

The Smart Connection

Newsletter for Students, Parents, and Educators

 **Smart Tutor Referrals**
www.SmartTutorReferrals.com

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Math, Gotta Love It

News & Announcements

Education Fair

Visit Smart Tutor Referrals' booth at the 8th Annual Island Parent Education Fair.

date: Saturday, February 17, 2007

time: 10:00 am - 4:00 pm

cost: free admission

location: Da Vinci Centre, 195 Bay St. (across from Westside Village)

▶ Over 30 Exhibitors and six free education seminars!

Upcoming Workshops

The following STR workshops are being hosted by Pearkes Recreation Centre. To register, please call Pearkes at 475-5400, or register online at:

www.gov.saanich.bc.ca/resident/recreation/prc.html

▶ Study Skills

date: Saturday, February 24, 2007

time: 10:00 am - 1:00 pm

cost: \$42

▶ Provincial Exam Prep

date: Saturday, June 2, 2007

time: 10:00 am - 1:00 pm

cost: \$65

Math Contests

▶ For a list of math competitions in Canada and worldwide, visit: <http://www.answers.com/topic/list-of-mathematics-competitions>

▶ Pacific Institute for the Mathematical Sciences (PIMS) has a UVic office that can be reached via email at uvic@pims.math.ca. They sponsor many competitions and seminars for Victoria students at elementary, middle and high school levels.

▶ Math Mania presents a variety of interactive demonstrations, puzzles, games and art, led by PIMS faculty and students from the University of Victoria. These activities are designed to demonstrate to children and their parents fun ways of learning both math and computer science concepts. Math Mania events take place at elementary schools.

This month's "Smart Connection" is a discussion with two Smart Tutor Referrals high school & university-level tutors: Reyna Jenkyns, a recent BMath who is currently working on her Masters in Ocean Physics, and Murray Kucherawy, a PhD in physics, with a teaching certificate, and over thirty years experience teaching math and physics at the high school and university levels. They both have a strong passion for math and physics and enjoy igniting that passion in their students.

STR: Why do so many students seem not to be interested in math and physics?

RJ: Students are always asking, "Why is this important?" How do we keep the kids interested? Unless we let them see how it's interesting...they feel this is just another hoop to jump through; most students think that the only jobs people can get with math is as a math teacher or accountant. If teachers can get excited about math, they can excite students.

MK: The current students' approach to math and physics is to read a problem and then begin a quest to find a formula to fit the problem, to grind out a figure that they don't have a real appreciation for without getting any real understanding. They don't even have to know the formula because they're given a formula sheet and they just start scouring the sheet looking for a formula that will fit the problem rather than stopping and asking, "What do I think is going to happen in this problem?"

STR: How can we help students to recognize the relevance of math to life outside school?

RJ & MK: There isn't enough time spent convincing students that this is a topic worth studying, that math is relevant, and this is how to use it. Teachers ought to show applications and how/why math is important. Unfortunately, teachers and parents don't necessarily know applications themselves or have time to include them in their classes.

Some Applications for Math:

▶ Talking about sine curves, we can relate them to how MP3 players work.

▶ Parabolas relate to satellite dishes, shooting baskets or hitting volleyballs.

▶ Fractions are useful in recipes when doubling or reducing amounts.

▶ Teachers and tutors have to really watch for what interests the students and adjust their examples accordingly.

▶ Historical examples are great for students interested in history. Did you know that the Egyptians couldn't deal with fractions with a numerator other than 1? They had enormous tables to convert quantities to sums of fractions.

The Great Pyramid of Giza is aligned within seconds of one degree of the cardinal points (i.e. north, south, east, west) – Did you know the three pyramids aren't in a straight line? They're offset in the same way as the three stars in Orion's belt. At a pyramid in Mexico, the sun on a particular day illuminates a stairway in such a way that a serpent appears to descend a stone staircase. Students love hearing about that kind of stuff.

Some Job Applications for Math:

▶ Interior decorator – geometry for placement of furniture

▶ Architect

▶ Scientist

▶ Engineers of all kinds

▶ Painters and Sculptors may use the Golden Ratio

▶ Psychologists and sociologists use statistics

▶ Marketing

STR: Many Canadian students seem to feel that math is a very difficult subject. "Math anxiety" is accepted as a reality for many students. Why do you think this is so?

RJ: This belief is largely cultural – students are taught that math is hard and geeky. They're not taught that it's fun.

MK: Parent's attitudes have a great influence here. Some parents and even some teachers will often convey the message, for example, "Oh no, we're going to talk about fractions today. This is difficult. I don't understand it well,"

About Us

Our Mission Is:

- ▶ To provide top quality, flexible learning support and service to students and parents of students through:

Superior private tutoring matched specifically to each student's needs.

Stimulating workshops building skills in a practical and creative way.

- ▶ To enhance students' skills and increase learning confidence through individualized support, recognizing each student's unique abilities.
- ▶ To improve the quality of life, in individuals and communities through education.

Our tutors are certified teachers and professionals. Each is carefully screened and selected to match individual students' needs.

We help students to achieve.

For more information and resources, visit us on-line at:

www.SmartTutorReferrals.com

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rather than saying, "This is something interesting and fun and related to everyday life." Also, girls' parents are often more concerned with their daughters' marks in arts and languages, rather than math and sciences. Parents usually won't put pressure on their daughters to do well in math.

RJ: Math can throw people off with its density of notation (i.e. there are lots of letters and numbers).

MK: The answer isn't to make math simpler, it's to raise students' confidence and skill level with math. There are many effective ways to teach math so that students feel comfortable with it.

STR: What are some ways to address students' seeming lack of interest in math?

RJ & MK:

- ▶ Disguise math as a game.
- ▶ Build their enthusiasm through applications suited to their interests.
- ▶ Build on small successes from the basics.
- ▶ The early years are crucial.
- ▶ Card games and dice can help younger children develop math skills, since it helps them recognize patterns, sequences and even simple arithmetic.
- ▶ Using real-life "manipulatives" for young students (like money) can help them to make sense of the numbers they see on the paper.
- ▶ Let younger students use math equipment – bring math specialists into elementary schools to model passion and enthusiasm for math.
- ▶ When the class is moving forward, students can't necessarily keep up on their own – they may need a tutor to walk back with them to relearn since math builds on itself.
- ▶ Math Mania – the UVic math department visits elementary schools with math-related games (*see sidebar for info*).
- ▶ Students could visit university math departments' open house demonstrations.
- ▶ Contests can help to build excitement, there are so many out there now (*see notes in sidebar*).
- ▶ On-going learning for teachers – ex. Professional subject conferences where they can learn applications to enliven their lessons.

- ▶ Bringing guest speakers into classrooms.

STR: What are some common mistakes students make in math and physics?

- ▶ not reading the entire question.
- ▶ not writing down all steps – trying to do everything in their head.
- ▶ writing a solution that is illogical – ex. too many equals signs (like a run-on sentence): step one isn't really equal to step two.
- ▶ improper conversion of units, for example mm to m, so the answer is ridiculous...so the Seattle Sky Needle ends up being 3m tall!
- ▶ poor penmanship: '-' signs that look like periods.
- ▶ missing '+' or '-' signs.
- ▶ memorizing rules rather than understanding.
- ▶ not drawing diagrams and displaying information clearly.
- ▶ over-dependency on calculators – they can become a crutch rather than a tool, destroying a student's sense of numeracy, giving them no insight into how to do math.
- ▶ at higher levels too much effort may be put into learning how to use the calculator.

STR: Can you offer some math study tips?

RJ & MK:

- ▶ Do sample questions – lots of repetition can help students to prepare for new "out there" questions.
- ▶ Prepare by first mastering simple things, then build understanding of concepts.
- ▶ Practise; don't just memorize formulas. Students often use past provincials and work through them, but it's important to extrapolate and really understand the concepts.
- ▶ Draw pictures and examine how all the information in the problem is related.
- ▶ Create a good relationship with the teacher – keep open lines to help foster a good learning environment.
- ▶ Take good notes. Review often.
- ▶ Read questions aloud and discuss concepts.

STR: Why do you like math and physics so much?

RJ: I like how it's a tool to describe the natural world. I like the logic behind it.

MK: I get a real kick out of the applications. You're surrounded by them. For example, rainbows – when observing rainbows, you have to raise your eyes 53 degrees above the horizon? Why?