Learning Support Assistants

Supporting Mathematics

In the Secondary School

Howard Brayton

Flexible Programme

10 00   **Introductions**
SEN / SLDD students - Who are they?
Differing Roles and Perceived Needs of LSAs
Current Status and Training Opportunities

11 00   **How students learn**
Perceptions - Learning styles

11 15   **Coffee**

11 30   **Mathsmagic!**
What is maths?   Language
Aesthetic, recreational and functional roles
How do students learn maths?
Concept or computation?

13 00   **Lunch**

14 00   **Supporting in maths**
The National Numeracy Startegy
Lines, Grids and Puzzles
Alternative strategies

15 15   **Tea**

15 30   **Expectations of the Day Revisited**
Questions   Discussion   Forward Planning

16 00ish   **Close to be negotiated**

LSA INSET

**Considering Learning Difficulties
and / or Disabilities**

*   Are student's care needs being met?

*   Are teacher's expectations appropriate?

*   Does teacher assume past experiences?

*   Problems with accommodation/access?

*   Does teacher use inappropriate
language?

*   Are appropriate aids available to
support the student?

*   Is the student's short attention span
acknowledged?

SEN INSET

Activity

Discuss for five minutes, any aspect of your role as an LSA.

Recruitment, induction, how you work, relationship with SENCO and teachers, contract, appraisal, inservice training ...

SEN INSET

DfEE Publication

Working with Teaching Assistants

FREE!!

"Working With Teaching Assistants"

(October 2000)

The ROLE of the TA
- Draft intended for TAs' line managers
- Value for TAs and classroom teachers
- Largely primary. Secondary to be addressed later
- "...what TAs are capable of achieving..."
- "...no universal recipe..."
- "TA", stresses the importance of teaching support
- Support for the pupil
  Support for the teacher
  Support for the curriculum
  Support for the school
- "...requires the close cooperation of
  class teachers...heads and other managers

Good TA Practice
- Supervising and assisting small groups
- Developing social skills
- Implementing Behaviour Management Policies
- Spotting early signs of bullying and disruption
- Helping integration
- Keeping children on task

SEN INSET

- Enabling independent learning
- Raising self-esteem
- Assisting individuals with tasks
- Free the teacher - TA takes whole class
- Working with outside Agencies
- Modelling good practice
- Assisting with physical needs
- Helping to raise pupil's achievements
- Helping to implement lesson plans
- Provide support for literacy & numeracy
- Provide feed back to teachers
- Preparing classroom materials

Supporting the Role of the TA
- School policy
- Appointment - Contract
- Job Description
- Probationary period
- Induction
- Lines of Communication

SEN INSET

Deployment
- Clear line management
- Most appropriate line manager
- Where the TA should work
- Ensuring continuity of work
- Valuing the job description
- Facilitating team work in class
- Giving the TA a wider picture
- Giving the TA specific information
- Encouraging TAs to take initiative
- Reviewing the TA/pupil link
- Using TAs' special skills

Partnership with Teachers
- Differentiating the roles
- Ensuring TAs' participation in planning
- Allowing for TAs' input & feedback
- Dealing with behaviour management
- Including TAs in IEPs
- TAs are full members of staff
- Recognising legal responsibilities
- Reviewing classroom relationships

SEN INSET

Partnership with Others
- Outside Agencies
- SENCOs
- Parents
- Ethnic communities
- School functions

Partnership among TAs
- Regular in-school meetings
- Providing a TA room
- Encouraging sharing pupil information
- Information about TA support groups
- Liaison with Support Staff Governor

Reviewing Performance
- Regular appraisal
- Revisit job description
- Assessing TAs' training needs
- Providing / sharing / evaluating training
- A Professional Development portfolio

An Audit of Current Practice

Estelle Morris June 2002

"The following common tasks... should, as soon as practicable, be transferred to support staff."

* collecting money
* photocopying
* producing letters
* record keeping
* classroom displays
* process exam results
* admin. Work Exper.
* invigilate exams
* ICT trouble–shoot and repairs
* ordering supplies
* chasing absences
* copy typing
* class lists
* filing
* attendance analysis
* collating reports
* admin. Exams
* covering teachers
* commission new ICT equipment
* stocktaking
* cataloguing, preparing, issuing and maintaining equipment and materials
* minuting meetings
* personnel advice
* inputting pupil data
* submitting bids
* managing pupil data

N.B. Watch for Edn.Bill currently before Parliament – TAs' future role.

Education Act 2002

Part 8   Teachers

Section 133 Required to be Qualified

"… the Secretary of State may set out the specified work which only qualified teachers may carry out … Certain other persons may carry out this work … if they satisfy specified requirements. The section will also provide for T.A.s to carry out the specified work … if they are appropriately supervised."

Consultation period:

October/November/December 2002

TAs & The Current Situation

* Many TAs in a recent GMB survey, said they felt "...second class ... invisible ... spare parts ... servants.

* LEAs (Rochdale) "... can employ four TAs for cover supervision for the cost of a supply teacher."

* Large chunk of the £268m Standards Fund for TAs training, will be delegated to schools – can be used for staff salaries.

* Sept 2003, teachers' routine tasks taken by support staff and "Super Assistants" used to cover for teachers.

* GMB Union research – of 25 routine tasks 19 are clerical or administrative

* The OU has estimated 90% of TAs would need additional training before taking whole classes.

* The TTA " Super Assistants" will receive 50 hours of training ... in school and via the Internet.

* Many LEAs (Birmingham) offering own TA training and career structure.

* No-one mentions pay and conditions!!!

SEN INSET

Proposed Career Structure

Four categories

1. Administrative Staff

2. Curriculum Resource and Support . technician

3. Teaching Assistants

4. Behaviour Support Assistants

Four grades - for each category

* Induction grade to Management grade

* Grades two to four to have NVQ qualifics

* Level three TAs qualified to *supervise* classes

* Level four TAs qualified to *teach* classes

UNISON demanding 25% increase I pay

Lobbying Parliament on June 5th

SEN INSET

Issues

11 Year olds fail to reach L4   25% in English
                                           18% in Maths
                                         33% in both

1152 support staff not replaced - financial

1 in 5 5-12 year olds missing trips and uniform

In 10 years, 1742 allegations against staff
                    - only 69 upheld

Truancy dropped daily by only 712 to 50,540

Baroness Mary Warnock   (1981 Edn Act)
                   - Statementing "Disastrous"

Government's Maths enquiry - "Maths for the
    Citizen" now "on hold" - divisive

A new strategy for SEN before Christmas

A Childrens' Commissioner to safeguards
childrens' rights and protect from harm & abuse

SEN INSET

Self - Review

Being an Effective Teaching Assistant

* *Supported* self-review

* Starting point - clear, shared view of role

* Complete Statements

* MIC - Maintain   (85%)
        - Improve   )
        - Change   )   (15%)

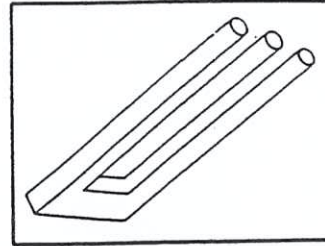* Discuss completion with someone
                              (SENCO / DH)

Rotherham Edn. Services   Tel: 01709-382121
Norfolk House   Ext. 2576
Walker Place   Fax: 01709-372056
ROTHERHAM S65 1AS www.rotherham.gov.uk

MORE ILLUSIONS
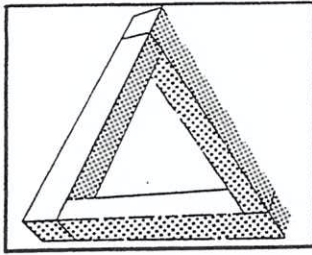
Look at the impossible triangle and the impossible prongs. Then try to draw them yourself.

What do these signs say? Read them aloud quickly — then have another look! Now try to make up some more yourself.

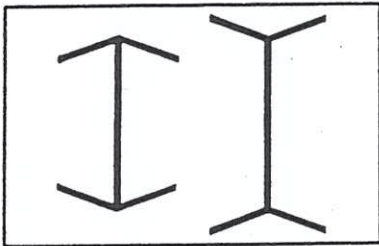PARIS IN THE THE SPRING

ONCE IN A A LIFETIME

Cut out the rectangle with the left-facing arrow and prop it upright on a table. Place a glass of water in front of it, stand a little way away, with your eyes on a level with the glass — and you will see that the arrow has miraculously changed direction!
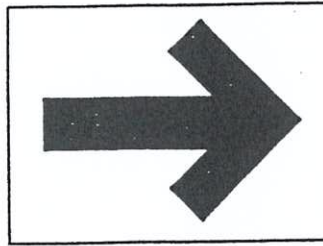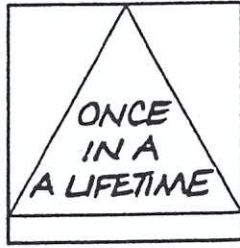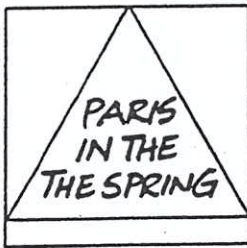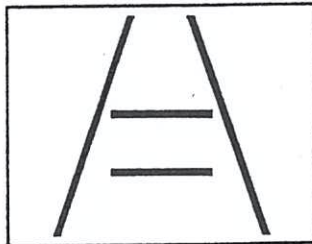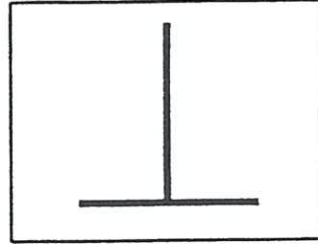
Which vertical line is longer?

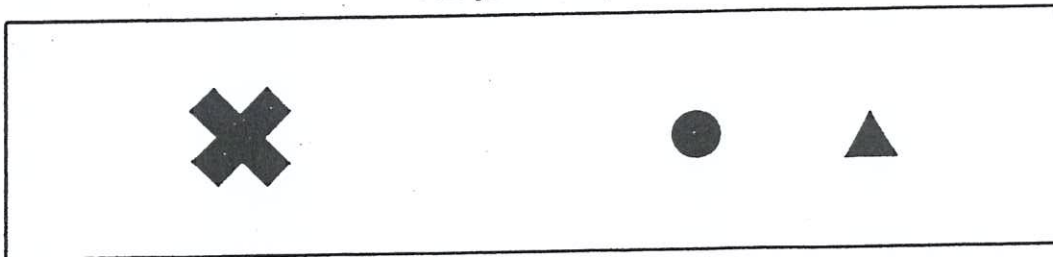Which horizontal line is longer?

Is the vertical or horizontal line longer?

Guess first, then measure.

Find your blind spot.

Lay the pad on a table, cover your left eye and lower your head to the page, looking all the time at the cross with your right eye. As you lower your head, first the triangle will disappear as it falls on your blind spot, then the circle, then the triangle will reappear.
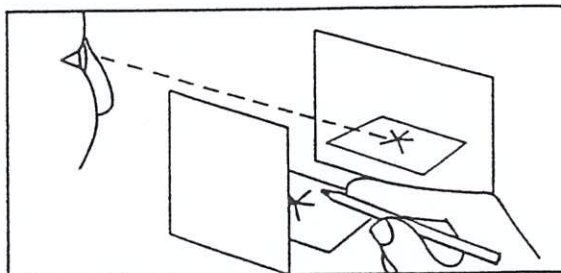
Stand a mirror upright on the table. Draw a 5-pointed star on a piece of paper and place it in front of the mirror. With one hand hold a piece of cardboard upright resting on the table so that it hides the star from you, but so that you can see its reflection in the mirror. Now, looking in the mirror only, take a pen and try to draw round the lines of the star. You will find your hands positively refuse to obey!
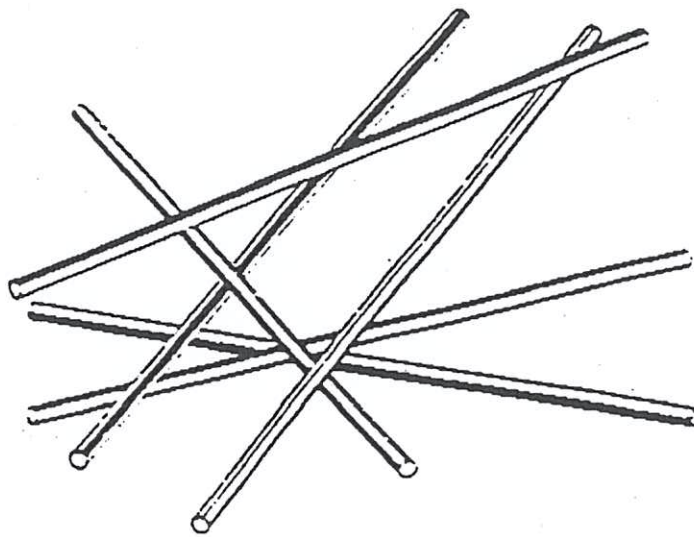
Can you arrange six drinking straws to
make four triangles, all with sides of the
same length?

Cut and Fold

FIG 1

FIG 2

LSA INSET

INTELLIGENCE = INTELLECT + INTUITION

Learning Styles

Activists

Reflectors

Theorists

Pragmatists

Honey & Mumford

LEARNING STYLES - GENERAL DESCRIPTIONS

Activists

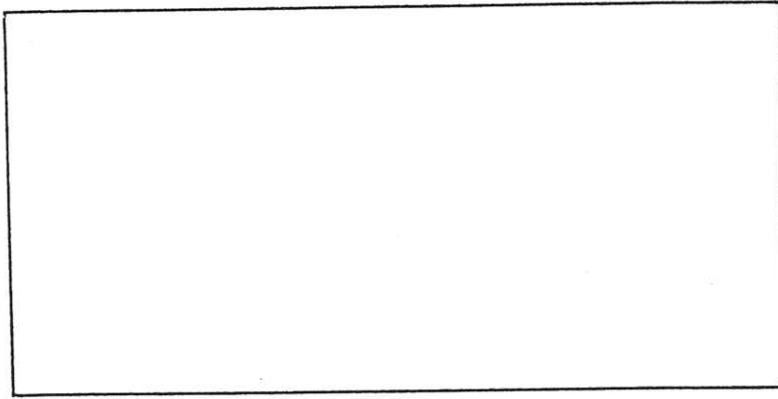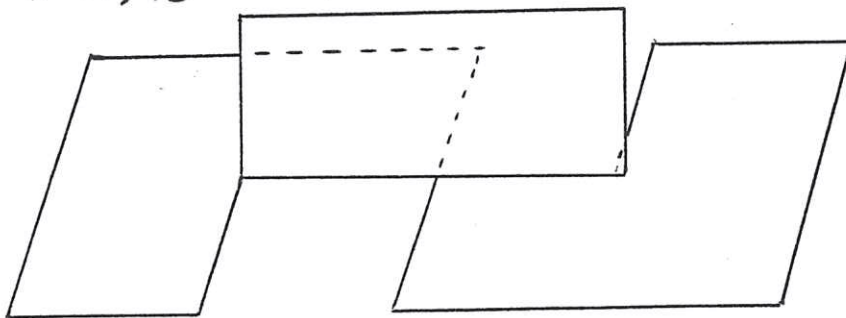Activists involve themselves fully and without bias in new experiences. They enjoy the here and now and are happy to be dominated by immediate experiences. They are open-minded, not sceptical, and this tends to make them enthusiastic about anything new. Their philosophy is: 'I'll try anything once'. They tend to act first and consider the consequences afterwards. Their days are filled with activity. They tackle problems by brainstorming. As soon as the excitement from one activity has died down they are busy looking for the next. They tend to thrive on the challenge of new experiences but are bored with implementation and longer term consolidation. They are gregarious people constantly involving themselves with others but, in doing so, they seek to centre all activities around themselves.

Reflectors

Reflectors like to stand back to ponder experiences and observe them from many different perspectives. They collect data, both first hand and from others, and prefer to think about it thoroughly before coming to any conclusion. The thorough collection and analysis of data about experiences and events is what counts so they tend to postpone reaching definitive conclusions for as long as possible. Their philosophy is to be cautious. They are thoughtful people who like to consider all possible angles and implications before making a move. They prefer to take a back seat in meetings and discussions. They enjoy observing other people in action. They listen to others and get the drift of the discussion before making their own points. They tend to adopt a low profile and have a slightly distant, tolerant unruffled air about them. When they act it is part of a wide picture which includes the past as well as the present and others' observations as well as their own.

Theorists

Theorists adapt and integrate observations into complex but logically sound theories. They think problems through in a vertical, step by step logical way. They assimilate disparate facts into coherent theories. They tend to be perfectionists who won't rest easy until things are tidy and fit into a rational scheme. They like to analyse and synthesise. They are keen on basic assumptions, principles, theories models and systems thinking. Their philosophy prizes rationality and logic. 'If it's logical it's good'. Questions they frequently ask are: "Does it make sense?" "How does this fit with that?" "What are the basic assumptions?" They tend to be detached, analytical and dedicated to rational objectivity rather than anything subjective or ambiguous. Their approach to problems is consistently logical. This is their 'mental set' and they rigidly reject anything that doesn't fit with it. They prefer to maximise certainty and feel uncomfortable with subjective judgements, lateral thinking and anything flippant.

Pragmatists

Pragmatists are keen on trying out ideas, theories and techniques to see if they work in practice. They positively search out new ideas and take the first opportunity to experiment with applications. They are the sort of people who return from management courses brimming with new ideas that they want to try out in practice. They like to get on with things and act quickly and confidently on ideas that attract them. They tend to be impatient with ruminating and open-ended discussions. They are essentialy practical, down to earth people who like making practical decisions and solving problems. They respond to problems and opportunities 'as a challenge'. Their philosophy is: 'There is always a better way' and 'If it *works* it's good'.

What is Maths?

Maths is the structure of relationships:

It has a recreational and aesthetic side;

as well as a vocational side

Number Puzzles

19 - 11 - 1999   when is the next date?

_____

2   4   6   30   32   34   36   40

42 44 46 50   52   54   56   60

62 64 66 2000 ____   ____

_____

1. Take a number between 1 and 10
2. Double it
3. Add 5
4. Multiply by 50
5. Add 1751 if you haven't had your b/d
6. Add 1750 if you have
7. Subtract the year of your birth
8. Answer e.g. 562
   You chose 5   Your age is 62

More puzzles

Use 4, four times to create as many answers as possible

Try a different number

Try 4, three times or five times

Countdown

50   8   4   7   3   5

Targets   276   473   507

Select other numbers at random

Select other targets at random

CODES

A8M   After eight mints

1A-AFD   1st April - April Fools Day

101D   One hundred and one dalmations

4WD   Four-wheel drive

25D-CD   25th December - Christmas day

65-RA   65 - Retirement age

100WB   100watt bulb

————

————

————

Arrange the Trees in Order

CHERRY

ASH

SYCAMORE

ELDER

REDWOOD

PEAR

MATHSMAGIC

$$
\begin{array}{r}
1\ 2\ 3\ + \\
\underline{2\ 3\ 4} \\
\underline{3\ 5\ 7}
\end{array}
\qquad
\begin{array}{r}
1\ 2\ 3\ + \\
\underline{2\ 3\ 4} \\
\underline{4\ 1\ 2}
\end{array}
$$

$$
\begin{array}{r}
1\ 2\ 3\ + \\
\underline{2\ 3\ 4} \\
\underline{4\ 0\ 1}
\end{array}
\qquad
\begin{array}{r}
1\ 0\ 1\ 0\ 1\ 1\ + \\
\underline{1\ 0\ 1\ 1\ 0} \\
\underline{1\ 0\ 0\ 0\ 0\ 0\ 1}
\end{array}
$$

$$
\begin{array}{r}
T\ Z\ /\!/\ O\ + \\
\underline{O\ S\ T\ Z} \\
\underline{O\ Z\ Z\ Z\ O}
\end{array}
\qquad
\begin{array}{r}
T\ Z\ /\!/\ O\ - \\
\underline{O\ S\ T\ Z} \\
\underline{O\ Z\ S\ O}
\end{array}
$$

1 2 4 8 16 — — —

1 1 2 3 5 8 — — —

Questions

Q1 Subtract 1.78 from 5

Q2 Take away 2.43 from 5

Q3 Add together 5.5, 7.25 and 3.75

Q4 The total of 4.25, 6 and 7.74

Q5 Multiply 6 x 21

Q6 Multiply 16 x 21

Q7 Area of a room 11m x 18m

Q8 Number of apples each person gets if a box of 72 is shared by six people

Q9 Work out 15% of 700

Q10 Number of children in a crowd of 7900 if the proportion is 10%

Q11 What is 5/6 of 300?

Q12 Number of books not in the sale if a third are in the sale and the total number of books is 420

Country	UK	France	Nethèrlands	Sweden	Japan	Australia	Denmark
Age band	16-60	18-60	16-60	16-60	18-59	16-59	16-60
Base	660	932	994	813	884	801	852
	%	%	%	%	%	%	%
12 correct answers	20	40	38	34	43	33	36
10-12 correct answers	47	65	76	65	81	58	68
6-9 correct answers	27	25	19	26	14	26	24
5 or fewer correct answers	22	10	4	7	5	14	7
Could not answer any question	2	*	0	1	0	1	*
Refused after seeing all questions	2	1	1	1	0	1	1
Average number of correct answers	7.9	9.6	10.3	9.6	10.5	9.0	9.8

Table 1: Scores achieved across 12 numeracy tasks

How Students Learn Maths

Stage 1	Sensori-motor	0-2 years
Stage 2	Pre-operational	2-7 years
Stage 3	Concrete operation	7-11years
Stage 4	Formal operational	>11years

Piaget

How Students Learn Maths

1. Conservation of number

2. Counting

3. Correspondence

4. Recording

5. Concepts of Addition & Subtraction

6. Conservation of Quantity

7. Conservation of Length

8. Seriation, Order, Pattern

9. Estimation

Numberwork

* Basics
* Computation vv Concepts
* Pupil motivation / interests
* Application of number
* Practical apparatus
* Appropriate use of calcualtors
* Use of I.T. - graphs / spread sheets
* Differentiation
* Setting / groups

Primary Numeracy Strategy

RECEPTION Count up to ten objects
Recognise numerals 1 - 9
Use words such as "circle" "bigger" for shape

YEAR 1 Say what is one more or less than 10 up to 30
Know by heart pairs of numbers which total 10
Solve mentally, counting, adding, subtracting,
doubling and halving

YEAR 2 Understand subtraction is the inverse of addition
Know all add. & sub. factors for numbers to 10
Understand halving is the inverse of doubling

YEAR 3 Know all add. & sub. facts for numers to 20
Know 2, 5, 10 multiplication tables
Understand division is inverse of multiplication

YEAR 4 Use known number facts to add & subtract mentally
Know 2, 3, 4, 5, 10 multiplication tables
Derive quick division facts from these tables

YEAR 5 Use decimal notation for tenths & hundredths
Calculate mentally e.g. 8006-2993
Column add. & sub. up to 10,000
Know all tables up to 10 x 10

YEAR 6 Find simple percentages
Solve simple ratio and proportion
Calculate division facts up to 10 x 10

SEN INSET

Publications

"Framework for Teaching English: years 7, 8 and 9"
(DfEE 0019/2001)
"Management Summary" (DfEE 0103/2001)
"Framework for Teaching Mathematics:
reception to year 6" (ISBN 0 8522 922 5)
"Framework for Teaching Mathematics:
years 7, 8 and 9" (DfEE 0020/2001)
"Management Summary" (DfEE 0076/2001)
"National Numeracy Strategy:
Mathematical Vocabulary" (ISBN 08 55229 551)

(All free from: DfEE Publications, PO Box 5050, Sudbury, Suffolk CO10 6ZQ 0845-6022260)

"Teaching Mental Calculations: key stages 1 and 2"
(QCA/99/380)
"Teaching Written Calculations: key stages 1 and 2"
(QCA/99/486)

(£3-00 each QCA Publications, PO Box 99, Sudbury, Suffolk CO10 6SN 01787-884444)

Activity

Aim

In 15 minutes, gain a flavour of a Unit

* Individually or in pairs on your table, select a **Section** from your **Unit**

* Read the **direct teaching points**

* Look at the examples

* Do you think the section would be useful?

* How could it be adapted for students below level 3?

* Share findings with others on your table

* Two minute feedback to the whole group

Mathematical Conversation

* Stating & Restating the problem or task

* Talking about numerical patterns in the problem to be solved

* Working out calculations aloud

* Challenging other's observation

* Providing explanations when challenged

* Speaking about uncertainties

SMOG Readabilty Test

SMOG Readability Test

1. Select a text

2. Count 10 sentences

3. Count number of words which have three or more syllables [   ]

4. Multiply this by 3 [   ]

5. Circle the number closest to your answer:

   1   4   9   16   25   36   49   64   81

   100   121   144   169

6. Find the square root of the number you circled:

   1   4   9   16   25   36   49   64   81   100   121   144   169

   1   2   3   4   5   6   7   8   9   10   11   12   13

7. Add 8 [   ] =Readability level

The lower the readability level the easier something is to read and understand. A readability level under about 10 will be able to be understood by most people.

MATHEMATICS
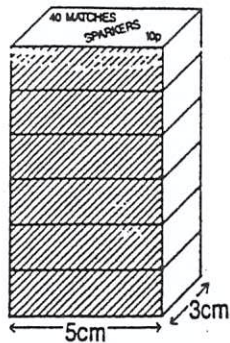
(b) The boxes are packed in sixes before being sold to shops; assuming they are packed face to-face, draw a sketch of the packet and mark in its dimensions. Calculate the minimum amount of wrapping paper required to cover the six boxes — ignoring overlaps. You are advised to set your answer out as follows:

Front requires: _____ × _____ = _____ cm^2
Top requires: etc.

5. The plan shows a racing track with the diameter of the semi-circular ends x metres.
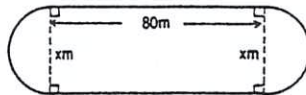
(a) Taking one complete lap of the track to be 317m, calculate x to the nearest m.

(b) Using your answer to (a), calculate how long it takes a workman to dig up the area enclosed by the track, if he digs 48m^2 an hour. Give your answer to the nearest hour.

6. A student of architecture was told to make a 1:80 model of the end of a building; the triangle represents the model.
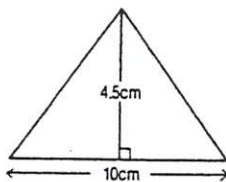
(a) What was the area of the end of the building in m^2?

(b) In making her model she was allowed to be out ±1mm in her drawing; what was the minimum possible area of her model?

7. In the diagram the area of the parallelogram ABCD is 32cm^2.
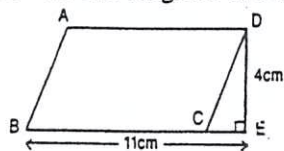
What is the area of the triangle DCE?
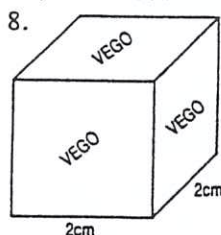
8. (a) What is the volume of one Vego cube?

2cm (b) What is the smallest number of Vego cubes that can be put together to make another cube?

(c) In a wrapped cubical packet there are 343 cubes; what is the length of the edge of the packet?

6

Skills LSAs Need

Understanding of the process of learning

Patience & Empathy

Conversation

Imagination and Ideas

"Task Analysis"

Apparatus & Resources

Support Ideas

* Relate maths to students' interests particularly money!

* Learn number bonds and tables:
  practically - grids and table squares
  through games
  through puzzles
  by rote
  mental tests

* Make it practical

* Start a maths club

* Use computer software

* Differentiate materials

* Check readability of texts

* Check the maths in other N.C. subjects

Number Patterns

Square Numbers

```
*        * *        * * *              * * * *
         * *        * * *              * * * *
                    * * *              * * * *
                                       * * * *
```

Triangle Numbers

```
o        o          o                  o
         o o        o o                o o
                    o o o              o o o
                                       o o o o
```

```
o +          o + +          o + + +
o o          o o +          o o + +
             o o o          o o o +
                            o o o o
```

Number Patterns

L - Shaped Numbers

```
o     o        o            o

   o o        o            o

          o o o            o

                           o o o o
```

```
o +        o + +        o + + +

o o        o + +        o + + +

           o o o        o + + +

                        o o o o
```
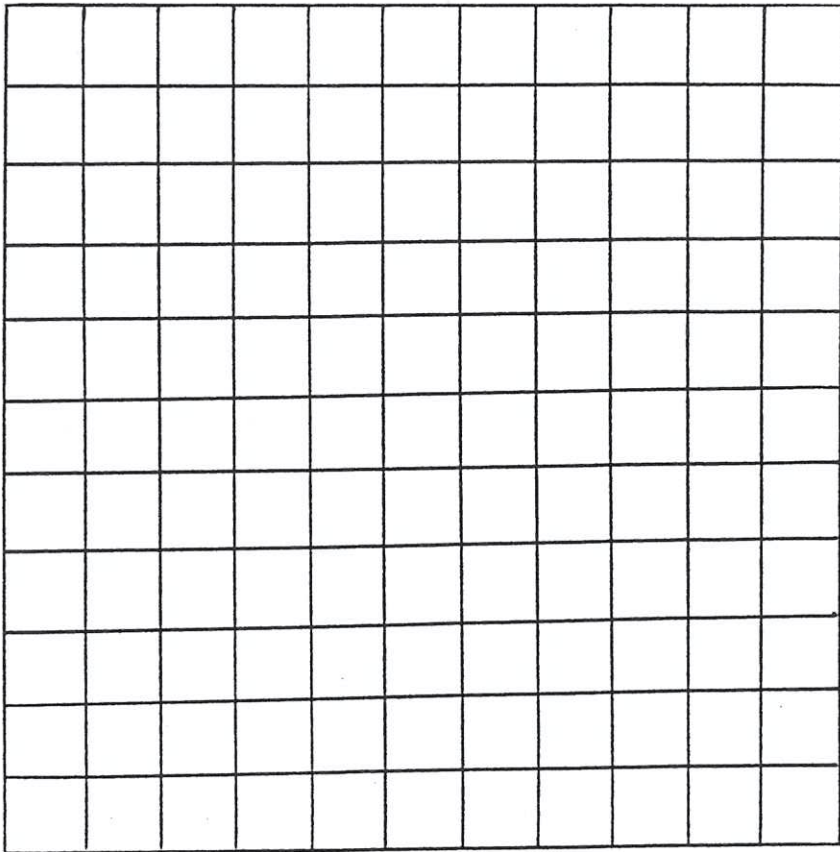
Rectangle Numbers - factors

```
*  *  *        *  *  *  *        *  *  *  *  *  *

*  *  *        *  *  *  *        *  *  *  *  *  *

               *  *  *  *        *  *  *  *  *  *

                                 *  *  *  *  *  *
```

Number Grids

Addition

$86 + 57 = 86 + 50 + 7 =$

$$
\begin{array}{l}
86\ + \\
\underline{50} \qquad \text{(count in 10s)}\\
136\ + \\
\underline{7} \qquad \text{(count on)}\\
\underline{143}
\end{array}
$$

$86 + 57 = 80 + 6 + 50 + 7 =$

$$
\begin{array}{ll}
80\ + & \qquad\qquad 86\ + \\
\underline{50} \quad \text{(count in 10s)} & \qquad\qquad \underline{57} \\
130\ + & \qquad\qquad 13\ + \\
\underline{6} \quad \text{(count on)} & \qquad\qquad \underline{130} \\
136\ + & \qquad\qquad \underline{143} \\
\underline{7} \quad \text{(count on)} \\
\underline{143}
\end{array}
$$

* Try: 356 + 427   * Try: £3.56 + £4.27
* Draw on a number line

Subtraction

$$651 -$$
$$\underline{287}$$
$$\underline{364}$$

$$651 = 600 + 50 + 1 \quad -$$
$$287 = \underline{200 + 80 + 7}$$

$$600 + 40 + 11 \quad -$$
$$\underline{200 + 80 + 7}$$

$$500 + 140 + 11 \quad -$$
$$\underline{200 + 80 + 7}$$
$$300 + 60 + 4$$

$$= \mathbf{364}$$

Draw 84 - 56 on a number line

Work out, by counting on, the change from £10.00 if you spend £7.28

Magic Squares

<table>
<tr><td>8</td><td></td><td></td></tr>
<tr><td></td><td>7</td><td></td></tr>
<tr><td></td><td>56</td><td></td></tr>
</table>

<table>
<tr><td>1p</td><td></td><td>10p</td><td>15p</td></tr>
<tr><td></td><td>13p</td><td></td><td>6p</td></tr>
<tr><td></td><td></td><td>16p</td><td></td></tr>
<tr><td>14p</td><td>11p</td><td></td><td>4p</td></tr>
</table>

<table>
<tr><td></td><td>17</td><td></td><td>8</td><td>1</td></tr>
<tr><td>10</td><td>3</td><td></td><td>19</td><td>12</td></tr>
<tr><td>16</td><td></td><td></td><td></td><td>23</td></tr>
<tr><td>2</td><td>25</td><td></td><td>11</td><td>9</td></tr>
<tr><td></td><td>6</td><td>4</td><td>22</td><td>20</td></tr>
</table>

<table>
<tr><td></td><td>$n+2$</td><td>$n+1$</td></tr>
<tr><td></td><td>n</td><td></td></tr>
<tr><td>$n-1$</td><td>$n-2$</td><td></td></tr>
</table>

SEN INSET

Magic Squares

Multiplication

Repeated addition

$$5 \times 3 = 5 + 5 + 5$$
$$3 \times 5 = 3 + 3 + 3 + 3 + 3$$

Draw an array

5 x 3   =   3 x 5

```
*  *  *              *  *  *  *  *
*  *  *              *  *  *  *  *
*  *  *              *  *  *  *  *
*  *  *
*  *  *
```

Scaling

Find 5 lengths of string each 15cm
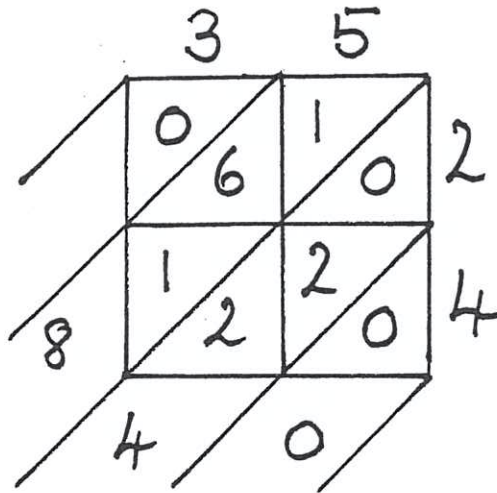
/_____/_____/_____/_____/_____/

Multiplication

35 x 24   35 x 24

$$
\begin{array}{r}
35 \\
\times\ 24 \\
\hline
700 \\
140 \\
\hline
840 \\
\hline
\end{array}
$$

$(30 + 5)$ x $(20 + 4)$

$600 + 100 + 120 + 20$

$=\ 840$

= 840

Grid Multiplication

	20	4	
30	600	120	720
5	100	20	120

840

Box Multiplication

	10	10	10	5	
10	100	100	100	50	350
10	100	100	100	50	350
4	40	40	40	20	140

840

Division

Equal Sharing

$35 \div 5 =$ how many lots of 5?

how much do each of 5 get?

how many rows of 5?

Use an array

$35 \div 5 =$ how many rows of 5?

+ + + + +	=	5	1 row
+ + + + +		10	2 rows
+ + + + +		15	3 rows
+ + + + +		20	4 rows
+ + + + +		25	5 rows
+ + + + +		30	6 rows
+ + + + +		35	7 rows

Cross-Number Puzzles

A Cross-Number puzzle is like a Cross-Word puzzle. You are given questions or 'clues' as they are called, and the answers are put in the box or 'grid'.

Here is a short one to start you off.
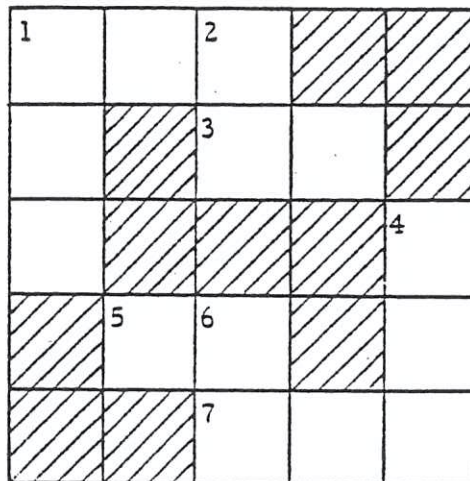
Clues Across
1. Number of days in a leap year.
3. 7 multiplied by itself.
5. Number of days in May.
7. 1,000 — 16.

Clues Down
1. 145 + 230.
2. 8 × 8.
4. A gross.
6. One less than a score.

You don't need all the clues to fill in all the blanks, you can use some of them for checking whether your other answers are right.

Resources

calculators	maths books
cards	dictionaries
clock faces	games
coins	posters
compasses	signs
construction kits	spike abacus
counters	measuring equipment
dice	lined / squared paper
dominoes	coloured pens
elastic bands	"wish" books
interlocking cubes	time tables
pegs / pegboard	_____
pinboards	_____
rulers	_____
scissors	_____
sellotape	_____
set squares	_____
shapes	_____
straws	_____
sticky shapes	_____

Mathematical Topics

TIME
What is time? calendar, time zones, shadow / candle water / clocks /watches, pendulum, speaking clock, pulse / heart rate, timetables, distance / time graphs

NUMBER PUZZLES
Number patterns, binary / computers, series, magic-squares, cross-number puzzles, prime numbers, factors, pythagoras, Pi, codes, puzzles

SHAPES
Pattern board, Pythagoras, tesselations, symmetry, in nature, in buildings, two and three dimensions, nets

SIMPLE MACHINES
Garden / kitchen / DIY tools, levers, ramps, friction, gyroscope, belts, pulleys, converting motion, wind, steam, the wheel

MOTOR VEHICLES
Statistics, graphs, distribution, new / used costs, running costs, tax, insurance, servicing, MOT, support services, time / distance graphs, route planning, motor cycles etc.

MONEY
History, coins, conversion, value comparisons, budgets, home shopping, household bills, discounts, deferred payment, banking, rent / rates / mortgages, P.A.Y.E.

Mathematical Topics

HOLIDAYS
Camping, hotels / B&B, waterways, bookings, route planning, travel agents, foreign packages, airports, passports, currency conversions, duty-free, car abroad

COMMUNICATIONS
Letter / word frequency, codes, radio / television / cinema, newspapers / magazines, media listings, advertising, Post Office, computers, INTERNET, statistics, Braille, signing

SPORTS & GAMES
Olympics, internationals, play area dimensions, rules, attendances, scoring, soccer, racing, dice, coins, games of chance / betting, pub games, darts, snooker, dominoes

ENVIRONMENT
Population growth, food statistics, farming, pesticides / insecticides, fossil fuels, mining / quarrying, pollutions, patterns of life, natural disasters, work & leisure

OTHER
Students' own interests, pop music, drug abuse, nature, animals, space, model making, weather ....

The World Trade Centre - New York - 1970

* Recently sold for 3,200,000,000 dollars
* 1,362 (S) / 1368 (N) feet high - 60 ft foundation
* Weigh 1,500,000 tonnes
* 110 floors high
* 50,000 people work there
* 200,000 people visit daily - half tourists
* 68 miles of steel used
* 16 miles of staircases
* 49,000 tonnes of air conditioning
* 198 miles of heating ducting
* 12,000,000 square feet of space
* 12,000 miles of electric cable
* 23,000 flourescent light tubes
* 43,600 windows   600,000 square feet
* 19,600 miles of telephone cable
* 75,000 telephones
* 239 *banks* of lifts
* 20,000 lift doors
* 300 security cameras
* 300 security guards
* 75 shops 6 banks 22 doctors' surgeries
  19 chapels (6 faiths)
* 3 underground train stations / 150,000 passengers
* cafes serve 30,000 cups of coffee every day
* 87 tonnes of food brought in every day
* 17 births   19 murders   since 1970

ACTIVITY

* Choose a topic

* Brainstorm the maths potential

* Analyse the maths involved

* Devise a short-term programme

* List the materials and equipment

'THE SWAMP'
Forward Action Planning

	Myself	Team	School	LEA	'Them'
Tomorrow					
Next Week					
Next Term					
Next Year					
Sometime					
Never					