, media or electronic format (e.g. booklet, photographs, video, computer disk). Portfolios encourage collaborative assessment with the teacher and develop the student's abilities to critically assess their own growth and development. They are a valuable resource for the preparation of anecdotal reports, for parent-teacher interviews, and for assessing program delivery and needs. They also provide consistent opportunities for one-on-one conferencing between the student and teacher. Parents can also become part of the conferencing and goal-setting process with the student and teacher. Portfolios can contribute to self-esteem by allowing students to “show” a collection of what they have achieved.

Reading Response p. 91
Reading response is a strategy whereby students make thoughtful, personal connections with the ideas, language, emotions, and experience in a literary text. Reading response enables students to articulate links to personal experience and to form generalizations from the text for deeper meaning and understanding. It allows students to participate emotionally, intellectually, and reflectively in the reading experience. Although student talk is an important component of the processes of reflecting, connecting, comparing, and challenging assumptions, other forms of response are also encouraged (e.g. illustrations, sketches, student questions, letters to the author).

Reflection p. 92
Reflection is a thinking process that involves taking time to consider information and making sense of it in light of previous experience. Reflection also involves looking back to evaluate previous experience and learning and to identify possible problems and likely opportunities ahead. It is part of the metacognitive process and as such is a complex process that enables deeper thinking. Keeping a journal or response log is a reflective practice that provides opportunities for student to synthesize their thoughts, document their thinking, and become aware of their decision making and learning process.

Report p. 93
A report is a text of varied length that is written to document and communicate information on a topic. It is often based on findings as a result of an investigation, inquiry, or research. Reports are used to organize, present, and
classify factual information. The content must be expressed in clear, concise and objective style using formal and precise language. When reports are about a technical or scientific topic, they contain vocabulary specific to that topic. Reports may also be presented orally but retain the logical organization and clear language of the formal written text.

- **Response Journal p. 94**
  A response journal is a form of writing in which students make thoughtful connections to texts, activities, and experiences. A response journal provides sustained opportunity to explore, analyze, question, interpret, or reflect in order to gain new insights and enriched appreciation or understanding. Response journals may be used in any subject area where students encounter interesting or powerful content, experiences, and ideas. A response journal is the personal processing of the student rather than restatement or recounting of text. Response journal use is stimulated by reading, viewing or listening to material that has interest to the student.

### Inquiry and Research Models

- **Cognitive Skills Model p. 95**
  A cognitive skills model of inquiry and learning involves using concepts, skills and habits of mind which enable students to interpret and respond to their own learning. The process involves students actively focusing on incoming information and making this information personally meaningful. Cognitive skill development focuses on processing the information for long-term retention and being able to transfer that learning to other learning situations and experiences. Teachers can use strategies such as note taking and mind maps to actively engage students with incoming information while relating the new information to prior knowledge. This model emphasizes the generating and answering of questions about the concepts and knowledge to reformulate information in personally meaningful ways. Students then organize, encode and retell the information in a way that it can be retrieved and retained for tasks.

- **Decision-Making Models p. 97**
  Decision-making models are ongoing instructional processes (both planned and incidental) that encourage the selection of solutions from alternatives in order to reach a desired goal and make prudent choices. Decision-making models usually include such ordered activities as:
  - gathering information about a problem,
  - analyzing and evaluating alternatives,
  - selecting a solution,
  - implementing the solution,
  - reviewing the process for possible modification.
  Decision-making models can be connected to both curricular and/or real-life situations and a variety of models should be used to reflect the needs of the class or situation. Models are applicable in all subjects and for both individual learning and when group consensus is necessary.

- **Historical/Geographical Inquiry p. 98**
  The historical/geographical inquiry is a structured framework or process in which students apply critical thinking to recognize basic issues and provide strategies for developing subject content through questioning and focussed research. This model takes into consideration the nature of problems and investigations in the two subject areas. Historical/geographical inquiry encompasses eight general skills (compare “Methods of Geographic Inquiry” p.15 and “Methods of Historical Inquiry” p. 35 in Canadian and World Studies Grades 7 to 8):
  - **focus** (i.e. limit, direct or define a problem or issue);
  - **organize** (i.e. select or develop visual representation, charts or organizers for the focus);
  - **locate** (i.e. identify, find and use reliable, relevant sources of information);
  - **record** (i.e. summarize and translate the information);
  - **evaluate/assess** (i.e. determine the validity, appropriateness, significance and accuracy of the information);
  - **synthesize/conclude** (i.e. observe relationships in and draw conclusions from the information);
  - **apply** (i.e. predict, generalize, compare and decide on a conclusion using these formulations);
  - **communicate** (i.e. express the information and ideas and describe the processes involved in the inquiry);

- **Mathematical Problem Solving p. 99**
  Mathematical problem solving is a structured process of inquiry that uses mathematical ideas, principles and concepts to solve a variety of problems. Activities of reasoning and making connections from one area of
mathematics to another and to real-life problems are important aspects of this process. Mathematical problem solving may use an inquiry model such as described in Mathematics, Grades 1 to 8, p.74:

- understand the problem (exploratory stage)
- rereading and restating the problem
- identifying information given and required
- communicating (talking about the problem to understand it better);
- make the plan
- comparing the problem to previous experience considering possible strategies
- selecting a strategy or blend of strategies
- communicating (talking to clarify the method and listening to ideas of others);
- carry out the plan
- executing the chosen strategy
- doing the calculations
- monitoring success
- revising as necessary
- communicating (drawing pictures, using manipulatives to illustrate projections or interim results, writing words and symbols to represent steps of “doing”, sharing output from computer or calculator operations);
- look back
- checking the reasonableness of the answer
- reviewing the method: Does it make sense? Is there a better way?
- communicating (choosing the best format for describing and explaining how the solution was reached).

- Problem-Based Models p. 101
Problem-based models are structures whereby students use knowledge and skills from several disciplines to solve problems developed though an interdisciplinary approach to inquiry. It involves the design of curriculum units based on problems that are relevant to students and have significant social, cultural or environmental concerns. Students set up the problem, clarify the issues, and develop ways to gather the information or data to help resolve the problem, then test or evaluate the conclusions. The more “real” the problem or the more connected the students are to the problem, the more real and transferable will be the learning result, especially when students choose their own problems to solve.

- Research Process p. 102
Research is the process whereby students investigate a topic by asking questions, locating and selecting resources, analyzing and evaluating information, reporting findings, and transferring learning for purposes of extending and creating knowledge, solving problems, and making decisions. Research is used by students to acquire further learning about topics of personal interest, or for information required for school projects and assignments. Research supports students in fostering information management skills such as retrieval, selection, organization and communication. Particularly through the analysis and evaluation of information, research also encourages students’ critical, creative, and independent thinking. In similar ways to the inquiry process, the research process includes discernable stages, though these may or may not be followed in a fixed order depending on the task and learning style. A generic model of research (Ontario School Library Association Information Studies, 2000) includes the following stages:

Stage 1: Preparing for Research
- define information needs
- explore information needs
- identify ways information is organized
- relate prior knowledge

Stage 2: Accessing Resources
- locate a variety of appropriate resources
- select information appropriate to need using a variety of strategies
- gather information using organizers, and conventions of text
- collaborate with others to share findings and ideas
Stage 3: Processing Information
- analyze and evaluate the information
- test ideas to adjust research and problem solving strategies
- sort information using a variety of formats and organizers
- synthesize findings to create meaning and formulate conclusions

Stage 4: Transferring Learning
- revise product appropriate to purpose, audience and format
- present findings in a variety of forms
- reflect on and evaluate research process and product
- transfer skills and knowledge to solve problems and make decisions

- Scientific Method p. 104
The scientific method/inquiry model is a logical reasoning process used to solve a problem through observation and measurement, experimentation and research, and analysis and dissemination. It attempts to explain phenomena by examining cause and effect. Usually experimentation involves manipulating one variable while other variables remain constant thus providing a controlled situation allowing conclusions to be drawn with reliability. The scientific method may be used in all subject areas that allow for empirical testing of data, hypotheses, or prior knowledge. The scientific method includes many skills, such as the following summarized from The Ontario Curriculum Grade 9 and 10 - Science:
  - formulating the scientific question;
  - planning and conducting an inquiry;
  - planning ways to model or simulate an answer to the question posed;
  - selecting and integrating information from various sources – electronic, print, community;
  - performing personal data collection, observation and experimentation;
  - analyzing qualitative and quantitative data and explaining how the evidence gathered supports or refutes the initial hypothesis;
  - communicating scientific ideas, procedures, results and conclusions using appropriate language, formulas and conventions;
  - predicting, verifying and explaining the effect;
  - defending a given position on an issue or problem based on the findings;
  - evaluating the processes used in planning, problem solving, decision-making and completing the task.

- Technical Design p. 105
The technical design process is a problem-solving model that deals with concrete manipulation of images, materials and technology for the purpose of solving a design problem. It promotes creativity, extends thinking, and develops competence in the use of technology, as students are required to develop original solutions. It reinforces the reflection process in that students need to constantly create, evaluate and revise the product. The technical design process could be open-ended when all the steps are student designed or it could be teacher-directed to varying degrees. The stages of development include:
  - developing a focus: using a design process, researching, problem solving and documenting the process;
  - developing a framework: using appropriate materials and tools for the project;
  - choosing the best solution: identifying production techniques and materials to meet the specifications;
  - implementing a plan;
  - reflecting on the process;
  - reflecting and evaluating the product

- Writing Process p. 106
The writing process is a process whereby writers work through key steps from discussion or brainstorming, selecting a topic, planning, writing a first draft, revising, redrafting and editing to publishing a finished/polished written product. It is used in all grades and subjects for writing that will be published or have an audience (e.g. in sharing written stories). Initially students must be given instructions for each step and directed activities to develop their skills stage-by-stage. The writing process requires that students actively participate in assessing and revising their own work and that they make appropriate decisions regarding form, purpose and audience. With daily practice and purposeful application, students gain confidence in sharing edited stories with an audience.
Learning Styles

- **Bodily-Kinesthetic Intelligence p. 109**
  Bodily-kinesthetic intelligence is characterized by the use of the whole body or parts of the body to solve problems. Students with strength in this form of intelligence learn best by direct involvement and participation. They explore objects and the environment through touch or movement, thereby constructing the information they are learning. A person with highly developed bodily kinesthetic intelligence demonstrates skill in and creates new approaches to acting, athletics, and dancing and has the ability to fine tune and perfect these physical performances through mind and body integration.

- **Interpersonal Intelligence p. 110**
  Interpersonal intelligence is characterized by the ability to understand and communicate with others noting the difference in moods, temperaments, motivation and skills. It also includes the ability to form and maintain relationships and assume various roles within a group whether it is as an effective group member or as a group leader. Students exhibit interpersonal intelligence when they show sensitivity to the feelings of others and demonstrate a commitment to helping others around them. Interpersonal intelligence involves an interest in the social relevance of classroom studies.

- **Intrapersonal Intelligence p. 111**
  Intrapersonal intelligence is characterized by the ability to perceive and understand self and thus to make thoughtful connections with learning and transfer that learning to ways of understanding other situations. Intrapersonal intelligence reveals itself as a curiosity about the meaning, relevance and purpose of life and as an inner strength that can be relied on for planning, monitoring and evaluating goals and values in life. The intrapersonal learner manages ongoing learning and personal growth effectively and has a keen awareness of inner thoughts and emotions that affect this growth. This learner finds appropriate outlets to express feelings and thoughts.

- **Logical-Mathematical p. 112**
  Logical-mathematical intelligence is characterized by mathematical calculation, logical thinking, problem-solving, deductive and inductive reasoning, and discernment and representation of patterns and relationships. It is characterized by a high level of competence in calculating, qualifying, and developing propositions and hypotheses in all complex mathematical operations. Central to logical-mathematical intelligence is the ability to recognize and solve problems. The learner who exhibits logical-mathematical intelligence demonstrates a familiarity with concepts of quantity, time, and cause-effect relationships and demonstrates understanding through the use of concrete objects and predicting and testing logical outcomes.

- **Musical-Rhythmic Intelligence p. 113**
  Musical-rhythmic intelligence involves the human voice and body as instruments and means of self-expression. Students gifted in music exhibit the tendencies early and demonstrate facility in making music and using it in a variety of ways (e.g. to express humour, heighten suspense, sadness, tragedy or joy). Those who exhibit musical-rhythmic intelligence respond to experience by conducting, performing, composing, creating or dancing: emotionally through response to the tempo and moods of music and dance, and intellectually and aesthetically by analyzing, exploring and evaluating the content and form of music and dance. They use the vocabulary and notation of music proficiently and exhibit sensitivity to pitch, melody, rhythm and tone.

- **Verbal-Linguistic p. 114**
  Verbal-linguistic intelligence is characterized by the ability to use language to express and explain complex meanings and concepts. It involves the use of language to explore and expand human intelligence through thoughtful reading, effective speaking, careful listening and skilful writing and consists of the ability to think in words to remember, analyze, plan and create. The ability to use words to communicate and document information and to express emotions is unique to human beings. Students with a dominance in verbal-linguistic intelligence, demonstrate a strong sensitivity to the sound, rhythm and meaning of words, as well as the ability to move quickly from concrete to abstract thinking.

- **Visual-Spatial Intelligence p. 115**
  Visual-spatial intelligence is characterized by the ability to perceive mental images, and think in pictures, visuals and details. Students with highly developed visual-spatial intelligence learn by seeing and observing, using visual images as aids to recall. Visual-spatial learners see things in different ways or from new perspectives and demonstrate the ability to arrive at unique solutions to artistic problems. They enjoy doodling, drawing, painting,
sculpting or other forms of representation. Visual-spatial learners have the capacity to navigate themselves and objects through space. They have the capacity to recreate, transform or modify images and think and create objects in three dimensions. These learners demonstrate acute ability in decoding charts, graphs, maps and diagrams and exhibit skills such as visual discrimination, visual recognition, and image manipulation.

**Technology Applications**

- **CAD/CAM Applications p. 116**
  
  Computer Aided Design (CAD) and Computer Aided Modeling (CAM) programs are software programs with specific design and manufacturing features such as architectural design components and automobile design modules for simulating and testing structural and design features. The ease of use in changing design variables allows student to visually see the results before undertaking a modelling or building project. CAD/CAM programs allow students to engage in experimentation without risk while at the same time developing reasoning and decision making skills. Related to CAD/CAM applications is 3-D modeling software that allows users to create three-dimensional objects that can then be rotated, stretched, and combined with other model objects in complex 3-D representations.

- **Communication Applications p. 117**
  
  Communication software falls into several categories. Productivity software consists of word-processing, database and spreadsheet software for communication and data management. Telecommunications software includes email programs and web browsers for electronic access. Desktop publishing and graphics programs heighten visual display. Multimedia and hypermedia software help create multimedia presentations, slideshow and web-based publication. Students develop skills in using the appropriate application to communicate learning, either through interactive communication or the creation of a product. Use of communication software provides opportunities for students to consolidate knowledge and clarify thinking in preparation for delivery to a specific audience. The process of preparing a final product for presentation develops skills in editing, critical thinking and synthesizing information to transform it into an effective format.

- **Computer-Assisted Learning/Instruction p. 118**
  
  Computer-assisted learning/instruction describes the use of a computer to learn new material, to practise skills, or to reinforce material already learned through individualized instruction and immediate feedback. Such applications allow students to pace their own learning, retrace the steps if necessary and track their progress. Students can develop problem-solving skills through the use of open-ended software or they can focus on specific skill development, learn new software applications through tutorials or participate in simulations. Computer-assisted learning is a motivating tool that can engage students when doing repetitive tasks and assist in building their self-esteem through successful experiences. Computer-assisted learning is a dominant strategy used in distance learning where students work independently online to meet specific curriculum expectations in courses.

- **Database Applications p. 119**
  
  A database is an organized collection of information that can be categorized, sorted, analyzed and stored in a computer. The information can be manipulated, controlled and retrieved as required. A complete set of related information is called a record. A field is a category of information (e.g. “name” and “address”) in a database record. Each field can be searched and sorted as required to analyze and use the information gathered. Students can use a database to organizing information in a useful and retrievable format using decision making and reasoning skills in the process. Students must decide which information they have gathered is important; determine under what headings (fields) it is to be entered; develop a search strategy and transform the data into tables, lists, or diagrams that form the basis of the analysis and investigation. Databases are also available in commercial formats providing access to full-text records of journals or encyclopedia, bibliographic databases with citations or abstracts, directories of lists, numeric census or stock market figures, and online library catalogues.

- **Email Applications p. 121**
  
  Electronic mail (email) is a form of electronic communication from one computer to another that allows users to communicate with each other locally and globally. Email is available through a commercial Internet Service provider (ISP) or a school board provider and gives users an electronic address. Email enables the user to send and receive messages and add file attachments of documents, images or sound. Messages and files sent through email can be captured and imported into a word processing program which allows the document to be manipulated and edited. This makes it an ideal format for curriculum sharing between students and teacher as well as with other students.
Email serves a variety of other purposes, enabling students and teachers to:
~ contact global experts in any field to satisfy information needs;
~ participate in bulletin boards, listservs, newsgroups, and on-line conferences; collaborate in local and international projects;
~ gather data in such activities as research of primary and secondary sources;
~ experience virtual field trips;
~ communicate with parents and others in the school community.

- **Graphic Applications p. 122**
  Graphic applications are computer software programs, such as paint and draw programs, which are used to create and edit images, pictures and other visuals. They are also used to capture and alter images through digital means such as scanners and digital or video cameras. Clip art files, charts and graphs are graphics included in many word processing and presentation software programs or as stand-alone products and can also be edited, grouped or ungrouped, located and aligned on a page or document. Graphic organizer software is a specific application that visually creates and dynamically manipulates such images as flow charts and conceptual maps. The use of graphic applications and desktop publishing software can enhance work by clarifying and illustrating the text to improve communication, provide additional information, illustrate ideas, appeal to the visual learner and act as memory aids.

- **Internet Technologies p. 123**
The Internet (Net) is a worldwide computer network connecting users to each other for communication. This “network of networks” was originally conceived for academic and military research and now connects educational institutions, private and public services, commercial enterprises and individuals. Computer users connected to the Internet can read and post messages, download software and media files, research by following hyperlinks on diverse web sites, communicate with experts, search catalogues of major libraries, and connect with information throughout the world. It is a constantly evolving set of technologies (e.g. through the World Wide Web) that provide an open, unmonitored forum to which anyone can contribute and publish many different viewpoints. Because of the open structure, the use of the Internet requires the teaching and learning of critical searching skills in order to find and use relevant, valid and useful information in a timely, safe, and ethical manner.

- **Media Production p. 124**
Media production involves the use of a variety of technological and media tools for student created work that conveys information or represents a culminating performance or project. Tools used in media production include cameras, video or digital editing equipment, television, video players, audio recorders and players, slide projectors, computers and the appropriate software required to use these tools. Media productions provide the opportunity to integrate and present text, graphics, sound, video, and animation in unique and exciting ways. The use of technological tools for media production encourages students and teachers to learn new skills, solve problems, create and demonstrate new ways of learning, and extend thinking in flexible and challenging ways. Students learn by creating products using emerging skills and by talking and reflecting on their products.

- **Multimedia Applications p. 125**
Multimedia applications are computer software programs that integrate a variety of elements such as sound, animation, text and graphics into a presentation format. Multimedia applications allow students to practise their skills in a variety of technologies creating a multimedia production. Such applications are non-linear and allow students to compose, communicate and create new knowledge in innovative ways. The use of multimedia applications for personalizing learning and demonstrating understanding is highly motivating for students. Multimedia authoring software enables the creation and editing of multimedia documents for presentation and publication to a variety of audiences (e.g. classroom, Internet). Hypermedia is multimedia that provides hypertext links between computer text and audio-visual material.

- **Online Public Access Catalogues (OPAC) p. 126**
Online Public Access Catalogues (OPAC) are library catalogues that are accessible for searching over a computer network. They are databases of organized information that can be accessed by students through the use of searching skills incorporating key word, Boolean and limiting parameter searching. Students are taught these transferrable skills to make them effective and efficient researchers of online information sources throughout the world. The school library information centre provides access to board, public and post-secondary, national and global library catalogues, while maintaining its own OPAC for immediate access to on-site resources selected to support curriculum. Online Public Access Catalogues are efficient means of sharing cataloguing information that is in a consistent and standardized format. Searching capabilities and the information retrieved about resources are faster and more extensive than manual catalogues.
Spreadsheet Applications p. 127
Spreadsheet applications are software programs that record and manipulate numerical data in a variety of organized and accurate ways. They are used to perform mathematical calculations on numeric information for budgetary purposes, financial or statistical analyzes, or the analysis of data from a variety of scientific or other experiments. Spreadsheets perform a useful function in making comparisons and contrasts and for converting numerical information into charts and graphs for visual display. Well-designed reports are easily generated and printed through spreadsheet applications. Spreadsheets can be formatted in varying column widths and text styles incorporating appropriate labels, formulas and cell references for specific purposes making it a useful tool for many curriculum areas such as data management and probability, scientific simulations, investment management, and grading and reporting.

Time-Management Applications p. 129
Time-management applications are effective tools for organizing time, setting goals and priorities, assessing personal use of time, and making realistic decisions. Students learn to use a time-management device or application to schedule study time and to keep track of all their classes, activities and appointments. Students can develop recording sheets to track projects, assignments and due dates on a daily, weekly or monthly basis and have it monitored by the teacher or parents if necessary. Using computer-based applications, students can effectively edit and modify the entries as events and times change and provide an attractive format to which they can refer. Such time-management applications can be used individually at both desktop stations and portable devices as well as integrated within a networked-based scheduling system.

Thinking Skills Strategies

Analyzing Bias/Stereotype p. 131
Analyzing bias and stereotype is a process that examines inequities based on race, ethnicity, gender, class, points of view or perceptions and any number of physical or mental attributes of individuals. It allows students to examine their own personal prejudices as well as systemic discrimination and to understand how social, political, economic, organizational and cultural structures in society contribute to these perceptions. Analyzing bias and stereotypes also examines the role that media play in shaping our views. Students learn the skills to make critical assessments of their reading, listening and viewing in order to be aware of biases and stereotypes reflected therein and how the variety of motivations, controls and constraints related to media has a direct influence on our perceptions.

Anticipation Guide p. 132
An anticipation guide is a series of statements presented to students with which they must agree or disagree, supporting their responses with reasons. It can be used in all subjects to assist in assessing background knowledge about a topic prior to study or to identify gaps or misconceptions in student knowledge. Anticipation guides are also effective for providing new knowledge when students are reading, viewing or listening to text, especially non-fiction. An anticipation guide can also take the form of a prediction. In this case students are asked to make predictions about a topic, giving reasons to support their responses. Anticipation guides can help motivate student learning by building student confidence in what they already know about a topic and by providing students with a purpose for reading, viewing, or listening.

The teacher:
- can use anticipation guides to assess prior knowledge or provide knowledge:
  - selecting three to eight short, factual statements from text to be read, viewed, or listened to;
  - modelling the strategy by using a “think-aloud” to demonstrate whether she/he agreed or disagreed with the first statement, and the reasons for doing so;
  - asking students to respond to the statements individually, then providing opportunities for students to engage in dialogue in small groups or large groups concer ning their responses;
  - analyzing student responses to assess their degree of prior knowledge and the gaps or misconceptions in the particular topic that will need further instruction;
- can use anticipation guides for prediction:
  - describing the general aspects of a theory, situation, or narrative;
  - asking students to make a prediction about the topic or story;
  - requiring students to support their predictions or hypotheses with reasons;
  - analyzing student responses when appropriate to assess their degree of prior knowledge and the gaps or misconceptions in the particular topic that will need further instruction.
Brainstorming p. 133
Brainstorming is a group process for generating questions, ideas, and examples and is used to illustrate, expand, or explore a central idea or topic. Brainstorming involves students sharing whatever material comes to mind and recording every idea, without making judgements about the material being generated. When introducing a topic, brainstorming can be used for assessing what students already know or wish to learn, and for providing direction for learning and reflection. Brainstorming stimulates fluent and flexible thinking, and can also extend problem-solving and problem-finding skills.

Case Study p. 134
A case study is a process by which a particular real life instance is examined as an exemplar of general principles. Case studies can be pursued as real or simulated problems. One common approach to case study is role-playing where students come to understand the problem clearly and identify possible solutions. A case study is also used to provide an opportunity for in-depth study of an issue or problem they currently face or have faced. It requires students to actively participate throughout the investigation by gathering materials from current events or real life application of issues in curriculum (e.g. situations in history, problems in family life, entrepreneurial ventures). Case studies are useful for identifying social problems and issues, providing options for dealing with them, and analyzing the values underlying these options.

Classifying p. 135
Classifying is a form of inductive thinking in which established or student-generated criteria are used to sort data into identified sets, groups, or patterns. It involves collecting, organizing, displaying and interpreting data to solve problems and make decisions and predictions based on the data. Classifying is used to help understand relationships and sets of ideas, to construct systems for understanding, and to manage ideas. It can be done with concrete materials or in the abstract, with ideas. It is particularly useful when the focus is on personalized understanding and long-term retention of concepts or generalizations and when students need to investigate or discover systems in order to benefit from further instruction.

Concept Clarification p. 137
Concept clarification is a process that defines a concept by identifying its critical attributes, identifying examples and creating analogies to help students visualize or remember the concept. Concept clarification can be used either to introduce new concepts or to extend known concepts and stimulate new ways of thinking. It uses a frame or visual organizer in the clarification process often using increasingly complex frames or models as student competency improves. Concept clarification is often used in math, science and social science to focus on precise information about the characteristics or criteria of concepts.

Concept Mapping p. 138
Concept mapping is a visual strategy often used to teach scientific processes. It shows various relationships among concepts and indicates the order and sequence of the concepts. It is useful as an organizer to identify the key concepts that were presented in a lecture or a text. A concept map is created as a tree-like structure with the most inclusive concept at the top and the most general ones connected with lines to the first concept. A third level can be added until all the important ideas and relationships are identified. Concept maps can also contain events, objects, themes, activities or other items related to the concepts being taught.

Experimenting p. 139
Experimenting involves carrying out investigations to test predictions or a hypothesis or test prior knowledge or understanding. It focuses on problem solving and decision making and is a link to real world authentic learning. Experiments are central to science, technology and mathematics but may also be applied to other disciplines, such as the Arts, to make connections between concrete and abstract learning. Experimenting requires that students follow an established procedure (e.g. inquiry method, scientific method) which is structured so that students hypothesize, investigate, test, explore, manipulate, organize information, and record observations. Experimenting encourages students to use cooperative skills effectively in communication when interpreting experimental findings. It can be teacher or student initiated to enhance student motivation, understanding, and active involvement.

Expressing Another Point of View p. 140
Expressing another point of view is a strategy used to develop critical thinking in students and the ability to look at issues from more than one perspective. It includes identification of which person’s point of view is being considered, the needs and concerns of the person identified, investigation of information about the person identified, and summarizing the position of the identified person. Expressing another point of view can be used with reading, writing, and viewing activities in most subject areas, but is central in social studies and language when
using such scenarios such as: "What would you have done if you were . . . ?" and "What might you have said if . . . ?" It involves examination of an issue and/or character and provides practice in thinking like someone else without letting personal bias interfere. It helps students form conclusions about what has been learned from taking on the persona of another.

- **Fair Test p. 141**
  A fair test is an investigation carried out under strictly controlled conditions to test a theory and to ensure accuracy and reliability of results. A fair test requires an effective method of reporting and communicating the results of tests. In a fair test, all variables are identified and controlled except the one under investigation. A fair test is used in science and technology investigations and inquiries when active exploration and hands-on investigation will best promote learning to apply theory. It follows the scientific method of asking a question, making a hypothesis, setting up appropriate test conditions, conducting the test, making observations, drawing conclusions and repeating the cycle. Fair tests should be able to be replicated by others with the same results. Fair tests can be conducted using computer software that simulates real conditions.

- **Graphing p. 142**
  Graphing is a visual tool for problem solving that involves describing and interpreting the world with numbers and representing these understandings in a variety of visual formats (e.g. circle, bar, line graphs). It involves collecting, organizing, displaying and interpreting data and requires making decisions and predictions based on the data. Graphing is used effectively to link estimation, measurement, statistics, and probability to other content areas such as social and environmental sciences.

- **IDEAL Problem Solving p. 143**
  The IDEAL problem-solving strategy is one model for helping students to identify and work through a problem. This strategy uses a specific frame or model that can be applied to a variety of problem-solving situations, particularly in mathematics. IDEAL is a mnemonic device (Identify, Decide, Equation/Estimate, Answer, Look back) to recall the steps in the model. The steps include: identify the information given and what information must be found out; decide what steps you must take; write out the equation and estimate your answer; find the answer; look back and check answer with your estimate. The IDEAL problem-solving strategy is used most frequently in mathematics when estimation and problem solving are linked but has applications in other curriculum areas.

- **Issue-Based Analysis p. 144**
  Issue-based analysis is a strategy used to develop the higher level thinking skills of analysis and synthesis. It involves summarizing the material, distinguishing fact and opinion, identifying sources and analyzing biases in primary source materials commonly using a visual organizer or frame. Issue-based analysis involves students generating questions to examine issues especially a current issue (e.g. in the environment, local community, and science community) when connections to and implications for today and the future are required.

- **Lateral Thinking p. 145**
  Lateral thinking describes a process of solving problems by divergent or unorthodox ways. This type of thinking recognizes that the mind perceives things from many angles and is thus able to generate many creative solutions to problems and challenges. Lateral thinking involves reviewing the problem, situation or challenge from multiple perspectives, often by breaking the elements up and recombining them in a different way (perhaps randomly). It develops skills in bringing the positive and negative aspects of a situation to the fore and evaluating the whole picture.

- **Manipulatives p. 146**
  Manipulatives are materials that appeal to the senses and that can be touched, moved about and rearranged. Working with manipulatives helps bridge the gap between the concrete and abstract and strengthen the ability to generalize and transfer ideas. The process enables students to recognize and use patterns as a problem-solving tool and creates opportunities for them to explore, justify, represent, solve, construct, investigate, use and predict with the materials. This strategy allows for different levels of cognitive development and generates student interest as it encourages students to think about concepts while working with the materials. Manipulatives promote communication of ideas and provide a problem solving and decision making focus linked to real world learning through the underlying relationships that pervade logic in nature and the universe.

- **Map Making p. 147**
  Map making involves representing physical, demographic and or numerical data through visual formats (e.g. maps, globes, diagrams, timelines). The process allows students to invent their own symbols and create legends as well
as to learn universal symbols (e.g. symbol for railroad crossing) in traditional map making. It provides students with an opportunity to use visual representation of data to organize and understand information. When students sketch out preliminary understandings or representations, map making becomes a tool for thinking, planning, and making decisions. Map making enables students to construct understanding of their physical and social environment, to recognize new patterns and to synthesize ideas.

- **Media Analysis p. 148**
  Media analysis is the examination of commercial media works for the purpose of “decoding” the work, that is, determining the purpose, intended audience, mood, message and techniques used to create the work. Media analysis promotes critical thinking and evaluation of everyday media and allows students to use media techniques to create and enhance their own works. Key concepts of media analysis include recognition that media construct reality, have commercial implications, contain ideological and value messages, and have social and political implications. Students must be able to make a conscious critical assessment of the media by maintaining a critical distance and resisting manipulation by media producers.

- **Mental Calculation p. 149**
  Mental calculation is a method whereby students calculate in their head a series of operations to solve problems. Mental calculations may be used to assist with quick recall and memorization and as an aid to check whether solutions arrived at by using a calculator are likely to be correct. An artist may use mental calculations to determine the percentage of warm colours in relation to cool colours to achieve the desired effect. In sports, mental calculations can apply to such operations as batting averages or average number of shots stopped by a goalie. Mental calculations are often teacher–directed and are based on the skill level and previous knowledge of the students. Students can build up confidence and expertise as they build up their skills. Mental calculations can take the form of a game.

- **Metacognitive Reflections p. 150**
  Metacognitive reflection is a process in which students think about their own thought processes. They may use a process of self-questioning (e.g. Have I encountered this problem before? Did I use a successful strategy at that time? What are some other solutions to this problem? What have I learned from this experience?) or reflect on their past performance (e.g. through a portfolio). Metacognitive reflection is used in identification and understanding of student strengths and areas for growth by making connections to prior knowledge and past experience. The process is particularly useful in problem-solving situations where students formulate questions and make inferences. It involves transferring skills and knowledge across subjects and all curriculum areas (e.g. math or science journals, self-assessment) and involves continuous self-monitoring.

- **Mind Map p. 151**
  A mind map is a visual note-making strategy that allows students to sketch a central idea or to see the big picture of their topic and then create tree-like branches of additional information surrounding the central one. Mind maps can display key concepts and relationships but differ from concept maps in that they are much more global in their approach. Mind maps can generate ideas or test prior knowledge, allow the free flow of ideas, and organize ideas in clusters on a page for understanding. The central element or focus is at the centre of the page, key words represent ideas and are connected to the central focus with lines. Colours and symbols may be used to make associations and provide mnemonic signals for recall.

- **Model Making p. 152**
  Model making is the creation of two- or three-dimensional constructions used to represent ideas and interpretations and demonstrate knowledge and understanding. It emphasizes the importance of information carried by visual, tactile, or concrete features and often attempts to represent mental constructs of the universe (through physical details, shape, dimension, and scale). Model making can be used in all subject areas as a process activity, which may either result in a prescribed representation or operation, or change substantially as it progresses. Materials, experiences and circumstances can play a major part in revising plans. Model making can be used as a final culminating activity to demonstrate understanding.

- **Oral Explanation p. 153**
  Oral explanation describes a process in which students talk to share their understanding and justify their reasoning. Students may use oral explanation to clarify thinking of a concept and become aware of what they know and do not know. Through oral explanation, teachers can assess student understanding and reasoning overtly and quickly.
Oral explanation builds in responsibility and accountability and encourages active listening, when students are engaged by topic.

- **Problem Posing p. 154**
  Problem posing is a component of problem solving whereby students and teachers apply critical and creative skills to define, identify and develop new problems that challenge the thinking of others. It combines information and ideas from various sources and uses this information in novel ways to create problems. Problem posing is used to develop flexible thinking (e.g. looking at a problem from a variety of perspectives) and to extend thinking by raising questions beyond the obvious or usual ones asked. Effective problem posing encourages divergent thinking and a variety of solutions, answers and processes.

- **Problem Solving p. 155**
  Problem solving is a process in which students apply critical and logical thinking to perceive and resolve the gap between a present situation and a desired goal. Problem solving strategies are used in all grades and subjects to engage students in new learning situations, to extend thinking and to communicate ideas. It is also part of a process of inquiry where students understand a problem, make a plan, carry out the plan, check the results, and communicate the results. Problem solving is applied to authentic tasks based on real-life experiences (e.g. following connected instructions in building a structure or overcoming obstacles in pursuing a course of action in the community).

- **Process Notes p. 156**
  Using process notes is a problem solving strategy in which students outline in written form the process or steps they used in attempting to solve a problem. Process notes are used in all grades and in all subject areas and especially useful in Mathematics and Science. Process notes assist students in recording and assessing their own problem solving process as they think about a problem in a different way.

- **Questioning Process p. 157**
  Questioning is a process whereby a wide range of strategies are used to stimulate discussion, explore ideas, and encourage students to think about their learning. Questions help students to probe for deeper understanding, extended meaning, and new applications for learning. Questioning initiates the process of inquiry that engages students in divergent thinking and provides opportunities for them to articulate their understanding by exchanging ideas and viewpoints. The use of open-ended questions which have no single word response or “right” answers, challenges students to further their learning and open up the multi-dimensional aspects of issues, ideas, phenomena and experiences. Good questioning strategies assist in directing research projects by providing focus for topics and engaging students’ personal interests. The quality and success of student thinking and learning are closely linked to the quality of the questions that students and teachers raise and the nature of the supporting classroom interaction, environment, and resources.

- **Semantic Feature Analysis p. 158**
  Semantic feature analysis is a strategy used to help understand the meanings of words, including how words are the same or different conceptually. Students create a grid or matrix with words and concepts listed on the vertical axis and the critical attributes of a word or concept listed on the horizontal axis. Students can then use the information in the matrix to prepare oral and written reports. The visual depiction of the critical attributes on the grid supports student learning of new concepts. Semantic feature analysis may be used in all subject areas to introduce new concepts and words and to help students clarify concepts by examining critical attributes.

- **Seriation p. 159**
  Seriation is a strategy whereby students put three or more objects or ideas in a linear order based on measurable characteristics or attributes. Seriation is used to develop the ability to compare measurable attributes and identify patterns. It is also used to track growth in logical reasoning abilities, problem-solving strategies and observation skills. Seriation can assist students whose language development does not yet allow them to express and explain their thinking. It makes visible the student's ability to order and compare by allowing the use of concrete materials rather than working in the abstract. Seriation can be applied to experiences where it is important to sequence events in logical order such as in the performance of a play, conducting an experiment in a prescribed order or following the daily school timetable in a predetermined manner.
Statistical Analysis p. 160
Statistical analysis involves the analysis of numerical data (statistics) that have been obtained through observation. Statistics can be used to make inferences, that is, to draw conclusions based on a relationship that has been identified between variables in a set of data. Generally, statistics are used to make inferences about a large group (population) based on observations of a small group (sample). The sample must be representative of the data being studied. Statistical analysis may form the basis of decision making when students analyze data they have gathered. The process involves understanding basic principles and terminology of research design and analysis such as types of bias in sampling and aspects of validity and reliability of data.

Think Aloud p. 161
Think aloud is a strategy whereby the teacher or student verbalizes (i.e. self-talk) a thinking/learning process during its use. Think aloud is used as a strategy for all students when learning a difficult or challenging concept and reinforcing the learning. It is a demonstration of thinking which can be assessed by teacher observation in all curriculum areas. To assist language learning (ESL), think aloud can be conducted as either an individual interview or a peer interview with data collected through audio- or video-recorder, checklist, or record sheet.

The teacher:
~ uses the strategy to demonstrate thinking and learning;
~ uses the strategy to model and teach elements of a process or strategy;
~ helps students to know when to use the strategy.

Visual / Graphic Organizers p. 162
Visual/graphic organizers are frames, matrices, grids, webs and similar forms used to help students structure their thinking and represent knowledge in a visible format. Visual/graphic organizers assist students in accessing prior knowledge and connecting it to new concepts learned. They help students to plan how they will investigate problems, organize their thinking and present information. Organizers help students to apply higher order thinking skills such as comparing and synthesizing information. Visual organizers provide vehicles for the analysis of information such as cause and effect and sequencing that help students actively organize and sort information for understanding and retention. Visual organizers can provide organizational support for independent work, an opportunity to collect thoughts related to a topic before starting on a task, and a way to review and consolidate thinking after the completion of a topic or reading.

Writing To Learn p. 163
Writing to learn describes a process in which students develop new knowledge and understanding through writing in a variety of writing formats. Writing to learn may be used both by the teacher to assess students’ understanding in a particular area of study and for students to assess their own understanding. Writing to learn allows students to draw on prior knowledge, engage in new learning experiences confidently, support reflection and communicate new learning. It improves communication skills, by helping students in focus and synthesize thoughts. Students can use the strategy to summarize text, responses, and process as a follow up to a lesson.
Classroom Presentation p.47
~ is an assessment which requires students to verbalize their knowledge, select and present samples of finished work and organize thoughts, in order to present a summary of learning about a topic.

Conference: p.48
~ is usually a meeting held between the teacher and a student to review progress in learning;
~ might be an informal discussion involving the student and the teacher, another student, a parent, or a combination of these;
~ has a clear focus on learning for discussion.

Essay: p.49
~ is a writing sample used to assess student understanding and/or how well students can analyze and synthesize information;
~ is a pencil and paper assessment where a student constructs a response to a question, topic, or brief statement;
~ provides the student with opportunity to communicate his/her reasoning in a written response.

Exhibition/ Demonstration: p.50
~ is a performance in which a student demonstrates individual achievement through application of specific skills and knowledge;
~ is used to assess progress in tasks that require students to be actively engaged in an activity (e.g. performing an experiment).

Interview: p.51
~ is a form of conversation in which both parties (usually teacher, student) increase their knowledge and understanding.

Learning Log: p.52
~ is an ongoing record by the student of what he/she does while working on a particular task or assignment;
~ makes visible what a student is thinking and/or doing through frequent recordings over time.

Observation: p.53
~ is a process of systematically viewing and recording student behaviour for the purpose of making programming decisions;
~ permeates the entire teaching process by assisting the teacher in making the decisions required in effective teaching.

Performance Task: p.55
~ is an assessment which requires students to demonstrate a skill or proficiency by asking them to create, produce, or perform;
~ may be an observation of a student or group of students performing a specific task to demonstrate skills and/or knowledge through open-ended, "hands-on" activities.

Portfolios: p.56
~ is a purposeful collection of samples of a student's work that is selective, reflective, and collaborative;
~ demonstrates the range and depth of a student's achievement, knowledge, and skills over time and across a variety of contexts;
~ has student involvement in selection of portfolio materials as part of the process;
~ is a visual presentation of a student's accomplishments, capabilities, strengths, weaknesses, and progress over a specified time.

Questions and Answers (Oral): p.57
Questions:
~ are posed by the teacher to determine if students understand what is being/has been presented or to extend thinking, generate ideas or problem-solve.
Answers:
~ provide opportunities for oral assessment when the student responds to a question by speaking rather than by writing.
Quizzes, Tests, Exams: p.58
~ are assessments in which the students write what they know (knowledge) and, in some cases, perform what they are able to do (skills).

Response Journal: p.59
~ provides frequent written reflective responses to material that a student is reading, viewing, listening to, or discussing.

Select Response: p.60
~ is a pencil and paper assessment in which the student is to identify the one correct answer;
~ is a commonly-used procedure for gathering formal evidence about student learning, specifically in memory, recall and comprehension.

Self Assessment: p.61
~ is the process of gathering information and reflecting on one's own learning;
~ is the student's own assessment of personal progress in knowledge, skills, processes, or attitudes;
~ leads a student to a greater awareness and understanding of himself or herself as a learner.
What is book levelling?
Book levelling is an ordering of books according to a specific set of criteria/characteristics that will determine the levels of text difficulty.

Why level books?
Books are levelled to accurately match the reading skills of the student with the appropriate levels of text for both independent reading and instruction. Research indicates that readers who struggle with recognizing the words of a text, lose track of meaning (Preventing Reading Difficulties in Young Children, page 211).

Why use levelled books?
Texts at a student’s independent reading level allow the reinforcement of existing reading skills through practice and for the development of fluency. Texts at a student’s instructional level allow for the development of new skills with the support of the teacher. Texts at the student’s frustration level are suitable for neither practice nor new skill development.

What are reading levels?
~ The independent reading level is the highest level at which a child can read easily and fluently: without assistance, with few errors in word recognition, and with good comprehension and recall (i.e. with 95% or greater accuracy).
~ The instructional level is the highest level at which the child can do satisfactory reading provided that he or she receives preparation and supervision from a teacher: errors in word recognition are not frequent, and comprehension and recall are satisfactory (i.e. with 90-94% accuracy).
~ The frustration level is the level at which the child’s reading skills break down: fluency disappears, errors in word recognition are numerous, comprehension is faulty, recall is sketchy, and signs of emotional tension and discomfort become evident (i.e. with less than 90% accuracy). Preventing Reading Difficulties in Young Children, p. 213

How do you use levelled books?
1. Levelled books can be used for assessment by monitoring the growth of a student’s reading abilities. This can be best achieved by using running records and a reading conference to determine the student’s independent and instructional levels.
2. By knowing a student’s independent reading level, appropriate books can be selected for practice and fluency development.
3. By knowing a student’s instructional reading level, appropriate books can be selected for the development of new skills during modelled, shared and guided reading sessions.
4. Knowing students’ instructional reading levels is one way to group students for instruction. This should not be the only criteria for grouping students. Students should be grouped and regrouped flexibly according to a variety of criteria (e.g. interest, reading strategies used and needed, understanding of vocabulary, experience in reading texts with different structures, experience in reading texts of different genres.)
5. Reading levels are not used to label students.

What are the criteria for levelling books?
Books are levelled using specific criteria that determine their degree of difficulty.

These criteria include:
~ book and print features
~ themes and ideas
~ language and literary features
~ text structure
~ content
~ sentence complexity
~ vocabulary
What are some general criteria for levelling text by division?
The following chart is designed to provide some general criteria for levelling books by division.

### Factors Related to Text Difficulty

<table>
<thead>
<tr>
<th>Book and Print Features</th>
<th>Early Primary</th>
<th>Primary</th>
<th>Junior</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly supportive illustrations on each page</td>
<td>Supportive illustrations of diminishing frequency</td>
<td>Few illustrations</td>
<td>Minimal to no illustrations</td>
<td></td>
</tr>
<tr>
<td>Short in length</td>
<td>Increasing length</td>
<td>Varying in length (e.g. article/chapter book)</td>
<td>Varying in length (e.g. poem/history text)</td>
<td></td>
</tr>
<tr>
<td>Large print</td>
<td>Large to regular size print</td>
<td>Regular size print</td>
<td>Regular print size</td>
<td></td>
</tr>
<tr>
<td>One or two lines of text on left-hand page</td>
<td>Three to twelve lines of text per page</td>
<td>Frequently full pages of text</td>
<td>Commonly full pages of text</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Themes and Ideas</th>
<th>Early Primary</th>
<th>Primary</th>
<th>Junior</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple isolated ideas</td>
<td>Simple related ideas</td>
<td>Simple related ideas</td>
<td>Complex conceptual ideas (e.g. human relationships, multiculturalism)</td>
<td></td>
</tr>
<tr>
<td>Familiar themes</td>
<td>Familiar themes</td>
<td>New themes</td>
<td>Mature themes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language and Literary Features</th>
<th>Early Primary</th>
<th>Primary</th>
<th>Junior</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly patterned</td>
<td>May contain repetitive words, phrases and actions</td>
<td>May contain sentences in a basic paragraph structure</td>
<td>May contain a variety of sentence and paragraph structures</td>
<td></td>
</tr>
<tr>
<td>Repetition</td>
<td>Descriptions of objects</td>
<td>Greater detail in description of objects</td>
<td>Detailed description of ideas and events</td>
<td></td>
</tr>
<tr>
<td>Predictable language (e.g. patterns, rhyme)</td>
<td>Simple, short dialogue</td>
<td>Simple dialogue varying in length</td>
<td>Dialogue using complex oral structures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simple literary devices (e.g. alliteration)</td>
<td>A greater variety of literary devices (e.g. simile)</td>
<td>Complex literary devices (e.g. metaphor)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Text Structure</th>
<th>Early Primary</th>
<th>Primary</th>
<th>Junior</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiction: not a story, single thought/event</td>
<td>Fiction: simple plot, setting, character, problem, solution</td>
<td>Fiction: more complex plot, setting, character, problem, solution</td>
<td>Fiction: intricate plot, setting, character, problem, solution</td>
<td></td>
</tr>
<tr>
<td>Non fiction: isolated facts</td>
<td>Non Fiction: information with titles/subtitles</td>
<td>Non Fiction: a variety of forms (e.g. explanation, procedure)</td>
<td>Non fiction: a wide variety of forms (e.g. exposition)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Content</th>
<th>Early Primary</th>
<th>Primary</th>
<th>Junior</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics and events relevant to the student’s real life experience and prior knowledge</td>
<td>Broader range of topics and events vicariously related to a student’s experience and knowledge</td>
<td>Wide range of topics and events with less obvious relationships to the student’s experience and knowledge</td>
<td>Wide range of less familiar topics, events, ideas and concepts with little relationship to the student’s experience and knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>May include charts, simple graphs and diagrams</td>
<td>May include maps, graphs, charts, diagrams etc.</td>
<td>May include detailed maps, graphs, charts, diagrams etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longer and more varied with some clauses (e.g. exclamatory, interrogative, compound etc.)</td>
<td>Varied in length and structure</td>
<td>Varied in length and more complex in structure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All types of basic punctuation</td>
<td>Less familiar punctuation introduced (e.g. colon)</td>
<td>All types of punctuation</td>
<td></td>
</tr>
</tbody>
</table>
Literacy Guidelines – Book Levelling

<table>
<thead>
<tr>
<th>Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>➤ Simple and short words common to most children’s speaking vocabulary</td>
</tr>
<tr>
<td>➤ Longer words common to a student’s speaking vocabulary</td>
</tr>
<tr>
<td>➤ Content specific vocabulary</td>
</tr>
<tr>
<td>➤ Reflects familiar concepts and ideas</td>
</tr>
<tr>
<td>➤ New vocabulary introduced</td>
</tr>
<tr>
<td>➤ Subject specific vocabulary</td>
</tr>
<tr>
<td>➤ May reflect unfamiliar concepts and ideas</td>
</tr>
<tr>
<td>➤ Wider range of new vocabulary introduced</td>
</tr>
<tr>
<td>➤ Specialized terms and concept related vocabulary</td>
</tr>
<tr>
<td>➤ May reflect new concepts and ideas</td>
</tr>
</tbody>
</table>

Are there any resources that identify a variety of books and their levels?

There are several sources.

Many publishers’ catalogues identify books by level. A variety of levelling formats are used (e.g. DRA levels, Reading Recovery levels, and Guided Reading levels).

Guided Reading levels have been determined using the work of Irene C. Fountas and Gay Su Pinnell. Lists of hundreds of books levelled to their criteria can be found in:


Guiding Readers and Writers Grades 3-6, Heinemann, 2001 ISBN 0-325-0