The Role of Information Literacy

Information Literacy is the ability to access, interpret, evaluate, organize, select, produce, and communicate information in and through a variety of media technologies and contexts to meet diverse learning needs and purposes.

Research Process

Information can be used to examine critically knowledge and understandings. Through the research process, students can revise their understandings, perceive weaknesses in information, and make better sense of their world.

The current emphasis on information literacy and its manifestation, resource-based learning, makes research an essential part of a school curriculum and life long learning. Teachers provide curricular opportunities and experiences through which students can define, investigate, and develop solutions to problems, and learn to make informed, wise decisions as they assume responsibility for learning. Students’ questions are pursued through original research and investigation, and by questioning and using information in a range of media.

Students have much to gain when they experience a consistent approach to the research process beginning in the early primary grades and continuing throughout their school years. Where library professionals are part of the instructional team, they can provide co-ordination and support to teachers as they develop a school-wide plan for teaching information skills and strategies. A collaborative and planned approach to the information process will result in schools having a carefully developed continuum of information skills and strategies, as well as a plan for instruction. This approach will be activated for a variety of projects, including those that make use of technology, in order to access, use, create and share information.

The process of doing research involves a number of interrelated processes, skills, and strategies:
- thinking processes (creative, critical, cognitive, problem solving)
- communication processes (reading, viewing, writing, representing, listening)
- scientific process (experimenting, testing hypotheses)
- research and traditional library skills
- media literacy skills
- technological skills

In the primary grades, students need many opportunities to see the research process demonstrated and to work through the process with support as a collaborative group. Another way teachers and/or library professionals can support students in the early grades with research is to set up learning centres where preselected resources are found in one location to be accessed and used in structured learning activities.
Specific directions about information skills are given, and products are often contained in predesigned booklets.

As students gain more experience, teachers sometimes organize learning stations that include several resource-based learning activities consisting of a variety of appropriate resources and directions focusing on the information skills to be practised. Students usually work in cooperative groups and rotate through the stations. These learning activities can be completed by all students or they can be differentiated to meet students' needs and interests. Creative and critical thinking should be encouraged.

Like the writing process, the research process involves a variety of skills and strategies grouped within phases or stages commonly identified as:

- Planning
- Creating New Information
- Gathering Information
- Sharing and Presenting Information
- Interacting with Information
- Evaluation
- Organizing Information

It should be emphasized that these stages of the research process are not lock step or linear. Students often return to stages, always building on them as they construct their own learning. Although not every information processing activity will take students through all of these stages, students need to have opportunities to work through the whole process. When they do engage in activities at learning centres or learning stations that focus on one or more stages of the process, it is important for them to understand what stage they are working on, and what skills and strategies they are practising.

During the planning stage, topics are identified for further inquiry. These topics often grow out of a classroom theme, unit of study, or a personal interest. Students and teachers decide on a general topic and narrow it to make it manageable and personal for students. For example, a general topic brainstormed by a class might be animals. This might be narrowed down to animals that live in the wild in the Atlantic Provinces, with each student choosing an animal that he/she is interested in learning more about.

Students build on prior knowledge and experiences by brainstorming what they already know about the topic, and they develop questions to guide the processing of information (e.g., What do we want to find out about ... ?) In the primary grades, teachers generally involve students in generating the questions as a group. For example in researching specific animals, students might generate questions such as:

- What does it eat?
- How does it protect itself?
- Where does it live?
- What does it look like?
- Who are its enemies?
- How does it care for its young?
As students begin to ask questions, they develop a growing sense of ownership of the research problem. The planning process also involves considering possible sources of information and thinking about how the information will be used and recorded.

**Gathering Information**

At this stage of the process, students access appropriate learning resources (print, non-print, information technology, human, community). They locate the resource, and find the information within the resource. Students need gradual structured opportunities to learn and practise several important skills:

- select an appropriate resource from a display, centre, or station
- use organizational features within a resource (e.g., table of contents, index, glossary, captions)
- skim, scan, view, and listen to information to determine whether the content is relevant to the topic questions
- search (with assistance) a card catalogue or electronic catalogue to find titles and call numbers for resources, and locate resources by call number
- use, with assistance, electronic sources such as CD-ROM or the Internet

Until students are more independent, teachers usually preselect resources to ensure that they are readable, interesting, and have organizational features that are helpful to students in locating appropriate information.

Students also need to see strategies demonstrated for gathering information (e.g., using print and electronic catalogue, magazines, and computer software; using organizational features such as table of contents, indexes, captions, and headings to find information within the resource). Students also need help to realize that fewer appropriate resources are better than a multitude of inappropriate resources. Volunteers and/or library monitors can be trained by teachers and library professionals to provide assistance with information gathering to individual students. It is helpful to involve students in discussion about their successes and difficulties in locating appropriate information/resources.

**Interacting with Information**

During this stage of the process, students use a variety of language skills and strategies as they attempt to answer their research questions. These include

- evaluating information to determine if it is useful in answering their questions
- using text features such as key words, bold headings, captions
- questioning, skimming, and reading (QSR)
- interpreting simple charts, graphs, maps, and pictures
• listening and viewing for relevant information
• recording their information in simple point-form notes or through pictures or numerical data

Students need to see demonstrations that make explicit the skills and strategies necessary to interact with information effectively (e.g., how to read, evaluate, and record information). It is helpful to provide students in the primary grades with formats such as matrix sheets or webs for recording information.

These formats may be adapted for individual or group purposes. A matrix, such as the one that follows, for example, might be demonstrated by the teacher on chart paper, overhead, or computer database, and students may also be encouraged to use it as a strategy for individual note-making.

Matrix

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Habitat</th>
<th>Food</th>
<th>Enemies/Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note-Making Web

Students need demonstrations of note-making skills and strategies as well as opportunities to practise. For example, students need to learn that notes have to make sense for future reference even though they are in point form.

Most learning centre or learning station activities focus on this stage of the process. Students are usually required to read/view/discuss/listen to information from various preselected learning resources, and then write notes or represent information in some way. Directions need to be written clearly and easy to follow.

The practice and protocols of acknowledging sources should be introduced in the primary years to overcome plagiarism and to create respect for the work and ideas of others. Students may keep track of resources they use by making use of a simple bibliographic format (Sources I Used for titles and authors). Names of resource persons, and dates of interviews should also be included.
Examples of pages from an information booklet about animals where students are asked to record bibliographic information

1. I read two information/non-fiction books about my animal.
2. I learned how to use an index to find information about my animal.
   1. ___________ page ___
   2. ___________ page ___
   3. ___________ page ___

This stage of the research process requires students to organize the information they have gathered to answer the questions generated during the planning stage. Since matrices or webs are often provided for note-making in the primary grades, the information is organized under questions or headings as students are recording their information. If these strategies are not used, organizational strategies should be modelled by teachers.

Teachers can demonstrate strategies to organize notes such as using numbers or colours. For example, all the notes having to do with what the animal eats (food) could be marked #1 or circled using a red marker; all the notes having to do with where the animal lives (habitat) could be marked #2 or circled using a blue marker. Students also need practice in group situations in reflecting on where specific pieces of information fit. (Where does this fact belong? Which question does it answer?)

At this stage of the process, conferencing will provide support as individual students begin to wonder if they have enough information. An important question for teachers to ask at this stage is, Can you answer all of the questions developed at the planning stage? If not, what can you do? For example, for the guiding question, How does the animal protect itself? a student may only have recorded the single word teeth. In this instance, the teacher will need to encourage the student to return to the source (or find another source) to expand on their notes.

Organizing Information

The series title is _______________________

The titles are
1. ______________________
2. ______________________

The authors are
1. ______________________
2. ______________________

The publisher is _____________

The copyright dates are
1. _________ 2. __________
and understanding of the information before it is used, interpreted, and shared with other students.

Creating New Information

Some research activities may not go beyond the organizing stage of the process. Students may simply share the information they have gathered and organized. At other times, the anticipated product would have been decided upon at the planning stage. Written products require students to develop sentences and paragraphs or sections from their recorded notes. With demonstrations and practice, students gradually develop the ability to synthesize data from several sources to create new information, or build new knowledge and understanding.

It should be emphasized that the written report is not the only end product of the research process. The process can result in a variety of other kinds of representations, such as posters, murals, models, dramatizations, drawings, graphs, and oral presentations. Students can also create products using newer technologies such as word processing and web browsers (or having their work scanned by teachers or older students.) They can also, with assistance, create products on-line with other students within the classroom or with students in other classes or schools.

Conferencing is vital at this stage of the process. When intervention is required, teachers and/or library professionals can work with individuals or small groups. For example, some students may not have recorded enough information; others may have difficulty combining their information into sentences; still others may need assistance with editing or illustrating.

Sharing and Presenting Information

Students should experience a variety of opportunities to share what they have discovered and created. Emergent and early writers will enjoy group sharing or discussion about their products, whether these are created through collaborative or individual efforts. Examples may include

- reading an original story or poem
- sharing information in pictures, simple graphics, and charts
- presenting information orally
- explaining how a student-created game is played
- publishing through the Internet

As students become more independent, they will be able to share in more complex ways. For example, they might publish reports with a cover, title page, table of contents, and glossary. They will also develop skills for constructing visual aids such as drawings, models, and posters to enhance their presentations. Students in the primary grades can be encouraged to dramatize their presentations, and with assistance, use
technology such as photographs, taped music, or videotape. Having students share in small groups with another class is also an effective way to share research products. Students need help to develop criteria for sharing products, such as speaking clearly and audibly when reading or dramatizing. They also need to be prepared for active audience participation (e.g., listening purposively, asking appropriate questions, offering positive, helpful comments).

It is important to involve students in reflecting on the process, skills, and strategies they are using throughout the research activity. They can begin to assess their learning process by contributing to whole-class or small-group discussion. For example, the class can be asked to reflect on what they learned about gathering information, or to evaluate critically the resources used (e.g., to reflect on which resources were most valuable). Students can be encouraged to reflect in learning logs. They can also use e-mail links in Internet projects for responding, commenting, or suggesting revisions to other students' work.

Assessment and Evaluation

Students can learn to assess and evaluate their own products by using checklists or rubrics that contain simple descriptions of what should be included in a good product. Another way to involve students in self-evaluation is to have them create portfolios that contain samples of research skills and strategies as well as products, providing evidence of developing information literacy.

Teachers use a variety of techniques to evaluate student processes and products:
- observation
- anecdotal records
- conferencing
- checklists
- rubrics (with criteria for research products)

(See the following pages for suggestions for working on the research process at various stages of development: emergent, pp. 82-83, and 130-131; early, pp. 94-95 and 142-143; transitional, pp. 108-109 and 158-161)
The Role of Media Literacy

Media literacy is the ability to understand how mass media, such as TV, film, radio, and magazines, work — how they produce meanings, how they are organized, and how to use them wisely.

The influence of media, such as TV, film, videos, magazines, computer games, and popular music, is pervasive in the lives of students today. It is important therefore, that beginning in the primary grades, students learn to use media resources critically and thoughtfully.

Media literacy is a form of critical thinking that is applied to the message being sent by the mass media. In the primary grades, students can begin to develop media literacy by asking themselves questions such as the following:

- What is the message?
- Who is sending the message?
- Why is the message being sent?
- How is the message being sent?
- Who is the intended audience?

Students make sense of media messages based on their prior knowledge and experiences. After considering their personal connections, they can learn to analyse and evaluate the ideas, values, techniques, and contexts of media messages. Media literacy activities should be integrated into the curriculum. Following are some examples of such activities appropriate for the primary grades:

**Print**

- Have students compare a print version of a story to a film version
- write something for a class or school newspaper
- produce a class book of poetry or stories
- examine the format and features of children's magazines
- visit a newspaper office

**Sound**

- Have students respond personally to audiotapes
- produce announcements for the school public address system
- produce a play with sound effects and share with another class through the school public address system
- visit a local radio station

**Images**

- Have students before watching a film or video, brainstorm what they already know, and pose questions they would like answered
- respond personally to a video or film
- write the print “captions” for a variety of images
- make a collage of pictures to reflect a feeling or a theme
- write a story to go with a photograph or painting
• keep a television viewing log
• discuss favourite TV programs (categorize as real or make-believe; for children or for adults.)
• graph viewing habits - kinds of programs the class likes best/least
• discuss commercials (What kinds of products are advertised in the shows students watch? Who are the advertisements aimed at? What words or phrases do students notice? What techniques do companies use to sell their products?)
• create visual images to go with a story, book, or poem and discuss reasons for choices
• visit a television studio
Critical literacy is the awareness of language as an integral part of social relations. It is a way of thinking that involves questioning assumptions; investigating how forms of language construct and are constructed by particular social, historical, and economic contexts; and examining power relations embedded in language and communication.

Literacy, as it was once understood—the ability to decode and make sense of a written text—vital as it is, is no longer a sufficient preparation for children growing up in an increasingly complex world. Critical literacy is becoming more and more central in continuing efforts to educate students in ways that help them grow into autonomous, caring, and engaged citizens.

When meaning is said to be socially constructed, it means that most of what is known/understood about the world and one another is determined by cultural and social expectations and by ways in which individuals are positioned.

It cannot be assumed that the laws, values, customs, traditions, and manners learned from one setting are universally interpreted and accepted in the ways in which they have been learned. The language used varies according to the situations in which individuals find themselves.

Critical literacy is all about examining and learning to examine these constructs. Knowledge, truth, education, and language can never be neutral or context free—they are constructed by individuals who have a history and a point of view. Such constructs often serve to maintain the established status quo, and historically, school has taught us to accept expert authority without question. Critical literacy involves questioning these taken for granted assumptions. It involves helping learners come to see that they construct and are constructed by texts; that they learn how they are supposed to think, act, and be from the many texts that surround and bombard them.

If one of the goals of the curriculum is to give children the tools they need to become thinking, caring citizens, they have to be taught to deconstruct the texts that permeate their lives—to ask themselves questions, such as the following:

- Who constructed the text? (age/gender/race/nationality)
- For whom is the text constructed?
- What does the text tell us that we already know?
- What does the text tell us that we don't already know?
- What is the topic and how is it presented?
- How else might it have been presented?
- What has been included and what has been omitted?
- What does it teach me about others and their place in the world?

Only by beginning to work with children as early as the primary grades to help them recognize how text constructs our understanding/world view of race, gender, social class, age, region, ethnicity, and ability, can teachers...
begin to give them the means to bring about the kind of social justice that true democracy seeks to create.

Teachers need to help children create and recreate ways in which they think about the world. Actively learning to recognize that the way things are isn't necessarily the way they ought/have to be encourages children to examine the conditions of their own lives and the lives of others.

Critical literacy teaches children to begin to make intelligent, considered, humane decisions about how they choose to accept, resist, or adapt understandings they have unravelled. It encourages children to look with open eyes, to explore many sides of the same issue. Through it, children can be engaged in conversations that deepen understandings that lead to action for a more just world.

Some ways teachers can nurture critical literacy in the primary grades include the following:

- Examine the texts in classrooms (posters, books, videos, etc.) asking, Who is represented here and how? Who isn't here and why not? Holding such conversations with students not only alerts them to the ways in which the classroom is/is not inclusive, but also opens the door for change.
- Help children, through discussions about books, to read the text of the pictures, not just to make sense of the words but also to ask again, Who is here and how are they represented? A Richard Scarry picture book, for example, constructs gender in very stereotypical ways, the deconstruction of which can help children to recognize how their own sense of gender is being constructed for them.
- Watch with children videos of their favourite movies or TV programs as a way to begin a conversation about the ways in which the world constructs individuals' sense of who they are and how they ought to be. Children can learn a great deal about the ideals that are part of the taken for granted assumptions of many TV programs.
- Engage children in deconstructing popular fiction they are reading. Children quickly come to see that many taken-for-granted assumptions about race, social class, and gender are constantly reinforced by the kind of reading for pleasure that individuals are unaccustomed to questioning.
- Ask children to look at how their images of self and others are constructed by the clothing they wear. This is another way of sorting out the ways in which individuals unconsciously categorize/label one another and deal with one another as a result of their conclusions.

The possibilities to work on developing critical literacy are endless. In an ongoing effort to teach children to examine taken-for-granted knowledge and assumptions intelligently and thoughtfully, teachers invite them not only to be more aware of social justice, but also to care deeply about working toward it.
The intent in focussing on visual literacy in the English language arts curriculum is threefold:

- to assist students in analysing visual images to understand the creator’s technique and intent
- to enable students to achieve a considered response to a visual image
- to enable students to achieve a considered response to a text through creating a visual image

Since response is a personal expression, it will vary from student to student. A climate of trust and respect for the opinions of all students must be established to ensure that everyone feels free to express his/her own personal point-of-view. The unique perspectives of many different student voices will enhance the understanding of all and will help students to appreciate the importance of non-verbal communication.

If the viewing of a visual image is to be a meaningful experience, it should consist of more than merely eliciting a quick reaction. Teachers can help students by guiding them through the viewing experience. In a visual response activity, students can engage in discussion about elements of design and colour, for example, and discuss how the artist/illustrator uses these effectively to convey a message. They can also discuss the feelings that a visual image evokes in them, or associations that come to mind when viewing a visual image.

Visual literacy also encompasses the ability to respond visually to a text. Students can be asked, for example, to create their own interpretation of a poem through a visual arts activity, such as drawing a picture, making a collage, or creating their own multimedia productions.
The Role of Drama

Drama can be a powerful medium for language and personal growth, and it is an integral part of the English language arts curriculum entry–3.

- Drama provides opportunities for personal growth. Students can use drama to clarify their feelings, attitudes, and understandings. With opportunities to develop and express their ideas and insights through drama, students grow in self-confidence and self-awareness.
- Drama is an art—stimulating the imagination and promoting creative thinking. It leads to a deeper appreciation for the arts and helps students to understand how they construct and are constructed by their culture.
- Drama is a social process in which students can work together to share ideas, solve problems, and create meaning. Students extend their learning with a variety of social interactions by practising the skills of collaborative interaction and by recognizing and valuing their own and others’ feelings and ideas.
- Drama is a process for learning. Because it is multisensory, drama appeals to various learning styles. It promotes language development, helps students become engaged with text, and strengthens comprehension.

Some drama structures appropriate for the primary grades include the following:

Dramatic Play
Dramatic play is a natural and unstructured childhood activity. Young children often engage naturally in activities such as playing house or pretending to be firepersons. Dramatic play can be encouraged by setting up a drama centre with dress-up clothes and simple props.

Role-Play
The language arts curriculum in the primary grades offers many opportunities for students to assume the role of various characters they meet in the literature they read, assume roles in imagined situations, extend a story through role-play, or interview a character in role.

For example, students can assume the role of various characters in the book The Queen Who Stole the Sky and hold a town hall meeting to explore the problem and possible solutions. Role-play can deepen and extend students’ response to literature, and provide opportunities to develop problem-solving skills and imagination.

Tableau
A tableau is a still picture that a group of students create based on a scene from a story, poem, or other text. Students can also choose to create a tableau of what they think might have led up to a situation in a text (a book, movie, painting, etc.), or a tableau representing what they
think might happen next. The students plan how they will stand and what facial expressions they will use. They may use simple props and costumes to help them create the scene. A tableau looks like a scene from a movie frozen in time.

**Mime**

Mime is acting without words. Hand gestures, body movements, and facial expressions are used to represent a feeling, idea, or story. In a community theme, for example, students might mime different kinds of jobs they might do within a community.

**Puppet Plays**

Puppet plays provide the opportunity for students to create and enact a variety of characters, roles, and situations. There are many types of puppets, from simple ones that fit on a finger, to more professional ones. Simple puppets can be made from materials such as paper bags, socks, or paper mache. Students might enact *The Three Billy Goats Gruff*, for example, by using stick puppets.

**Readers Theatre**

Readers Theatre is an interpretive oral reading activity. Students use their voices, facial expressions, and gestures to interpret characters in scripts or stories. Teachers and students can use prepared Readers Theatre scripts or adapt texts for readers theatre through a collaborative effort. A grade 3 class, for example, collaborated to adapt *Mollie Whuppie and the Giant* for Readers Theatre. They broke into groups, practised, and then each group presented the script in other classrooms in the school.
Integrating Technology with English Language Arts

As information technology shifts the ways in which society accesses, communicates, and transfers information and ideas, it inevitably changes the ways in which students learn. Information technologies include basic media such as audio and video recordings, broadcasts, staged events, still images and projections, computer-based media, data and information systems, curriculum software, and of course, print publications.

Because the technology of the information age is constantly and rapidly evolving, it is important to make careful decisions about its applications, and always in relation to the extent to which it helps students achieve the outcomes of the English language arts curriculum.

Technology can support learning in English language arts for specific purposes.

Data Access

- Students can access information through video, sound, and print texts, commercial CD-ROMs, and web sites on the Internet. The use of multimedia texts can enhance the research process. For example, there are a number of excellent museum and gallery sites on the Internet that offer text, pictures, and sound. After visiting the site, students in the primary grades might be asked to draw a picture of something in the exhibit and write a few sentences about what they have learned. As students engage in processing information from these texts, they are learning critical-thinking and problem-solving skills as well as skills and strategies related to technology and the research process.

- Students can create, collect, and organize information, images, and ideas using video and sound recording and databases.

Data Collection

Database software is a tool for recording, organizing, and presenting data in a systematic way. Database information is organized into records and fields that can be sorted in a variety of ways to show relationships within the information.

Working with databases helps students develop critical thinking by engaging them in
- predicting
- questioning
- organizing and sorting information
- discovering relationships and commonalities
- problem solving
- investigating new subjects
- presenting information and relationships in new ways
The groundwork for working with databases can be laid at the entry-1 level by engaging students in off-computer database activities. This introduces them to database concepts and terminology.

Example of off-computer database activities
- collecting information on simple questions such as
  - favourite colour  - favourite book
  - favourite animal  - favourite season.
- recording the information on a chart or individual cards
- analysing the data (asking questions)
  - How many students like red?
  - How many students like cats?
  - How many students like yellow and spring?
  (more complex)
  - What patterns do you see?

By grade 2, many students can use ready made databases, and with support, begin to create their own. The following are examples of teacher created databases used with grade 2 students in a Phoebe Gilman author study and a dinosaur theme.

*Phoebe Gilman's Books*
Samples of questions students might answer by sorting database records:

- Were the characters in Phoebe Gilman's books usually male or female?
- How long has Phoebe Gilman been writing books?
- In how many Phoebe Gilman books was the main character a girl and royalty?
- What was the all-round most favourite book?

<table>
<thead>
<tr>
<th>Title</th>
<th>Year</th>
<th>Main Character</th>
<th>Setting</th>
<th>Rhyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Balloon Tree</td>
<td>1984</td>
<td>girl—Princess Leonora</td>
<td>a kingdom</td>
<td>no</td>
</tr>
<tr>
<td>Jillian Jiggs</td>
<td>1985</td>
<td>girl—Jillian</td>
<td>Jillian's room</td>
<td>yes</td>
</tr>
<tr>
<td>Little Blue Ben</td>
<td>1986</td>
<td>man—Little Blue Ben</td>
<td>glen around his house</td>
<td>yes</td>
</tr>
<tr>
<td>The Wonderful Pigs of Jillian Jiggs</td>
<td>1988</td>
<td>girl—Jillian</td>
<td>Jillian's house</td>
<td>yes</td>
</tr>
<tr>
<td>Grandma and the Pirates</td>
<td>1990</td>
<td>girl—Melissa</td>
<td>pirate ship</td>
<td>yes</td>
</tr>
<tr>
<td>The Gypsy Princess</td>
<td>1995</td>
<td>girl—Cinnamon</td>
<td>a forest</td>
<td>no</td>
</tr>
</tbody>
</table>
### A Dinosaur Database File

<table>
<thead>
<tr>
<th>Name</th>
<th>Length m</th>
<th>Height m</th>
<th>Movement</th>
<th>Teeth</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allosaurus</td>
<td>11</td>
<td>3.5</td>
<td>walk</td>
<td>sharp</td>
<td>meat</td>
</tr>
<tr>
<td>Ankylosaurus</td>
<td>4.5</td>
<td>5.5</td>
<td>walk</td>
<td>flat</td>
<td>plants</td>
</tr>
<tr>
<td>Brachiosaurus</td>
<td>23</td>
<td>10</td>
<td>walk</td>
<td>flat</td>
<td>plants</td>
</tr>
<tr>
<td>Brontosaurus</td>
<td>22</td>
<td>8</td>
<td>walk</td>
<td>flat</td>
<td>plants</td>
</tr>
<tr>
<td>Diplodocus</td>
<td>28</td>
<td>12</td>
<td>walk</td>
<td>flat</td>
<td>plants</td>
</tr>
<tr>
<td>Elasmosaurus</td>
<td>15.5</td>
<td>4</td>
<td>swim</td>
<td>sharp</td>
<td>fish</td>
</tr>
<tr>
<td>Ichthyosaurus</td>
<td>12</td>
<td>12</td>
<td>swim</td>
<td>flat</td>
<td>plants</td>
</tr>
<tr>
<td>Protoceratops</td>
<td>2</td>
<td>1</td>
<td>walk</td>
<td>flat</td>
<td>plants</td>
</tr>
<tr>
<td>Pteranodon</td>
<td>8</td>
<td>0.65</td>
<td>fly</td>
<td>none</td>
<td>fish</td>
</tr>
<tr>
<td>Trachodon</td>
<td>9</td>
<td>5</td>
<td>walk</td>
<td>flat</td>
<td>plants</td>
</tr>
<tr>
<td>Triceratops</td>
<td>8</td>
<td>2</td>
<td>walk</td>
<td>flat</td>
<td>plants</td>
</tr>
<tr>
<td>Tyrannosaurus Rex</td>
<td>16</td>
<td>6</td>
<td>walk</td>
<td>sharp</td>
<td>meat</td>
</tr>
</tbody>
</table>
Examples of questions students might be asked to answer by sorting database records:

1. **PUT IN ALPHABETICAL ORDER BY NAME**
   - The fourth dinosaur is ____________________.
   - The first dinosaur is ____________________.
   - The eighth dinosaur is ____________________.
   - The last dinosaur is ____________________.
   - Which dinosaur came first? Pteranodon or Protoceratops?

   Two dinosaurs that start with the letter A are ____________________ and ____________________.

2. **SORT BY FOOD**
   - What food is listed first? ____________________
   - How many fish eaters are there? ____________
     - The fish eating dinosaur that flies is ____________________.
   - How many dinosaurs are plant eaters? ____________
     - Plant eaters have ________ teeth.
   - How many dinosaurs in the database are meat eaters? _______
     - Meat eaters have ________ teeth.

3. **SORT BY HEIGHT**
   - ____________________ was the tallest dinosaur.
   - ____________________ was the shortest dinosaur.

   How many dinosaurs were less than one metre _______
   How many dinosaurs more than ten metres _______

4. **SORT BY MOVEMENT**
   - Three ways that dinosaurs move are ____________________,
     ____________________, and ____________________.
   - Most dinosaurs moved ____________________.
Communication

Text Preparation

• Students can create, edit, and publish texts, using word processing and graphics software.

Word processing is computer software that facilitates writing. It allows for the easy insertion, deletion, and rearrangement of text. Writing at the computer involves composing, editing, and revising on screen. The writer can also vary the font, make layout changes, save the document for future use, and print a finished product. The full benefits of the power of word processing are revealed when students compose on screen rather than simply transcribing work to the screen.

The use of word processing in the primary grades can enhance the process of writing by
• facilitating the revising and editing stages of writing
• enhancing the presentation of student writing (layout, legibility, on-screen presentation, addition of multimedia components)
• enhancing group or collaborative writing

Keyboarding skills should not be considered a prerequisite for beginning word processing.

Emergent writers will become familiar with the keyboard through use of the keyboard, and familiarity can be taught. It is simply necessary that writers be able to key their ideas at a pace similar to composing with pencil and paper. Keyboarding skills for independent writers should be sufficient for them to keep up with their line of thought.

Word processing software is a well-accepted modern tool for communication. Its use in the classroom encourages growing skills both with facility in using the technology and with writing.

Examples of ways word processing can be used in Kindergarten–3 classrooms:
• creating alphabet books
• writing journals, literature responses, or learning logs
• composing stories, poems, letters, signs
• revising, editing, and publishing work
• creating a class newsletter
• creating reports
• creating group compositions
Interaction/Collaboration

- Students can share information, ideas, and interests with others through the Internet.

The Internet is an extensive network of interlinked yet independent computer networks. It is becoming an increasingly more important tool for education. Introduction to the Internet can, with support, begin as early as the primary grades.

Some ways in which students in the primary grades can communicate through the Internet include the following:

**Key Pals**
This is the electronic equivalent of pen pals. A class in Prince Edward Island, for example, might correspond through e-mail with a class in another school in the province, or with a school in another province. The correspondence might be group to group or student to student.

**Exchange of Information**
E-mail can also be used to exchange information. A grade 3 class, studying Canadian communities in social studies might, for example, exchange information about their community with students in other Canadian communities.

**Electronic Publishing**
The Internet offers an excellent opportunity for students to share their work with real audiences, students in other schools in their own province and beyond. Kidpub WWW publishing is an example of a site where students can publish their work. (http://www.kidpub.org/kidpub/) Another option is to publish student work on the school's home page. A grade 1 class, for example, collaborated to compose their own variation of a book they had read. Individual students used a drawing program to create illustrations for the various pages of the text, and their book was placed on the school's home page to be shared with other grade 1 classes in the province.

Teaching and Learning

- Students can inquire, refine, and communicate ideas, information, and skills using computer and other communication tutoring systems, as well as instructional simulations.
Expression

- Students can shape the creative expression of their ideas, feelings, insights, and understandings by using music making/composing/editing technology, video and audio recorders, and drawing/painting software.

Graphics and drawing programs or environments allow the user to manipulate a variety of drawing/shape creating tools, colours, and text and layout features to create pictures, images, and designs. These images can be used alone or imported into some text documents.

Examples of ways students can make use of graphics programs:
- creating posters and signs
- illustrating stories, poems, and reports
- creating wordless books

As students engage in using drawing programs, they are learning to problem solve (e.g., deciding what to draw, how to begin, which drawing tool to select, what colours to use, how large to make the drawing, in what order to place objects on the screen when layering objects). When they use such software in pairs, they are also learning co-operative problem-solving strategies.

See page 320 for a suggested list of primary software.