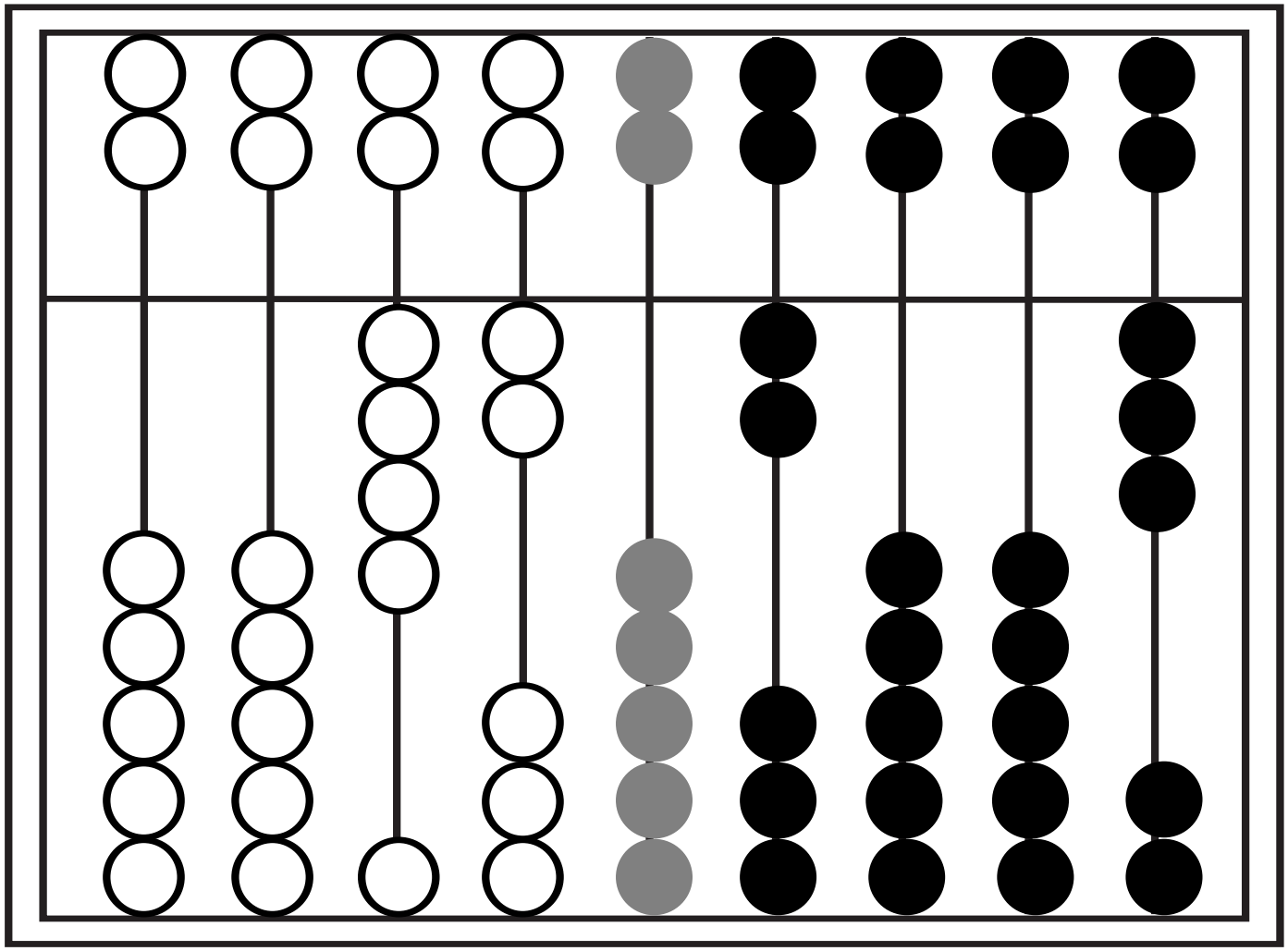
Abacus

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▲ From the Editor's Desk

Greetings from a former Editor of many years ago. It is heartening to think how long the *Abacus* has been providing classroom-ready materials for busy teachers. We hope you will find this issue's ideas equally useful.

Once again, here are some ideas from the "Invitations to Mathematics" series, that is being developed by a colleague, **Bev Marshman**, and me through the Centre for Education in Mathematics and Computing at the University of Waterloo. See the September, 2003 issue of *Abacus* for some activities in Data Management and Probability. Bev is a professor in Applied Mathematics at UW and I am a retired (from North York) independent math consultant. Since Bev is now (December writing) deep into exams (for classes of 100 students!), this is Lorna doing the final put-together and proofing. In the September issue, you will find information about other non-profit materials being produced at the Centre.

Activities in this issue come from "Investigations in Geometry", "Investigations in Measurement", "Investigations in Patterns and Algebra", and "Problems for the Web". More P4W activities can be found at cemc.uwaterloo.ca/p4w/root.html

Lorna J. Morrow

[Thank you Lorna and Bev for your great input for this issue. Your work is deeply appreciated.
Frances Schatz]

▲ Teacher Notes

(From materials developed by Dr. Lorna Morrow and Dr. Bev Marshman)

Investigations in Patterns and Algebra: Wurffles and Garnobs

Grade 4 students are expected to 'demonstrate an understanding of mathematical relationships in patterns' and 'discuss and defend the choice of a pattern rule'.

Activities such as ***Wurffles and Garnobs*** give students practice in identifying similarities and differences, a skill that is necessary in identifying patterns. Students should be encouraged to explain and justify their solutions.

As a side issue, #4 and 5 also include examples of plurals that are not formed by simply adding an 's'. Thus you have the opportunity for a language lesson as well.

Not all students will understand that the names used are not real mathematical terms, but may sound like it since the combinations of letters used are common in English. This could be explored further.

Investigations in Measurement: Metric Scavenger Hunt

Grade 5 students are expected to be able to 'estimate and measure length, ...area, ...volume, ...temperature ... and time intervals'. This scavenger hunt can be used as a pre- or post-test for a unit on measurement. This is intended as a small group activity, with a minimum of equipment needed. The following items should be in the classroom for reference: 30-cm rulers, cm-grid paper, a 1-kg mass, 2 or 3 1-L containers, a thermometer, and a clock/watch that shows seconds. Only the rulers, grid paper, and clock are needed for measuring items 12 – 16. The other answers should be estimates.

Investigations In Geometry: Net Matching

Grade 6 students are expected to be able to "identify nets for a variety of polyhedra from drawings by visualizing the two-dimensional faces of three-dimensional figures'.

Following a more standard exercise of matching nets to drawings, students are given this activity which demands that they not only match nets of figures but identify the face of the figure that is missing in the net, and its correct position in the net. There are multiple answers for many of these, and students should be encouraged to justify their solutions. One way to do this is to cut out each completed net and fold it to construct the figure.

Problems for the Web: P4W4: Folding Fun & P4W7: Wrong Numbers

Selections from two 'editions' of Problems for the Web (P4W) are included, one testing spatial abilities, and the other, number sense. For complete notes for these two activities and for more activities, check the web site listed in the editor's note.

These two activities are self-explanatory and are self-checking. For "Folding Fun" students can check their solutions by folding the figures. For "Wrong Numbers" they can check using calculators. They might, however, be asked to describe their strategies. There is no grade level attached to these activities; they are suitable for grade 4 to 8.

Activities in Probability: Bet on Your Favourite Vowel

This activity can be found in the Grade 6 Probability book but the activity is suitable for much younger students as well. After students have determined that "e" and "a" are the two most commonly used letters in English, they could explore other languages using the same alphabet such as French or Italian.

For a Language activity, challenge students to write a short paragraph without using the letter "e".

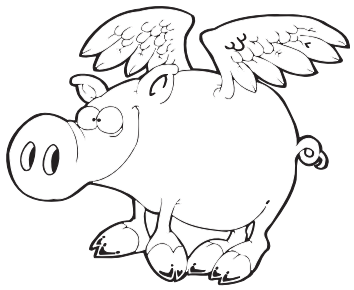
▲ Activity: Wurffles and Garnobs

1. These are wurffles: 2 24 62 46 8

   These are not wurffles: 101 51 63 99 37

   Which of these are wurffles? 3 27 34 50 82

   What is a wurffle? Write two more wurffles.



2. These are podlaps: 3 + 4 2 + 5 8 – 1 12 – 5 96 – 89

   These are not podlaps: 3 + 3 2 + 7 8 – 3 5+9 1 + 17

   Which of these are podlaps? 6 + 1 12 – 4 20 – 13 80 + 7 99 – 2

   What is a podlap? Write two more podlaps.

3. These are garnobs: 123 678 579 356 189

   These are not garnobs: 251 768 404 521 769

   Which of these are garnobs? 145 273 876 568 259

   What are garnobs? Write two more not-garnobs.



4. These are lundies: 33 55 99 88 11

   These are not lundies: 444 67 808 5 999

   Which of these are lundies? 77 505 222 44 660

   What is a lundy? Write two more not-lundies.

5. These are dawnlies: TWELVE TWENTY EIGHTY NINETY

   These are not dawnlies: TWO SIXTY FORTY FIFTY

   Which of these are dawnlies? SEVEN ELEVEN THIRTY ONE FIVE

   What is a dawnly? Write two more not-dawnlies.

6. These are hapters: A M T H

   These are not hapters: C P G D

   Which of these are hapters? V F W X O

   What is a hapter? Write one more hapter and one not-hapter.

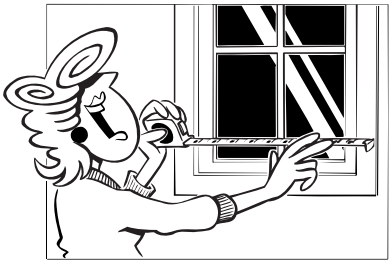
▲ Activity: Metric Scavenger Hunt

Work with a partner or in a small group. Find the following items or measures in your classroom. Write the names of the items or people in the blanks. For #12 – 16 write an actual measurement.

The group that does the best work is the Metric Winner. (There may be more than one winning team.)

Find:

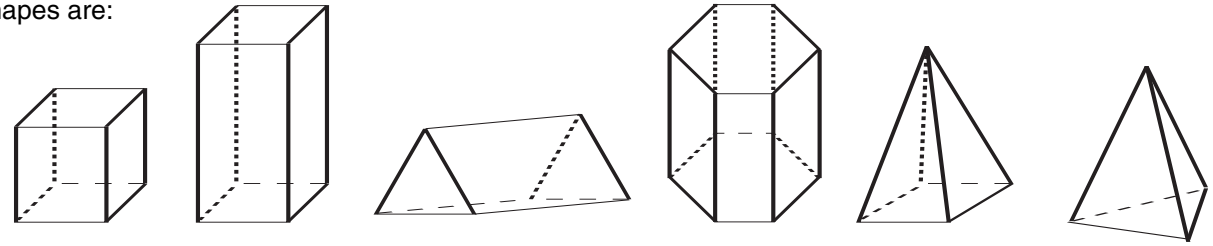
1. the tallest person in your group _____
2. the person whose wrist measurement is closest to 12 cm _____
3. something that is about 1 m long _____
4. something that weighs about 1 kg _____
5. something that weighs less than 1 kg _____
6. something that holds more than one litre _____
7. something that is more than 4 m long _____
8. something that holds between 2 L and 5 L _____
9. something about 10 cm long _____
10. someplace in the room warmer than 2°C _____
11. the person in your group with the warmest hand _____
12. the longest anyone in your group can stand on one foot with his/her eyes closed (in seconds) _____
13. the smallest footprint in your group (in square cm) _____
14. the average height of your group (in cm) _____
15. the average arm length of your group (in cm) _____
16. the fastest someone in your group can write the alphabet (in seconds) _____
17. something in the classroom that has an area of about 600 cm^2 _____
18. the person in your group with the widest smile _____





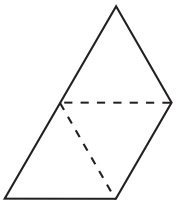
▲ Activity: Net Matching

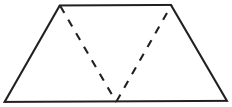
The shapes are:

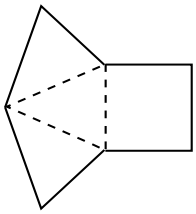


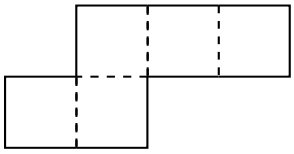
A Cube | B Rectangular prism | C Triangular prism | D Hexagonal prism | E Square-based pyramid | F Triangular pyramid prism

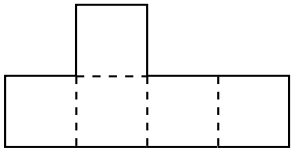
Each of the nets below is incomplete. One more piece must be added so the net can be used to construct one of the figures above. Add the necessary piece and tell which figure (A, B, C, D, E, or F) the net can be used to make.

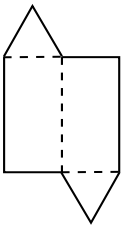
1. 

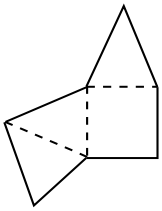
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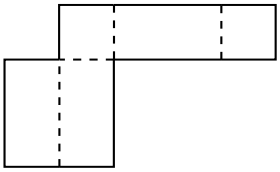
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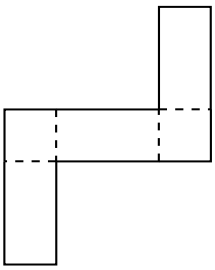
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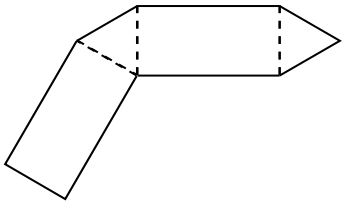
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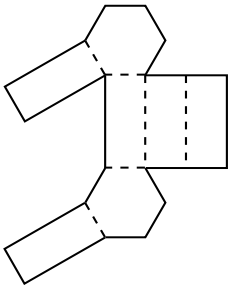
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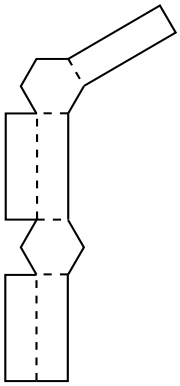
7. 

8. 

9. 

10. 

11. 

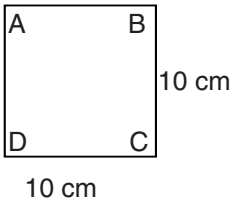
12. 

▲ Activity: P4W4 Folding Fun

Folding Squares

Draw a square that is 10 cm on each side

Label the corners A, B, C and D as shown.
Cut the square out.



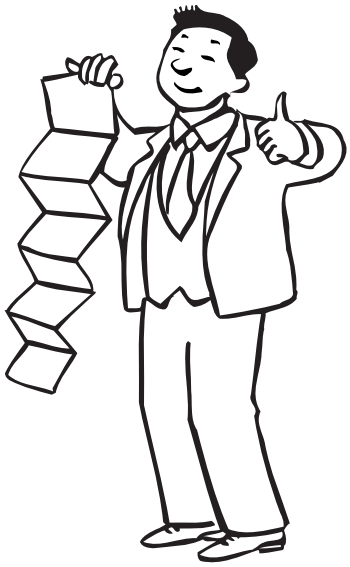
Imagine that you are folding the square in each of the following ways.

Do not actually fold the square.

Describe the result to your partner or draw a picture.

Example: if you fold A onto B you will get a rectangle that is half the size of the original square.

When you have decided what you think the results of the first problem below will be, fold the square to check. For each problem, predict the results, then check your prediction by folding the square.

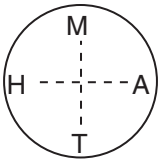


1. Fold A onto D.
2. Fold A onto B and then C onto B.
3. Fold A onto C.
4. Fold A onto D and then A onto C.
5. Fold C onto A and then D onto A.
6. Fold A onto the mid-point of side AB; then fold B onto the same mid-point.
   (How can you find the mid-point of side AB by folding?)
7. Fold A, B, C, and D onto the centre of the square.
   (How can you find the centre of the square by folding?)

Did you find that some of the answers could be used to help picture other answers? Which ones? Why?

Folding Circles

Draw and cut out a circle. You can draw a circle by tracing around a cup or tin can.



Fold the circle in half and in half again.

Open the circle and label the ends of the fold lines as shown.

Picture the folds below and describe or draw the result of each problem.

Then check by folding the circle.



1. Fold M onto T.
2. Fold M onto T, and then H onto A.
3. Fold M onto H.
4. Fold M and T onto the centre of the circle. (How do you know where the centre is?)
5. Fold M, A, T, and H onto the centre of the circle.

Did any of the results surprise you? Why or why not?

▲ Activity: P4W7 Wrong Numbers

Extra Numbers

In each row, there are too many numbers to give the total that is shown. Cross out the extra numbers so that the total is correct.

1. 1 + 5 + 6 + 9 + 3 + 7 = 11
2. 7 + 3 + 2 + 5 + 6 + 4 = 13
3. 2 + 5 + 8 + 3 + 9 + 4 = 17
4. 2 + 7 + 8 + 5 + 4 + 9 = 15
5. 4 + 3 + 5 + 6 + 8 + 1 = 14
6. 9 + 4 + 2 + 7 + 3 + 5 = 16

Find as many solutions as you can for each problem. Is it possible to use every number given in at least one solution?

Three Wrong Numbers

For each of these, cross out exactly three numbers.

1. 2 + 5 + 3 + 6 + 4 + 7 = 12
2. 8 + 2 + 5 + 1 + 9 + 6 = 16
3. 7 + 3 + 5 + 2 + 6 + 4 = 13
4. 6 + 2 + 9 + 1 + 5 + 8 = 15
5. 3 + 7 + 4 + 8 + 6 + 5 = 17
6. 5 + 8 + 2 + 1 + 7 + 4 = 13



Each of these has at least three solutions.

Try to find them all.

One Wrong Number

Each addition question here has one extra number. Cross out the extra number. Estimate first, then check with your calculator.

1.	2.	3.	4.	5.	6.	7.	8.	9.
219	371	897	723	689	247	386	564	987
364	902	253	689	109	86	37	209	156
205	65	125	237	356	736	634	175	202
112	153	141	591	298	95	82	498	895
788	1120	1291	1551	1096	1069	1057	1237	1253

Explain Yourself

Select one of the problems above and explain how you solved the problem.

▲ Bet on Your Favourite Vowel

In a group of 5, each person chooses one of the vowels and places a marker on the vowel beside START.

1. Select a page from any book – fiction, history, drama, science, or any other.
2. Count vowels word by word.
3. Each time your vowel occurs, move your marker one space along the race track.
   Play till at least 3 vowels have finished the race.

Which vowel reached FINISH first? second? third?

Try again with another book or another page in the same book. Did you get the same results? Did other groups get the same results?

