Ideas for the Junior High Class

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Outdoor Metrics

Now that the nicer weather is here, you might want to take your classes out for some metric fun. This can be done in the schoolyard, but, more impressive from the students' viewpoint, is a trip to a larger park. The workshop should involve linear measurement only and, with 25 to 30 students, will take an entire morning or afternoon. The students should work in pairs to check out each other's findings. Some classroom work in the metric system, and especially conversion from one metric unit to another, is a must before such a workshop is attempted.

The necessary equipment can easily be made in classrooms in some cases, or the larger pieces can be borrowed from resource centers or other schools. For each workshop involving 25 students, the following are necessary:

1. small metric tapes made in the classroom from seam binding, and so forth, about 1 to 2 metres in length;
2. 20 to 30 cm rulers, either manufactured or made from lino strips and clearly marked in the classroom;
3. about 4 trundle wheels for long distances;
4. longer tapes - 50, 60 metre size from your phys. ed. department;
5. clinometers which can easily be made in the classroom;
6. metre sticks;
7. stopwatches for running events, which add to the fun; and
8. centimetre graph paper.

If the workshop activities are divided into three sections, the scramble for equipment is eliminated. Keep the activities involving the limited pieces in one section so that only a few students will need them at one time. Here are a few suggestions for activities, most of which came from the Department of Education through Bob Mak, Area 3's consultant in Winnipeg Division #1.

Math in the Out-of-Doors

1. (a) Practice your metric measures! By placing stakes in the ground, estimate the following distances; then check by measuring with a metric tape or trundle wheel. Record your results in the chart.

Estimated Distance	Actual Distance
1 Metre	
10 Metres	
100 Metres	
1000 Metres	

(b) Count the number of paces it takes you to walk 100 metres. Calculate the length of each pace.

2. How far do you think you can walk in one minute? Estimate, walk, then measure (stopwatch needed).

Estimate: _____ metres per minute

Actual: _____ metres per minute

3. Choose three pairs of objects within your view. Estimate the distance between each pair. Measure to check. Record your data.

Objects	Estimated Distance Apart	Actual Distance Apart

4. How many blades of grass is it necessary to stack together to be the thickness of a centimetre? Estimate first, then measure. Calculate the average thickness of one blade of grass.

5. Choose three different trees. Measure their circumference and diameters. Record data. Calculate the ratios. C/D for each. What mathematical relationship have you discovered?

	Circumference C	Diameter D	Ratio C/D
Tree #1			
Tree #2			
Tree #3			

6. Mark out an area of 1 square metre ($1m^2$) using stakes.

7. Mark out with stakes each of the following:

   (a) a square of area $16m^2$. What is its perimeter?

   (b) a rectangle of area $16m^2$. State the dimensions of three other rectangles which would each have area of $16m^2$. Find the perimeter of each.

   (c) a triangle of area $16m^2$. Find the perimeter.

8. Using grid paper (cm^2), count the number of squares covered by each of five different objects found in the environment. Record data.

Object	Area (cm^2)

9. Make a list of things that you can find in nature or in your immediate environment (out-of-doors) which have geometric shapes or properties such as triangle, rectangle, circle, sphere, spiral, polygon, parallel lines, perpendicular lines, planes, symmetry.

Object	Shape or Property

10. Find height of objects:

   (a) Have a person whose height is known stand by the object to be measured. This person is the "unit of measurement."

   Hold a stick (or pencil) at arm's length. Sight over the top of the stick to the head of the "unit of measurement." Place the thumbnail on the stick where the line of sight meets the foot of the person.

   Determine the number of "units of measurement" fitting onto the object being measured by moving the stick upwards a unit at a time.

   (b) The Isosceles Right Triangle Method:

   Back away from the object (for example, tree) until an imaginary line from your eye to the top of the tree forms a 45 degree angle to a horizontal line from your eyes to the tree. Use a clinometer (vertical protractor) to help determine the correct angle.

In a 45 degree (isosceles right) triangle, the two sides are equal in length; hence distance A is equal to distance B.

*To find the height of the object, measure the distance from you to the object and add this amount to the height of your eyes from the ground.

A Desperate Student's Prayer

Now I sit me down to cram,
The night before my Math 10 exam.
With notes in hand and books on the floor
My mind's a blank; my eyes are sore.
The formulas and proofs I can hardly recall;
How will I ever remember them all!
"A triangle has 160 degrees ..."
No, that's not right! Lord, help me PLEASE!
The midnight hour is drawing near;
The dreaded day is almost here!
I'm panicky, I'm sick, I'm full of remorse;
Oh Lord, why did I ever take this course?
So, tomorrow, Lord, help me survive.
All I want is a 65.

- *Beverlee* and *Geraldine Hill*
New York

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