PLANNING FOR SCIENCE AND TECHNOLOGY THROUGHOUT THE YEAR

Exploring water with young children is not a theme or activity-based curriculum but rather a science inquiry that develops over time.

Understanding why science and technology is important in the kindergarten classroom informs educators' decisions about the learning environments they create, the classroom resources they use, and their daily short and long-term planning. Planning for science and technology involves more than scheduling a series of activities, such as planting seeds or doing a floating and sinking experiment. Instead, educators must plan for making connections, showing patterns and revisiting, rethinking, and reflecting about ideas and experiences.

THINKING IT THROUGH
Planning for Science and Technology Throughout the Year

- What interests children?
- What are children's theories or questions?
- What can children explore directly?
- How can science and technology be integrated into the centres and routines of the classroom?
- What are the "big" curriculum ideas that need to be addressed?
- What are the thinking skills that young children need to develop?
- What is available in the local community that will connect with science and technology?

As educators plan, they may use the following questions to guide the planning process.

1. What interests young children?

Educators think about what would be significant to a young child, and what could provide a science focus. Educators know that children are generally interested in naturally occurring events such as:

- rain storms that produce puddles and mud;
- worms on the sidewalks after a rain;
- nuts and leaves falling off the trees; and
- changes in weather, such as snow.

Educators will want to take advantage of the children's natural excitement over everyday occurrences. For example, meaningful discussions can happen spontaneously if a bird flies in a window *(Why did it come in? How will we keep it safe? What will it need?),* when the wind causes branches to break off trees *(How did it happen? What else did the wind damage? What does the wind move?),* when a shriveled apple is found in a backpack *(What happened? How does it compare with a regular apple? Does the same thing happen with other things? How could we speed up the process?).* Educators plan experiences that will engage children in wondering, exploring, and deepening their understanding.

2. What are the children's theories or questions?

From a very early age, children develop their own theories about how the world works. They ask a myriad of questions. Not all questions can be answered, nor are all responses within children's realm of understanding. However, the child's questions motivate exploration. The focus of the exploration highlights the need for certain materials and resources.

3. What can children explore directly?

Young children are concrete learners who want to manipulate and explore materials and objects. It is important to choose topics or inquiries they can explore directly. When topics are abstract, information must be gathered from secondary sources. When the creatures (ants, worms, birds, ladybugs) live in the child's 'real' world, information is far more accessible and meaningful. Children can observe and begin to gather their own data as they look for changes and patterns in behaviours. For example, although dinosaurs have a fascination for some young children, the topic cannot be explored directly and is not, therefore, an appropriate focus for science and technology.

4. How can science and technology be integrated into centres and routines?

When educators plan through a science and technology lens, scientific inquiry becomes part of the daily classroom program. Educators look for opportunities for children to explore, investigate, and construct in different areas. Educators plan experiences that encourage children to use the skills of inquiry.

Incorporate science and technology into the program through centres such as those listed below.

CENTRE	SCIENCE AND TECHNOLOGY LINK
at the visual arts centre	as children design, construct, and try new ways to fasten things
during snack	as children use their senses to taste a new fruit and talk about its texture and smell
at the take-apart centre	as children explore putting things together and taking things apart, and the connections between pieces
at the writing centre	as children sketch and draw the spider found in the classroom and add words or labels to describe it
in the morning message	that asks children to use their background knowledge to generate theories, such as "When it rains today, what will happen to the leaves that have fallen?"
at the construction materials centre	as a gear set is added and children explore this simple machine and how it works
at the music centre	as children experiment with making sounds using different objects, and then order them from loudest to softest
at the sand centre	as children observe the differences in the flow of sand with different sizes of sieves
at the water centre	as children observe blocks of ice melting and feel the changes in the temperature of the water
during outdoor time	as children explore and observe changes in light and colour with large sheets of coloured acetate
at the carpentry centre	as children use tools to design and construct

5. What are the 'big' curriculum ideas that must be addressed?

The curriculum provides topics and ideas for exploration. Possible topics for exploration include life cycles, changes, the natural world, properties and materials, simple machines, and common objects. Educators use models for planning that keep these 'big ideas' in mind.

The following questions may be used to guide a teacher's planning for a focus or inquiry that is holistic and integrated.

When using these questions as a guide for planning, educators do not waste time on isolated activities that do not connect the learning.

BIG IDEAS	EXAMPLES
What are the enduring understandings?	There are systems and these are interdependent. There are patterns and cycles for growth. Plants have needs...
What is important for children to know and to be able to do?	How to access information in non-fiction texts. How to use tools for observation...
What is important for children to be familiar with?	Certain names/labels.

6. What are the thinking skills young children need to develop?

As educators choose a topic of focus and plan for learning centres, they consider how to develop young children's thinking skills. Educators plan for the development of these skills, and encourage their use as they interact with the children.

Observation is a key skill. It leads to noticing similarities and differences, and to classifying objects. Later on, noticing important characteristics forms the basis of factual writing of documents such as reports. Educators support the development of children's observation skills by providing time for noticing, asking children questions to focus the observations, modeling how to look at objects from different perspectives, and recording the information in words or through drawings. ■

Excerpted from: *Thinking it Through: Teaching and Learning in the Kindergarten Classroom.* (http://www.etfo.ca/shopETFO)