The Seed That Grew - Grade 3
By: Leslie Atkinson

Project Description:
Students work with a template (or make their own) to show the growth of a seed.

Grade: 3

Subject(s)/Strand(s) Covered: Science, Life Systems
Math, Data Management

Estimated Time Frame: 1-2 weeks

Computer Time Required:
1 period at the start and 10-15 minutes every day for the next week or until the plant is full grown. Depending on the rate of growth of the plant, students may input their observations every day, other day or at longer intervals.

Computer Program(s) Used: KidPix

Prerequisite skills: Basic Skills in using KidPix and Graphers

	NETS COVERED
✔	1. Use keyboards and other common input and output devices (including adaptive devices when necessary) efficiently and effectively. (1)
✔	2. Discuss common uses of technology in daily life and the advantages and disadvantages those uses provide. (1, 2)
✔	3. Discuss basic issues related to responsible use of technology and information and describe personal consequences of inappropriate use. (2)
	4. Use general purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, and facilitate learning throughout the curriculum. (3)
✔	5. Use technology tools (e.g. multimedia authoring, presentation, Web tools, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom. (3, 4)
	6. Use telecommunications efficiently and effectively to access remote information, communicate with others in support of direct and independent learning, and pursue personal interests. (4)
	7. Use telecommunications and online resources (e.g., e-mail, online discussions, Web environments) to participate in collaborative problem-solving activities for the purpose of developing solutions or products for audiences inside and outside the classroom. (4, 5,)
	8. Use technology resources (e.g., calculators, data collection probes, videos, educational software for problem solving, self-directed learning, and extended learning activities. (5, 6)
✔	9. Determine when technology is useful and select the appropriate tool(s) and technology resources to address a variety of tasks and problems. (5, 6,)
	10. Evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources. (6)

MINISTRY EXPECTATIONS COVERED		
	Subject/Strand	**Expectation**
	Science, Life Systems	3s1 - Overall Expectations • demonstrate an understanding of the similarities and differences in the physical characteristics of different plant species and the changes that take place in different plants as they grow;
		3s4 - Understanding Basic Concepts – identify the major parts of plants (e.g., seeds, stem, pistil) and describe their basic functions;
		3s6 - Understanding Basic Concepts – describe, using their observations, the changes that plants undergo in a complete life cycle (e.g., from the germination of a seed to the production of flowers or fruit);
		3s8 - Understanding Basic Concepts – compare the life cycles of different kinds of plants (e.g., plants that grow from bulbs or from seeds);
		3s10 - Understanding Basic Concepts – describe, using their observations, how the growth of plants is affected by changes in environmental conditions (e.g., changes in light, soil);
		3s15 - Developing Skills of Inquiry, Design and Communication – use appropriate vocabulary in describing their investigations, explorations, and observations (e.g., stem, pistil, stamen, flower);
		3s16 - Developing Skills of Inquiry, Design and Communication – record relevant observations, findings, and measurements, using written language, drawings, charts, and graphs (e.g., produce a series of drawings to show a plant at different stages of development);
		3s17 - Developing Skills of Inquiry, Design and Communication – communicate the procedures and results of investigations for specific purposes and to specific audiences, using drawings, demonstrations, simple media works, and oral and written descriptions (e.g., make a graph that shows the number and kinds of trees found in different yards; design and construct a terrarium or garden that reproduces the conditions that they found to be requirements of specific plants).

		3s25 - Relating Science and Technology to the World Outside the School – demonstrate awareness of ways of caring for plants properly (e.g., ensure that a plant has sufficient light and water);
	Math, Data Management	3m91 - Overall Expectations • collect and organize data;
		3m92 - Overall Expectations • interpret displays of data, present the information, and discuss it using mathematical language;
		3m101 - Concluding and Reporting – construct bar graphs (with discrete classes on one axis and number on the other) and pictographs using scales with multiples of 2, 5, and 10;
		3m102 - Concluding and Reporting – interpret data from graphs (e.g., bar graphs, pictographs, and circle graphs);

Teaching/Learning (Lesson Outline)
Day 1 - Introducing the seeds (1 period in class, 1 in lab)
Materials:
- 2 or more seeds for each student (mung bean seeds grow very quickly but flowering plants like geraniums can be more fun if you have the time)
- clear plastic cup
- potting soil

- Have the students work in groups to describe the new seed and to plant it in the clear plastic cup. Make sure they plant one seed right against the side of the clear cup so that they can observe the growth below the soil. Plant the second seed in the middle of the container. Both seeds should be planted just below the soil or according to the plant instructions.

- Discuss experimental method including variables and the importance of testing only one variable at a time. Have students list several variables that might affect a plant's growth. (i.e. amount of sunlight, using water or Coke for moisture, cold vs warm temperatures) and have each group of 2 select one variable to study.

- Have students outline what they believe to be the best way to care for their plant (water till damp daily, set the plant in direct sunlight, leave the plant in a place at room temperature). Students should ensure that they follow this outline in caring for their plants except for the one variable to be studied.

In the Lab:
- Use a projector or chart to present the growth chart. Students use KidPix to reproduce the growth chart and then use the drawing tools to add the seed as it looked on the first day.

Day 2 and after
- Continue to draw the plant as observed at set intervals (every day, other day). Starting on the second day, have students measure and record the growth of the plants and record their observations by drawing a picture on the KidPix chart.

- Prepare a bar graph with an x axis labelled Day 1, Day 2 etc and the y axis labelled in centimetres. Make the graph large enough to fill in data for the total number of days for the experiment. Students continue to graph the growth of their plants using one colour to represent the plant in optimum conditions and a different one to represent the plant with the modified variable.

Final Day
- Students review their KidPix Growth charts and graphs and make a conclusion based on their observations.
- Each group presents their findings to the class
- Individual students write a summary giving recommendations for the best conditions for plant growth.

Suggested Extension Activity:
- prioritize the list by comparing the differences between the control and the modified plant for each variable
- try the same experiment with two different types of plants (control and variable for each type) and determine whether optimum conditions vary for different plants
- put the pictures into a slide show and add a title page and a page with the conclusions

Suggestions for classroom pods/one computer:
- Best to use a lab for the initial computer activity but rotating through a centre may work best for the rest of the activity since student need access to their plants to complete this part of the activity and bringing them to a lab could cause problems.

Assessment of Information Technology:
Use a classlist and the following checklist:
All observations are complete and match the recorded plant growth chart
Drawings are clear, include appropriate colour and accurately represented plant growth
Printout includes the title and student name

Assessment of Ministry Expectations:
Anecdotal records on the use of experimental method, recording of observations and conclusions based on observations.

Suggested Report card Comments for Information Technology:

Level 3, 4
777 makes effective use of the drawing tools in KidPix to record the observations from an experiment. Drawings were accurate and sequential.

Level 2
777 is working to use KidPix drawing tools to illustrate the observations from an experiment. Drawings lacked detail and did not always accurately represent the growth of the plants in the experiment. Some observations were incomplete or missing.

Level 1
777 is working with assistance to use the drawing tools in KidPix to illustrate the observations from an experiment. Drawings are consistently inaccurate and lacking necessary detail. Many observations were missing.

Growth of a Seed Chart

By:

(Slide 1)

Day 1 - The seed was planted	Day __

(Slide 2)

Day ____	Day ____

Growth of a Seed
By: Nathan

I planted the seed. | The seed started to grow.