APPENDIX 2: ACTIVATING PRIOR KNOWLEDGE

Using strategies to activate students' prior knowledge can be considered equivalent to preparing for a learning experience. The use of activating strategies can produce significant gains in learning potential by recognizing the importance of prior knowledge as the basis for familiarity with concepts, and by providing students with a context that argues strongly for new learning to occur.

Learning experiences that draw on students' prior knowledge act to

- assist students in relating new information (or skills) to what they already know and can do
- allow for the surfacing of misconceptions or naive conceptions that may impede learning
- allow teachers to make decisions to augment and strengthen students' knowledge before new information is engaged
- identify gaps in knowledge or skills that may exist
- stimulate interest and curiosity, or initiate an inquiry process that can provide a more personalized learning experience

The following learning strategies can be used in the science classroom to activate students' prior knowledge. Further information about these strategies can be found in other departmental publications, including the following:

- *Senior Years Science Teachers' Handbook: A Teaching Resource* (Manitoba Education and Training)—abbreviated as *SYSTH*
- *Senior 3 English Language Arts: A Foundation for Implementation* (Manitoba Education and Training)—abbreviated as *Senior 3 ELA*

Anticipation Guide (See *SYSTH* 9.20, 9.26, and *Senior 3 ELA* 4-336)

The teacher writes a number of statements to elicit a response to a topic. Students write an initial response to the topic and then discuss responses in small groups or in class. Students then listen to a lecture, watch a film, have a debate, or complete a reading. Afterwards, students write a response indicating why their opinions changed or were strengthened.

Brainstorming (See *SYSTH* 13.12)

Getting preliminary thoughts and ideas down in print or electronic form (e.g., in a Concept Map, web diagram, list) can bring thoughtful expressions of ideas into view for students. Some organization and clustering can be accomplished from an initial set of ideas. Many teachers are moving this task to students, and are using software aids (e.g., Inspiration®) as a way to help students organize ideas.

Clustering (See *Senior 3 ELA*, 4-288)

Clustering helps students to survey subjects and to see the connections between various associations. Students

- write a "nucleus word" or draw a central image in the centre of a sheet of paper
- record all the words and/or sketch all the images that come to mind around the nucleus
- circle each word as it is placed on the page and draw a line to the item to which it most closely relates
- examine the cluster for closely related words or images that could form the topic for a unit, or allow for discussion of a concept

Discrepant Event

A situation that is counter-intuitive and creates many excited questions and engages students in wondering "why." For example, an instantaneous colour change that takes place when solutions are mixed (e.g., the classic "Nassau" or "clock reaction") can help start a discussion of a topic or a process to be investigated.

Knowledge Chart (See *SYSTH* 9.9, 9.25)

A Knowledge Chart is similar to a KWL Chart.

KWL (Know–Want to Know–Learned) (See *SYSTH* 9.8, 9.24)

Using the KWL strategy and a three-column chart, students identify what they already know, what they want to know, and what they have learned in the lesson or unit. Concept Maps may be used to organize information within the columns, providing a summary and review of the information.

LINK (List–Inquire–Note–Know) (See *SYSTH* 9.18)

The teacher puts a concept or question on the board or overhead. Students write down their thoughts and ideas. In the class discussion that follows, students ask questions of each other while the teacher notes responses (e.g., on a Concept Map). Information is concealed and students write down what they remember (e.g., recreate Concept Map). Students then note what they have learned and what they need to know or learn.

Listen–Draw–Pair–Share (See *SYSTH* 9.15)

Students draw and label a diagram illustrating what they know about a topic. They share and compare their drawing with another student and then with the class. The teacher presents new information, such as an assigned reading, a lecture, or a film, and students alter, adapt, or redo their drawings. Students share their "before" and "after" drawings, discussing changes and differences.

Picture Puzzle

The teacher finds a picture (photograph, drawing, diagram) in which the subject is not obvious (such as a pollen grain or part of a meteorite). Students discuss what the picture could possibly represent.

Proposal Writing

For the purposes in this curriculum, proposal writing does not refer to grant-writing techniques. In the context of this curriculum, a *proposal* could reflect a response to an environmental problem (see English language arts, SLO 3.1.4). It can be particularly effective for student groups to submit a proposal for any large-scale project. A proposal assists in planning, and gives the teacher an idea of where strengths and weaknesses (or obstacles) could exist.

A proposal could include, but is not limited to, the following:

- outline of the main avenues of research
- resources to be used (e.g., print, online, expert witnesses)
- team membership and outline of responsibilities of each member
- steps to be taken in research and production of final report
- form of reporting that will take place (e.g., multimedia, oral, laboratory format report)
- suggested timelines for completion of project
- rubrics (or similar tools) that will assist students in self-assessment or peer review of the work

Rotational Cooperative Graffiti (See *SYSTH* 3.15)

A Rotational Cooperative Graffiti activity is often used as a group brainstorming strategy to expose and examine students' prior knowledge (under very limited time frames) of a topic, an idea, an issue, or a science concept. It is particularly entertaining and useful when the class is making a transition to a new component of the curriculum. One way to keep the enthusiasm elevated is to have groups rotate large sheets of paper upon which the ideas have been sketched out. The brainstormed ideas can exist as "paint splashes" (random positioning on the page), organized into lists, or drawn as pictures or cartoons. The strategy may be adapted as purposes require.

NOTES