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**TEACHING AND LEARNING  
RESEARCH EXCHANGE**

**Technological Skills in  
the Research Process**

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# Introduction

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Independent Learning is one of the Common Essential Learnings as stated by Saskatchewan Learning. It focuses on the “creation of the opportunities and experiences necessary for students to become capable, self-reliant, self-motivated and lifelong learners.” (Saskatchewan Education, 1988, p.9). Resource-based learning is one of many effective approaches that help to develop independent learners. To become independent learners, students need to be information literate. Information literacy can be defined as having the ability to “access, evaluate, and use information from a variety of sources” (Costa, 1985, p.2). This is now a highly valued and acknowledged skill. The Conference Board of Canada (2000) in its “Employability Skills 2000+” report lists the managing of information as a fundamental skill. It goes on to elaborate on the nature of this skill:

- *locate, gather and organize information using appropriate technology and information systems.*
- *access, analyze and apply knowledge and skills from various disciplines (e.g. the arts, languages, science, technology, mathematics, social sciences, and the humanities).*

Information literacy has been a focus in the Saskatoon Catholic School Division for many years. The SCS Division authored and implemented a five-stage Research Strategies Continuum in 1990. This document has been used by teachers and teacher-librarians in our division to plan collaboratively and to teach resource-based units. With the use of the Continuum, the students have been exposed to research skills and the independent learning skills necessary to function in the job markets and society of the 21st Century. It is crucial that teacher-librarians are prepared to combine resource-based learning with the technology available in today’s world (Eisenberg and Lowe, 1999).

Technology is critical in preparing students to live, learn, and work successfully in a digital age (Rockman et al., 1998). Jukes, Dosaj and Macdonald (2000) have noted that students now require a different set of skills than did students in the past just to navigate through the vast quantities of information of varying quality. For the first time in history, students have an overabundance of information. It is this very overabundance that elicits concern and, some argue, anxiety. “Information anxiety is rampant...it’s even got its own medical term: Information Fatigue Syndrome” (Investor’s Business Daily, 1996, in Eisenberg and Berkowitz, 1999, p.3).

In order for students to effectively use the vast amounts of information available, they will need information literacy skills at every stage of the research process. Even though technology is having a major impact on our use of information resources, most students do not possess the skills to make effective use of the available technology. All stages of the research process are negatively impacted by the lack of necessary skills. However, research planning (pre-search), data collection (information retrieval) and end products (organizing and creating) feel the largest effect. Technological skills need to be integrated into all steps of the research process so that students not only realize how technology can help them complete the research task, but they are also able to use the technology to enhance their quest for information in school, and more importantly, in the world beyond the classroom. It is crucial that students understand how to transfer these skills to real life situations (Eisenberg and Berkowitz, 1999).

# The Steps of the Research Process

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## PRE-SEARCH

In the pre-search stage, it is important that the students have a general understanding of the topic. It is during this stage that the task is defined and a research plan is created. Students “require the ability to ask the right questions” (Jukes, Dosaj and MacDonald, 2000, p.8) to guide the research. In this day of info-glut, this step helps students focus on the relevant information. In order for students to ask questions that will effectively guide their research, they need to have a thorough understanding of the topic. Difficulties may arise when not enough time is spent at this stage of the research process. There is a tendency to rush through this stage as it does not appear to be real research if there isn't any information to write down. Nevertheless, time spent developing a general understanding facilitates the remaining stages of the research process in terms of directing students' focus to the topic at hand. Students are encouraged to obtain a broad view of the subject before the research questions are formulated.

As a result of the information overload, it becomes crucial for teachers, teacher-librarians and students to take the time to peruse the many available resources in a critical manner so that students can find and maintain the focus of their topic.

## INFORMATION RETRIEVAL

Once this focus has been established, the students are then prepared to locate resources relevant to their topic. In this technologically influenced world, teachers and teacher-librarians may need to remind students of the many appropriate print resources that are available to them. Although students prefer to use the computer for research, it is not always their most effective tool since they may not have the necessary skills to locate the information. The wealth of information that is available to the students online can be overwhelming. The Internet presents information in a nonlinear fashion, so students will need to be taught how to access and make use of it (MacInnes, 1996). However, the Internet does provide the students with the opportunity to access current information (ATA, 2000), and they need to be taught how to conduct an effective search on the Internet. They will need to acquire the necessary skills, such as search techniques and web site evaluation, in order to use the technology to conduct their research. Students will also need to be taught about the variety of materials available to them, such as online databases, CD-ROMs, and other programs.

# INFORMATION PROCESSING

At the information processing stage, students record responses to their original questions. This information is often recorded using an outline, grid, or some other organizational format developed by the students and their teachers.

Students access the Internet with the expectation that it is accurate in the same way that the information in a published book is accurate. Most material on the Internet is not refereed or censored; therefore, students will need to be taught critical thinking skills in order to determine what information is correct (ATA, 2000). They will need specific skills in order to evaluate web sites and judge the reliability of the material. Students must cite their sources and, therefore, will need to be taught a proper format for their reference list or bibliography.

It should be noted that there are currently no means for evaluating the materials which are being marketed to the schools (ATA, 2000). As educators, we need to be aware of the curriculum and the needs of our students in order to make wise choices about these materials.

# END PRODUCTS AND PRESENTATION

The Internet as a tool has had a dramatic effect on the way students create end products. There exists a wide variety of interesting formats for students to explore, such as slide shows, video clips and sound bytes. Technology has opened the opportunity for multimedia presentations created by groups or individual students.

Unfortunately, this new exciting technology also makes it possible for students to download a paper and plagiarize. In order to prevent this, teachers need to change the way assignments are created. Students should be given the opportunity to analyze and synthesize information in the creation of their end product.

This knowledge of technology is essential if we are to continue to prepare students to be independent, lifelong learners. Information Communication Technology (ICT) is about the ways in which we can communicate, inquire, make decisions and solve problems (Alberta Learning, 2000).

# Methodology

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The teachers participating in this study occupied a variety of positions within our system – from full time high school teacher-librarian to .25 elementary teacher-librarian, as well as Board Office consultant. Our research group also had a lab manager from an elementary school who had set up a strong technology program at his school.

Student and teacher access to computers varied in each location. In one school, there were two or three computers with Internet access while in another school, there was a lab with 16 computers with Internet access.

The first step in the study was to conduct a literature review to develop a more detailed understanding of the current research. This literature allowed us to gain an understanding of the skills that may be required at each stage of the research process. We were able to consider the abilities of the students at the different grade levels as well.

Our second step was to reflect and write about the units that we had previously conducted using computers. Many of us have been involved in the Grassroots Project promoting technological use in the schools. Our written reflections included comments about the processes that worked, the problems we had encountered, and processes we wanted to try in order to solve the problems we had encountered. Based on the information gathered from the literature review and the reflections, we created a list of skills for each division level and stage in the research process.

We then met with a member of our group who has worked to develop a scope and sequence for computer skills. He is currently teaching these skills at a school in our system. At this meeting, we were able to see that there really are two distinct roles in the teaching of computers. While it is necessary to have a lab manager or computer literate person on staff, it is also essential to have a person who strives to use the computer as a tool in the research process. At this meeting, we decided to focus our research on the actual use of the computer in the research process, allowing the lab managers to use this information to create an updated scope and sequence for our system. We need to work together to develop technologically literate students in our schools.

Each teacher-librarian then taught a collaborative research unit integrating technology at all five stages as suggested by the continuum. A variety of assessment tools were used to evaluate the process at the various stages. The assessment tools used reflected the skill being evaluated. They ranged from check lists for web site evaluation skills to rubrics for the use of skills that were required to create quality end products. The students and cooperating teacher were also interviewed to gain an understanding of their feelings about the process.

Upon completion of the first unit, we integrated the technological skills into our current continuum. This continuum was then tested with a second unit in each of our schools. A final editing of the continuum was completed to reflect the information we gathered from our students during the process (see Appendix A).

# Findings

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One of the researchers worked with the same group of students during both Grassroots and McDowell projects. This researcher's findings, obtained through a technology evaluation form, revealed that students felt they knew more about technology than they actually did. It seemed that the more they thought they knew, the less they actually knew. This paradox became apparent during their research sessions using the computer. With this group, the most significant change was the way in which the students would decide if a web site was useful for their projects. On the first questionnaire, they were only concerned with the amount of information obtained; in later research projects, they developed some criteria for evaluating a website. They were also able to decide what to do with conflicting information. Most felt they would compare conflicting data with a book or other published document. They also realized they should check the currency of the information. The students were able to create a more detailed plan for research as their knowledge increased. They also understood what a bibliography was and its role in preventing plagiarism.

In another research station, the students also gained knowledge about the use of a bibliography and its usefulness in preventing plagiarism. These students were initially frustrated with the searches they conducted on the Internet. Many of them felt they had a firm knowledge of technology and were surprised when the task of searching was difficult. We found it necessary to spend time discussing key words and Boolean search techniques as most students did not have this knowledge. The Internet was a new technology in the lab at this school and while several students had used it at home for some time, they did not have the skills necessary to conduct effective searches. They also did not have the ability to evaluate web sites to determine their usefulness for their project. One of the major frustrations for students was the ability to find web sites that contained valuable information for the project instead of sites that were advertising items. Both of these skills showed dramatic improvement over the course of the research project.

The project which was conducted with the younger students faced some different challenges. It took the teacher and teacher-librarian many hours to locate appropriate web sites because many sites were too difficult for young students in terms of the level of reading ability they required. It then took a long time for the teacher to bookmark the appropriate sites. Bookmarking can be a challenge in the labs at our schools because the computers contain "Deep Freeze," and the password to disable "Deep Freeze" is accessible only to the lab managers. Although "Deep Freeze" remains a necessary precaution to prevent problems in the lab, it provided a source of frustration to the classroom teacher who was actually conducting the research. Inconsistency in the technology was another source of frustration. For example, since one web site had sound with it and only some of the computers had speakers, the students had to be divided into groups. Some were in the classroom, some on one site without sound, and others on the site with sound.

One class in the study had a fair knowledge of web site evaluation. Evaluation criteria were discussed prior to entering the lab and the students seemed to have a good grasp of what they were looking for. However, once they were in the lab, it was discovered that they did not have the necessary skills to conduct searches. They were not able to type in the URLs for the search engines. They were also frustrated with the diversity of equipment in the lab and the variety of ways used to start up and save material. The students in this group did not have a firm understanding of the research process and the citing of references to discourage plagiarism.

The students at the high school level seemed to have a better understanding of the terms 'bibliography' and 'plagiarism.' They knew they needed to give credit to an author when they used the author's material. These students did not have a thorough understanding of the research process. However, many felt that they could just use an encyclopedia to gain their information. Some students also did not understand the need to evaluate web sites nor the criteria for the evaluation.

## Study Analysis

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This research project was conducted in four different schools in our system; three elementary and one high school. The research took place in classes ranging from Grade One to Grade Nine. The focus of the research was on students' development of the research process and the implementation of technology as part of this process.

The differences in technology in the three different elementary schools created a problem for two of the schools. The students' lack of technological skills was magnified by the fact that several different instructions had to be given to accomplish the same task.

# Conclusions and Recommendations

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The findings from the research were used to create the attached research strategies continuum, which will be used by teacher-librarians and classroom teachers in our school division to develop research strategy skills in students.

One major conclusion that we reached was that students seemed to benefit from spending more time in the pre-search stage of the research process. At this stage the more time that students spent on defining the topic, creating the plan, and creating key words, the greater was their understanding at the end of the research project. However, the pre-search stage can also be a frustrating time since the students generally want to get at the resources and start the research. It takes patience on the part of the teacher and teacher-librarian to formally create the pre-search experience for the students.

We also concluded that the students generally feel they know more about technology than they actually do. They may have a firm understanding of the use of chat rooms, email, music files, and games; however, their search strategies are weak. They require extensive instruction in the area of searches as well as the evaluation of web sites.

The final area we looked at with the students was the creation of end products. We found that students' skills in this area depended on their previous experiences with a computer. Once again, the knowledge they had was not as great as they thought. As the use of computer labs grows within our system, their knowledge is increasing. We did not include an extensive list of end products in the continuum we developed since the products depend on the topic a student has chosen and the available technology.

In summary, our research pointed to the need for more time to be spent at the pre-search stage of the research process. The time spent developing a firm understanding of the topic, and creating key words and optional words for search engines, will make the research process easier and more worthwhile. Students require instruction in the use of computer skills and programs such as word processing, graphic programs and desktop publishing. It is the responsibility of the teacher-librarian and classroom teachers to work together to develop these skills in the students.

In addition, we would highly recommend that boards of education strive to ensure that hardware and software programs are standardized in all schools throughout the system. Without this consistency in technology, teachers and students will continue to experience frustration in their quest to integrate technology into the curriculum.

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# Appendices

## APPENDIX A: TECHNOLOGICAL SKILLS BY GRADE LEVEL (K-12) AND STAGE IN THE RESEARCH PROCESS

KINDERGARTEN PRE-SEARCH	KINDERGARTEN INFORMATION RETRIEVAL	KINDERGARTEN INFORMATION PROCESSING	KINDERGARTEN ORGANIZING AND CREATING	KINDERGARTEN INFORMATION SHARING
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview.</li> <li>2. Students are guided in the clarification of the topic through brainstorming. "What do I already know?" and viewing preselected multimedia resources.</li> <li>3. Students and Teachers categorize, "What do I already know?"</li> <li>4. Teachers and students brainstorm, "What do I want to know?"</li> <li>5. Students and teachers categorize the brainstormed questions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Materials are preselected by teacher and teacher-librarian.</li> <li>2. Students choose appropriate multimedia resources from those preselected for them by the teacher and teacher-librarian.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students verify previous knowledge and complete teacher directed exploration/research.</li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• categorizing information</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product.</li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 1 PRE-SEARCH</b>	<b>GRADE 1 INFORMATION RETRIEVAL</b>	<b>GRADE 1 INFORMATION PROCESSING</b>	<b>GRADE 1 ORGANIZING AND CREATING</b>	<b>GRADE 1 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview.</li> <li>2. Students are guided in the clarification of the topic through brainstorming, "What do I already know?" and viewing preselected multimedia resources.</li> <li>3. Teachers lead students through categorizing, "What do I already know?"</li> <li>4. Teachers and students brainstorm, "What do I want to know?"</li> <li>5. Students and teachers categorize the brainstormed questions.</li> <li>6. <b>Teachers and teacher-librarian develop headings and refine research statements or questions for the categories.</b></li> <li>7. <b>Students are informally introduced to their plan for research. This should include:</b> <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Materials are preselected by teacher and teacher-librarian.</li> <li>2. Students choose appropriate multimedia resources from those preselected for them by the teacher and teacher-librarian.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students verify previous knowledge and complete teacher directed exploration/research.</li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• <b>using key words</b></li> <li>• <b>reading print materials</b></li> <li>• <b>using a research grid to record information</b></li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. <b>These may include:</b> <ul style="list-style-type: none"> <li>• <b>written labels or sentences</b></li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 2 PRE-SEARCH</b>	<b>GRADE 2 INFORMATION RETRIEVAL</b>	<b>GRADE 2 INFORMATION PROCESSING</b>	<b>GRADE 2 ORGANIZING AND CREATING</b>	<b>GRADE 2 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview.</li> <li>2. Students are guided in the clarification of the topic through brainstorming, “<i>What do I already know?</i>” and viewing preselected multimedia resources.</li> <li>3. Teachers lead students through categorizing, “<i>What do I already know?</i>”</li> <li>4. Teachers and students brainstorm, “<i>What do I want to know?</i>”</li> <li>5. Students and teachers categorize the brainstormed questions.</li> <li>6. <b>Teachers and teacher-librarian develop headings and refine research statements or questions to create grid.</b></li> <li>7. <b>Teachers and students determine key words and phrases to use as entry points for information retrieval.</b></li> <li>8. Students are informally introduced to their plan for research. This should include: <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> <li>• <b>key words</b></li> <li>• <b>end product</b></li> <li>• <b>bibliography</b></li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Materials are preselected by teacher and teacher-librarian.</li> <li>2. Students choose appropriate multimedia resources from those preselected for them by the teacher and teacher-librarian.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students verify previous knowledge and <b>complete the research.</b></li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing pictures</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• using key words</li> <li>• reading print materials</li> <li>• using a research grid to record information</li> </ul> </li> <li>3. <b>Students develop a bibliography (author/title).</b></li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>• <b>sentences from the gathered information</b></li> <li>• <b>a bibliography</b></li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 3 PRE-SEARCH</b>	<b>GRADE 3 INFORMATION RETRIEVAL</b>	<b>GRADE 3 INFORMATION PROCESSING</b>	<b>GRADE 3 ORGANIZING AND CREATING</b>	<b>GRADE 3 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview.</li> <li>2. Students are guided in the clarification of the topic through brainstorming. "What do I already know?" and viewing preselected multimedia resources.</li> <li>3. Teachers lead students through categorizing. "What do I already know?"</li> <li>4. Teachers and students brainstorm. "What do I want to know?"</li> <li>5. Students and teachers categorize the brainstormed questions.</li> <li>6. <b>Students and teachers</b> develop headings and refine research statements or questions to create grid.</li> <li>7. Teachers and students determine key words and phrases to use as entry points for information retrieval.</li> <li>8. Students are informally introduced to their plan for research. This should include: <ul style="list-style-type: none"> <li>• sources of information</li> <li>• <b>and their locations</b></li> <li>• research grid</li> <li>• topic and headings</li> <li>• key words</li> <li>• end product</li> <li>• bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Teachers model the use of key words and the process of retrieving resources.</b></li> <li>2. <b>Students are introduced to the OPAC (on-line public access catalogue).</b></li> <li>3. Students choose appropriate multimedia resources from those preselected for them by the teacher and teacher-librarian.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students <b>answer their research questions and verify previous knowledge.</b></li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• using key words</li> <li>• reading print materials</li> <li>• <b>using indexes and tables of contents</b></li> <li>• <b>note taking (research grid)</b></li> <li>• <b>reading graphs</b></li> </ul> </li> <li>3. Students develop an <b>alphabetized</b> bibliography (author/title).</li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>• <b>sentences to develop paragraphs for each heading</b></li> <li>• <b>a draft which will be edited before the creation of the final copy</b></li> <li>• <b>an alphabetized bibliography</b></li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. <b>Self evaluation should be encouraged.</b></li> <li>4. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 4 PRE-SEARCH</b>	<b>GRADE 4 INFORMATION RETRIEVAL</b>	<b>GRADE 4 INFORMATION PROCESSING</b>	<b>GRADE 4 ORGANIZING AND CREATING</b>	<b>GRADE 4 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>Teacher and teacher-librarian determine the research topic and provide an overview.</li> <li>Students are guided in the clarification of the topic through brainstorming, "What do I already know?" and viewing preselected multimedia resources.</li> <li>Teachers lead students through categorizing, "What do I already know?"</li> <li>Teachers and students brainstorm, "What do I want to know?"</li> <li>Students and teachers categorize the brainstormed questions.</li> <li>Students and teachers develop headings and refine research statements or questions to create grid.</li> <li>Teachers and students determine key words and phrases to use as entry points for information retrieval.</li> <li>Students are <b>guided through</b> their plan for research. This should include: <ul style="list-style-type: none"> <li>sources of information and their locations</li> <li>research grid</li> <li>topic and headings</li> <li>key words</li> <li>end product</li> <li><b>time line</b></li> <li>bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>Teachers model the use of key words and the process of retrieving resources.</li> <li>Students choose appropriate multimedia resources from those preselected for them by the teacher and teacher-librarian. <ul style="list-style-type: none"> <li><b>Teachers model web site selections:</b> <ul style="list-style-type: none"> <li><b>relevancy</b></li> <li><b>objectivity</b></li> <li><b>credibility</b></li> <li><b>currency</b></li> <li><b>accuracy</b></li> </ul> </li> </ul> </li> <li><b>To locate additional resources and information, students use:</b> <ul style="list-style-type: none"> <li><b>appropriate encyclopedia</b></li> <li><b>dictionary</b></li> <li><b>OPAC</b></li> <li><b>atlases</b></li> <li><b>appropriate CD-ROMS</b></li> </ul> </li> <li>Students answer their research questions and verify previous knowledge. <ol style="list-style-type: none"> <li>Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>observing</li> <li>analysing pictures</li> <li>listening and viewing</li> <li>using key words <b>and phrases</b></li> <li>reading print materials</li> <li>using indexes and tables of contents</li> <li>note taking (research grid)</li> <li>reading graphs, <b>maps, charts and tables</b></li> <li><b>determining the relevance of information</b></li> </ul> </li> <li>Students develop an alphabetized bibliography (author/title/<b>publisher</b>).</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>sentences to develop paragraphs for each heading</li> <li>a draft which will be edited before the creation of the final copy</li> <li>an alphabetized bibliography</li> </ul> </li> <li>Students may create a final product integrating technological skills based on available technology.</li> <li>This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>Students share their learning with others.</li> <li>This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>Self evaluation should be encouraged.</li> <li>The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>	

<b>GRADE 5 PRE-SEARCH</b>	<b>GRADE 5 INFORMATION RETRIEVAL</b>	<b>GRADE 5 INFORMATION PROCESSING</b>	<b>GRADE 5 ORGANIZING AND CREATING</b>	<b>GRADE 5 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>Teacher and teacher-librarian determine the research topic and provide an overview. <b>Students are guided in selection of a sub topic at an appropriate time.</b></li> <li>Students are guided in the clarification of the topic through brainstorming, “<i>What do I already know?</i>” and viewing preselected multimedia resources.</li> <li>Teachers lead students through categorizing, “<i>What do I already know?</i>”</li> <li>Teachers and students brainstorm, “<i>What do I want to know?</i>”</li> <li>Students and teachers categorize the brainstormed questions.</li> <li>Students and teachers develop headings and refine research statements or questions to create grid.</li> <li>Teachers and students determine key words and phrases to use as entry points for information retrieval.</li> <li>Students are guided through their plan for research. This should include: <ul style="list-style-type: none"> <li>sources of information</li> <li>research grid</li> <li>topic and headings</li> <li>key words</li> <li>end product</li> <li>time line</li> <li>bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li><b>Students are assisted in retrieving multimedia resources.</b></li> <li><b>Teachers guide students through web site evaluation:</b> <ul style="list-style-type: none"> <li>relevancy</li> <li>objectivity</li> <li>credibility</li> <li>currency</li> <li>accuracy</li> </ul> </li> <li>To locate additional resources and information, students use: <ul style="list-style-type: none"> <li>appropriate encyclopedia <b>including online</b></li> <li>dictionary</li> <li>OPAC</li> <li>atlases</li> <li>appropriate CD-ROMS</li> <li><b>search engines/key words</b></li> <li><b>community resources</b></li> <li><b>vertical files</b></li> <li><b>specific subject area reference sources (e.g. almanacs)</b></li> <li><b>newspapers</b></li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>Students answer their research questions and verify previous knowledge.</li> <li>Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>observing</li> <li>analysing pictures</li> <li>listening and viewing</li> <li>using key words and phrases</li> <li>reading print materials</li> <li>using indexes and tables of contents</li> <li>note taking (research grid)</li> <li>reading graphs, maps, charts and tables</li> <li>determining the relevance of information</li> <li><b>determining the currency of information</b></li> <li><b>information dealing with conflicting information</b></li> <li><b>interviewing techniques</b></li> <li><b>determining when adequate information has been collected</b></li> </ul> </li> <li>Students develop an alphabetized bibliography (author/title/publisher/<b>place of publication/copyright date</b>) for various kinds of resources.</li> </ol>	<ol style="list-style-type: none"> <li>Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>sentences to develop paragraphs for each heading</li> <li>a draft which will be edited before the creation of the final copy</li> <li>an alphabetized bibliography</li> </ul> </li> <li>Students may create a final product integrating technological skills based on available technology.</li> <li>This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>Students share their learning with others.</li> <li>This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>Self evaluation should be encouraged. <b>Students should also be open to constructive feedback from their peers.</b></li> <li>The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 6 PRE-SEARCH</b>	<b>GRADE 6 INFORMATION RETRIEVAL</b>	<b>GRADE 6 INFORMATION PROCESSING</b>	<b>GRADE 6 ORGANIZING AND CREATING</b>	<b>GRADE 6 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview. Students are guided in selection of a sub topic at an appropriate time.</li> <li>2. Students are guided in the clarification of the topic through brainstorming. "What do I already know?", <b>selecting and viewing multimedia resources with attention to web searches.</b></li> <li>3. Teachers lead students through categorizing, "What do I already know?"</li> <li>4. Teachers and students brainstorm, "What do I want to know?"</li> <li>5. Students and teachers categorize the brainstormed questions.</li> <li>6. Students and teachers develop headings and refine research statements or questions to create grid.</li> <li>7. Teachers and students determine key words and phrases to use as entry points for information retrieval.</li> <li>8. Students are guided through their plan for research. This should include: <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> <li>• key words</li> <li>• end product</li> <li>• time line</li> <li>• bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students are assisted in retrieving multimedia resources.</li> <li>2. Teachers guide students through web site evaluation: <ul style="list-style-type: none"> <li>• relevancy</li> <li>• objectivity</li> <li>• credibility</li> <li>• currency</li> <li>• accuracy</li> </ul> </li> <li>3. To locate resources and information, students use: <ul style="list-style-type: none"> <li>• appropriate encyclopedia including online</li> <li>• dictionary</li> <li>• OPAC</li> <li>• atlases</li> <li>• appropriate CD-ROMS</li> <li>• search engines/key words</li> <li>• community resources</li> <li>• vertical files</li> <li>• specific subject area reference sources (e.g. almanacs)</li> <li>• newspapers</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students answer their research questions and verify previous knowledge.</li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• using key words and phrases</li> <li>• reading print materials</li> <li>• using indexes and tables of contents</li> <li>• note taking (research grid)</li> <li>• reading graphs, maps, charts and tables</li> <li>• determining the relevance of information</li> <li>• determining the currency of information</li> <li>• dealing with conflicting information</li> <li>• interviewing techniques</li> <li>• determining when adequate information has been collected</li> </ul> </li> <li>3. Students develop an alphabetized bibliography (author/title/publisher/place of publication/copyright date) for various kinds of resources.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>• sentences to develop paragraphs for each heading</li> <li>• <b>introductory and concluding paragraphs</b></li> <li>• a draft which will be edited before the creation of the final copy</li> <li>• an alphabetized bibliography</li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. Self evaluation should be encouraged. Students should also be open to constructive feedback from their peers.</li> <li>4. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 7 PRE-SEARCH</b>	<b>GRADE 7 INFORMATION RETRIEVAL</b>	<b>GRADE 7 INFORMATION PROCESSING</b>	<b>GRADE 7 ORGANIZING AND CREATING</b>	<b>GRADE 7 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview. Students are guided in selection of a sub topic at an appropriate time.</li> <li>2. Students are guided in the clarification of the topic through brainstorming, "What do I already know?", selecting and viewing multimedia resources with attention to web searches.</li> <li>3. Teachers lead students through categorizing, "What do I already know?"</li> <li>4. Teachers and students brainstorm, "What do I want to know?"</li> <li>5. Students and teachers categorize the brainstormed questions.</li> <li>6. <b>Students</b> develop headings and refine research statements or questions to create grid <b>or other structure</b>.</li> <li>7. Teachers and students determine key words and phrases to use as entry points for information retrieval.</li> <li>8. Students are guided through their plan for research. This should include: <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> <li>• key words</li> <li>• end product</li> <li>• time line</li> <li>• bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students <b>independently retrieve</b> multimedia resources.</li> <li>2. <b>Students evaluate web sites.</b></li> <li>3. To locate resources and information, students use: <ul style="list-style-type: none"> <li>• appropriate encyclopedia including online</li> <li>• dictionary</li> <li>• OPAC</li> <li>• atlases</li> <li>• appropriate CD-ROMS</li> <li>• search engines/key words</li> <li>• community resources</li> <li>• vertical files</li> <li>• specific subject area reference sources (e.g. almanacs)</li> <li>• newspapers</li> <li>• <b>on-line newspapers and magazines such as Infotrac, Canadian Newspaper Source.</b></li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students answer their research questions and verify previous knowledge.</li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing pictures</li> <li>• listening and viewing</li> <li>• using key words and phrases</li> <li>• reading print materials</li> <li>• using indexes and tables of contents</li> <li>• note taking (research grid)</li> <li>• reading graphs, maps, charts and tables</li> <li>• determining the relevance of information</li> <li>• determining the currency of information</li> <li>• dealing with conflicting information</li> <li>• interviewing techniques</li> <li>• determining when adequate information has been collected</li> </ul> </li> <li>3. Students develop an alphabetized bibliography (author/title/publisher/place of publication/copyright date) for various kinds of resources.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>• sentences to develop paragraphs for each heading</li> <li>• introductory and concluding paragraphs</li> <li>• <b>establishment of logical sequencing of paragraphs</b></li> <li>• a draft which will be edited before the creation of the final copy</li> <li>• an alphabetized bibliography</li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. Self evaluation should be encouraged. Students should also be open to constructive feedback from their peers.</li> <li>4. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 8 PRE-SEARCH</b>	<b>GRADE 8 INFORMATION RETRIEVAL</b>	<b>GRADE 8 INFORMATION PROCESSING</b>	<b>GRADE 8 ORGANIZING AND CREATING</b>	<b>GRADE 8 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview. Students are guided in selection of a sub topic at an appropriate time.</li> <li>2. Students are guided in the clarification of the topic through <i>brainstorming</i>, "What do I already know?", selecting and viewing multimedia resources with attention to web searches.</li> <li>3. Teachers lead students through categorizing, "What do I already know?"</li> <li>4. Teachers and students brainstorm, "What do I want to know?"</li> <li>5. Students and teachers categorize the brainstormed questions.</li> <li>6. Students develop headings and refine research statements or questions to create grid or other structure.</li> <li>7. Teachers and students determine key words and phrases to use as entry points for information retrieval.</li> <li>8. Students are guided through their plan for research. This should include: <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> <li>• key words</li> <li>• end product</li> <li>• time line</li> <li>• bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students independently retrieve multimedia resources.</li> <li>2. Students evaluate web sites.</li> <li>3. To locate resources and information, students use: <ul style="list-style-type: none"> <li>• appropriate encyclopedia including online</li> <li>• dictionary</li> <li>• OPAC</li> <li>• atlases</li> <li>• appropriate CD-ROMS</li> <li>• search engines/key words</li> <li>• community resources</li> <li>• vertical files</li> <li>• specific subject area reference sources (e.g. almanacs)</li> <li>• newspapers</li> <li>• on-line newspapers and magazines such as Infotrac, Canadian Newspaper Source</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students answer their research questions and verify previous knowledge.</li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• using key words and phrases</li> <li>• reading print materials</li> <li>• using indexes and tables of contents</li> <li>• note taking (research grid or outline)</li> <li>• reading graphs, maps, charts and tables</li> <li>• determining the relevance of information</li> <li>• determining the currency of information</li> <li>• dealing with conflicting information</li> <li>• interviewing techniques</li> <li>• determining when adequate information has been collected</li> </ul> </li> <li>3. Students develop an alphabetized bibliography (author/title/publisher/copyright date) for various kinds of resources.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>• sentences to develop paragraphs for each heading</li> <li>• introductory and concluding paragraphs</li> <li>• establishment of logical sequencing of paragraphs</li> <li>• a draft which will be edited before the creation of the final copy</li> <li>• an alphabetized bibliography</li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. Self evaluation should be encouraged. Students should also be open to constructive feedback from their peers.</li> <li>4. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 9 PRE-SEARCH</b>	<b>GRADE 9 INFORMATION RETRIEVAL</b>	<b>GRADE 9 INFORMATION PROCESSING</b>	<b>GRADE 9 ORGANIZING AND CREATING</b>	<b>GRADE 9 INFORMATION SHARING</b>
<p>1. Teacher and teacher-librarian determine the research topic and provide an overview. Students are guided in selection of a sub topic at an appropriate time.</p> <p>2. Students are guided in the clarification of the topic through brainstorming, “<i>What do I already know?</i>”, selecting and viewing multimedia resources with attention to web searches.</p> <p>3. <b>Students are guided through, “What do I already know?”</b></p> <p>4. <b>Students are guided through brainstorming, “What do I want to know?”</b></p> <p>5. <b>Students are guided through categorizing</b> the brainstormed questions.</p> <p>6. Students develop headings and refine research statements or questions to create grid or other structure.</p> <p>7. <b>Students</b> determine key words and phrases to use as entry points for information retrieval.</p> <p>8. Students are guided through their plan for research. This should include:</p> <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> <li>• key words</li> <li>• end product</li> <li>• time line</li> <li>• bibliography</li> </ul>	<p>1. Students independently retrieve multimedia resources.</p> <p>2. Students evaluate web sites.</p> <p>3. To locate resources and information, students use:</p> <ul style="list-style-type: none"> <li>• appropriate encyclopedia including online</li> <li>• dictionary</li> <li>• OPAC</li> <li>• atlases</li> <li>• appropriate CD-ROMS</li> <li>• search engines/key words</li> <li>• community resources</li> <li>• vertical files</li> <li>• specific subject area reference sources (e.g. almanacs)</li> <li>• newspapers</li> <li>• on-line newspapers and magazines such as Infotrac, Canadian Newspaper Source</li> </ul>	<p>1. Students answer their research questions and verify previous knowledge.</p> <p>2. Students use the following strategies for processing various types of information:</p> <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• using key words and phrases</li> <li>• reading print materials</li> <li>• using indexes and tables of contents</li> <li>• note taking (research grid or outline)</li> <li>• reading graphs, maps, charts and tables</li> <li>• determining the relevance of information</li> <li>• determining the currency of information</li> <li>• dealing with conflicting information</li> <li>• interviewing techniques</li> <li>• determining when adequate information has been collected</li> </ul> <p>3. Students develop an alphabetized bibliography (author/title/publisher/copyright date) for various kinds of resources.</p>	<p>1. Students are guided through the skills required in the production of the final product. These may include:</p> <ul style="list-style-type: none"> <li>• sentences to develop paragraphs for each heading</li> <li>• introductory and concluding paragraphs</li> <li>• establishment of logical sequencing of paragraphs</li> <li>• a draft which will be edited before the creation of the final copy</li> <li>• an alphabetized bibliography</li> </ul> <p>2. Students may create a final product integrating technological skills based on available technology.</p> <p>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</p>	<p>1. Students share their learning with others.</p> <p>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</p> <p>3. Self evaluation should be encouraged. Students should also be open to constructive feedback from their peers.</p> <p>4. The audience is expected to participate in this sharing by asking questions or providing feedback.</p>

<b>GRADE 10 PRE-SEARCH</b>	<b>GRADE 10 INFORMATION RETRIEVAL</b>	<b>GRADE 10 INFORMATION PROCESSING</b>	<b>GRADE 10 ORGANIZING AND CREATING</b>	<b>GRADE 10 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview. Students are guided in selection of a sub topic at an appropriate time.</li> <li>2. Students are guided in the clarification of the topic through brainstorming, "What do I already know?", selecting and viewing multimedia resources with attention to web searches.</li> <li>3. Students are guided through, "What do I already know?"</li> <li>4. Students are guided through brainstorming, "What do I want to know?"</li> <li>5. Students are guided through categorizing the brainstormed questions.</li> <li>6. Students develop headings and refine research statements or questions to create grid or other structure.</li> <li>7. Students determine key words and phrases to use as entry points for information retrieval.</li> <li>8. Students are guided through their plan for research. This should include: <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> <li>• key words</li> <li>• end product</li> <li>• time line</li> <li>• bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students independently retrieve multimedia resources.</li> <li>2. Students evaluate web sites.</li> <li>3. To locate resources and information, students use: <ul style="list-style-type: none"> <li>• appropriate encyclopedia including online</li> <li>• dictionary</li> <li>• OPAC</li> <li>• atlases</li> <li>• appropriate CD-ROMS</li> <li>• search engines/key words</li> <li>• community resources</li> <li>• vertical files</li> <li>• specific subject area reference sources (e.g. almanacs)</li> <li>• newspapers</li> <li>• on-line newspapers and magazines such as Infotrac, Canadian Newspaper Source</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students answer their research questions and verify previous knowledge.</li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• using key words and phrases</li> <li>• reading print materials</li> <li>• using indexes and tables of contents</li> <li>• note taking (research grid or outline)</li> <li>• reading graphs, maps, charts and tables</li> <li>• determining the relevance of information</li> <li>• determining the currency of information</li> <li>• dealing with conflicting information</li> <li>• interviewing techniques</li> <li>• determining when adequate information has been collected</li> </ul> </li> <li>3. Students develop an alphabetized bibliography (author/title/publisher/place of publication/copyright date) for various kinds of resources.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>• sentences to develop paragraphs for each heading</li> <li>• introductory and concluding paragraphs</li> <li>• establishment of logical sequencing of paragraphs</li> <li>• a draft which will be edited before the creation of the final copy</li> <li>• an alphabetized bibliography</li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. Self evaluation should be encouraged. Students should also be open to constructive feedback from their peers.</li> <li>4. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 11 PRE-SEARCH</b>	<b>GRADE 11 INFORMATION RETRIEVAL</b>	<b>GRADE 11 INFORMATION PROCESSING</b>	<b>GRADE 11 ORGANIZING AND CREATING</b>	<b>GRADE 11 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview. Students are guided in selection of a sub topic at an appropriate time.</li> <li>2. Students are guided in the clarification of the topic through brainstorming, "What do I already know?", selecting and viewing multimedia resources with attention to web searches.</li> <li>3. Students are guided through, "What do I already know?"</li> <li>4. Students are guided through brainstorming, "What do I want to know?"</li> <li>5. Students are guided through categorizing the brainstormed questions.</li> <li>6. Students develop headings and refine research statements or questions to create grid or other structure.</li> <li>7. Students determine key words and phrases to use as entry points for information retrieval.</li> <li>8. Students are guided through their plan for research. This should include: <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> <li>• key words</li> <li>• end product</li> <li>• time line</li> <li>• bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students independently retrieve multimedia resources.</li> <li>2. Students evaluate web sites.</li> <li>3. To locate resources and information, students use: <ul style="list-style-type: none"> <li>• appropriate encyclopedia including online</li> <li>• dictionary</li> <li>• OPAC</li> <li>• atlases</li> <li>• appropriate CD-ROMS</li> <li>• search engines/key words</li> <li>• community resources</li> <li>• vertical files</li> <li>• specific subject area reference sources (e.g. almanacs)</li> <li>• newspapers</li> <li>• on-line newspapers and magazines such as Infotrac, Canadian Newspaper Source</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students answer their research questions and verify previous knowledge.</li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• using key words and phrases</li> <li>• reading print materials</li> <li>• using indexes and tables of contents</li> <li>• note taking (research grid or outline)</li> <li>• reading graphs, maps, charts and tables</li> <li>• determining the relevance of information</li> <li>• determining the currency of information</li> <li>• dealing with conflicting information</li> <li>• interviewing techniques</li> <li>• determining when adequate information has been collected</li> </ul> </li> <li>3. Students develop an alphabetized bibliography (author/title/publisher/copyright date) for various kinds of resources.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>• sentences to develop paragraphs for each heading</li> <li>• introductory and concluding paragraphs</li> <li>• establishment of logical sequencing of paragraphs</li> <li>• a draft which will be edited before the creation of the final copy</li> <li>• an alphabetized bibliography</li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. Self evaluation should be encouraged. Students should also be open to constructive feedback from their peers.</li> <li>4. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>

<b>GRADE 12 PRE-SEARCH</b>	<b>GRADE 12 INFORMATION RETRIEVAL</b>	<b>GRADE 12 INFORMATION PROCESSING</b>	<b>GRADE 12 ORGANIZING AND CREATING</b>	<b>GRADE 12 INFORMATION SHARING</b>
<ol style="list-style-type: none"> <li>1. Teacher and teacher-librarian determine the research topic and provide an overview. Students are guided in selection of a sub topic at an appropriate time.</li> <li>2. Students are guided in the clarification of the topic through brainstorming, "What do I already know?", selecting and viewing multimedia resources with attention to web searches.</li> <li>3. Students are guided through, "What do I already know?"</li> <li>4. Students are guided through brainstorming, "What do I want to know?"</li> <li>5. Students are guided through categorizing the brainstormed questions.</li> <li>6. Students develop headings and refine research statements or questions to create grid or other structure.</li> <li>7. Students determine key words and phrases to use as entry points for information retrieval.</li> <li>8. Students are guided through to their plan for research. This should include: <ul style="list-style-type: none"> <li>• sources of information</li> <li>• research grid</li> <li>• topic and headings</li> <li>• key words</li> <li>• end product</li> <li>• time line</li> <li>• bibliography</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students independently retrieve multimedia resources.</li> <li>2. Students evaluate web sites.</li> <li>3. To locate resources and information, students use: <ul style="list-style-type: none"> <li>• appropriate encyclopedia including online</li> <li>• dictionary</li> <li>• OPAC</li> <li>• atlases</li> <li>• appropriate CD-ROMS</li> <li>• search engines/key words</li> <li>• community resources</li> <li>• vertical files</li> <li>• specific subject area reference sources (e.g. almanacs)</li> <li>• newspapers</li> <li>• on-line newspapers and magazines such as Infotrac, Canadian Newspaper Source</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Students answer their research questions and verify previous knowledge.</li> <li>2. Students use the following strategies for processing various types of information: <ul style="list-style-type: none"> <li>• observing</li> <li>• analysing pictures</li> <li>• listening and viewing</li> <li>• using key words and phrases</li> <li>• reading print materials</li> <li>• using indexes and tables of contents</li> <li>• note taking (research grid or outline)</li> <li>• reading graphs, maps, charts and tables</li> <li>• determining the relevance of information</li> <li>• determining the currency of information</li> <li>• dealing with conflicting information</li> <li>• interviewing techniques</li> <li>• determining when adequate information has been collected</li> </ul> </li> <li>3. Students develop an alphabetized bibliography (author/title/publisher/ place of publication/ copyright date) for various kinds of resources.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students are guided through the skills required in the production of the final product. These may include: <ul style="list-style-type: none"> <li>• sentences to develop paragraphs for each heading</li> <li>• introductory and concluding paragraphs</li> <li>• establishment of logical sequencing of paragraphs</li> <li>• a draft which will be edited before the creation of the final copy</li> <li>• an alphabetized bibliography</li> </ul> </li> <li>2. Students may create a final product integrating technological skills based on available technology.</li> <li>3. This final product may include a variety of oral, written, visual, dramatic, technological, musical or artistic products. Please refer to the appropriate SaskEd curriculum document for ideas and guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students share their learning with others.</li> <li>2. This sharing will reflect the type of end product chosen. It may be in large or small groups, partner or individual, or through the use of a multimedia display.</li> <li>3. Self evaluation should be encouraged. Students should also be open to constructive feedback from their peers.</li> <li>4. The audience is expected to participate in this sharing by asking questions or providing feedback.</li> </ol>



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