The Joy of Math

Nathalie Sinclair was born in France but grew up mostly in Calgary, Alberta. She is working on her doctorate in mathematics education at Queen's University. She has also traveled a lot, living for two years in France, Italy and Greece. Nathalie's web site is http://educ.queensu.ca/~nathsinc/

Why do you like math, Nathalie?
I like mathematics because it so often shows how one small change, like transforming an equation, introducing a new dimension, or seeing a different representation can give you a whole new feeling of how something works and how it connects to other things that we do or think about. I like the feeling of understanding something, seeing new connections, and of being able to admire the creativity of other mathematicians.

Why do you think some people don't like math or are afraid of math?
I have found that most children love to do mathematics but that as they move through school mathematics goes further and further away from the things they know and enjoy. As they start experiencing disinterest and continued failure, they become afraid of the subject.

What do you enjoy the most when working with students doing mathematics?
I love how excited the students can get about mathematics, how many of the topics can transform the way they think about or see things. I love learning about how they look at mathematical situations and seeing what sparks their interest.

What kind of mathematics do children enjoy most?
The students that I have worked with really enjoy geometry, whether it's figuring out how to get around on a grid, transforming shapes or visualising operations on three-dimensional objects. This is an area in which they have a lot of intuitive knowledge from everyday experience, that they find appealing and in which there are lots of interesting problems to explore.

Why did you decide to do a doctorate in mathematics education, Nathalie?
I began teaching at a middle school after I had finished my Master's degree in mathematics. At the same time I was working at Simon Fraser University, developing educational technologies for mathematics learning which I was able to try out with my students. I became so interested in this that I decided to do a doctorate in mathematics education.

What is your research focus in your doctorate?
I have two main focuses in my work. The first is on the role of aesthetics in mathematics learning. The second is on the development and design of computer-based technologies. The two have some interesting meeting points!

What do you mean by aesthetics, Nathalie?
Aesthetics is partly about discerning patterns or perceiving relations, and taking note of how things relate to one another and how they seem to fit together. When we experience things fitting together, they often look beautiful to us, and they often bring us a sense of pleasure.

How is math beautiful? Can you give an example?
I think that mathematics can be beautiful to different people in different ways. Some students love how fractal geometry transforms the way they see trees and clouds. Other students love the feeling of fitting different shapes together to create tessellations. And other students find it beautiful how you change a long and ugly equation into an easy one, always keeping it balanced, by repeatedly simplifying it. Often mathematics is beautiful when it lets you see something in a new way or remind you of something else that you already know or enjoy.

SOMETHING TO THINK ABOUT

1. Why does Nathalie like math?
2. What kind of math do you enjoy the most? Why?
3. How does Nathalie think that math beautiful?
4. Do you find math beautiful? How?