ACTIVITIES FOR INTERNALLY ISOLATED STUDENTS

MATHS

GRAHAM TIPPING

with

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and

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Chalkface PROJECT

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INTRODUCTION

The Pack

Activities for Internally Isolated Students: Maths has been written to provide meaningful activities for students to work on their own and at their own pace.

Student Suitability

You can use these lessons with Key Stage 3 and 4 students of all abilities. The pack is designed to be used in situations where the student is isolated from normal lessons.

Using the Pack

The lessons in the pack cover a wide and varied range of activities within the scope of mathematics. They may be used in any order as each is a standalone lesson, although some can be used as follow-on lessons where appropriate. Each lesson is a double-page spread to be photocopied for the student. As the students are working in isolation there are no Lesson Plans for teachers to follow; each lesson is designed to require no supervision. In some cases special materials or equipment will be required by students – details can be found in the General Guidelines. If you have any queries about how best to use the pack we are happy to help; you can contact us a the address below.

The People Involved

Graham Tipping was the consultant author for the pack. He is a full-time teacher. Sotiris Soteriades was the editorial co-ordinator. He is a mathematics teacher and Assistant Head of Year at Ecclesfield School in Sheffield. The pack was written and edited by Stephen Thomas, who is a freelance writer, and illustrated by David Braysher. The Chalkface format was created by Susan Quilliam.

Photocopy Laws

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GENERAL GUIDELINES

Guidelines for using this pack

Isolation from lessons should not mean that meaningful learning and practice ceases.

This pack enables internally isolated students to work on their own and at their own pace on a series of activities drawn from the National Curriculum.

The pack will provide material which will practice skills and concepts but will also aim to educate and 'stretch' the student. The emphasis here is on individual learning, but attention is also paid to ensuring that each lesson, though not all activities, is accessible to all abilities, though we assume at least a basic level of numeracy, literacy, and comprehension.

This pack has three main sections: Key Stage 3, Key Stage 4, and Answers. The lessons contained in both Key Stage 3 and Key Stage 4 contain four subsections that summarise the nature of the lessons therein. The answers to all lessons can be found in the Answers section.

Each lesson is a double-page, standalone student worksheet. We recommend that each lesson is photocopied onto a single sheet of A3 paper. If a lesson is to be copied onto two sheets of A4 paper, or onto both sides of a single sheet of A4 paper, it should be made clear to the student that the lesson continues on a second page or overleaf.

This pack can also be used with students who are too ill to attend school, or with students who for whatever reason are not able to access the normal classroom situation.

Preparing for the lesson

- There is no specified duration for these lessons and it is suggested that students are allowed to work at their own pace. However, a specific duration may be set if appropriate.
- The following lessons require special materials and/or equipment:

  KEY STAGE 3
  PERCENTAGES: Students may require a calculator to complete this lesson.
  PARALLEL AND PERPENDICULAR LINES: Students will need a protractor or angle measurer to complete this lesson.
  THREE DIMENSIONS: Students will require isometric paper to complete this lesson.
  AVERAGES 1: Students may require a calculator during this lesson.
  AVERAGES 2: Students may require a calculator during this lesson.
  PROBABILITY EXPERIMENTS: Students will need two dice to complete this lesson.

  KEY STAGE 4
  CALCULATOR METHODS: Students will require a calculator to complete this lesson.
  CIRCLES AND ANGLES: Students will need a protractor or angle measurer to complete this lesson.

The lesson

Each sheet contains a number of activities. These fall into two basic formats:

- Examples followed by exercises.
- Exercises.

Section One
KS3

SECTION ONE: KS3

NUMBER

ALGEBRA

SHAPE, SPACE AND MEASURES

HANDLING DATA

ROUNDING UP OR DOWN

Learning objective When you have finished this worksheet you will be able to:
• round answers to problems up or down by1 or 2 decimal places.

Resources required You will need a calculator for this lesson.

1 **268.7cm has been written to the nearest millimetre.**

268.7cm to the nearest centimetre is 269cm. The 7 after the decimal point is 7mm. As there are 10 millimetres to 1 centimetre it means that 268.7cm is nearer to 269cm than 268cm.

268.7cm to the nearest 10cm is 270cm. 268.7 is between 260 and 270. 265 is half way, so 268.7 is nearer to 270.

268.7cm to the nearest 100cm is 300cm. 268.7 is between 200 and 300. 250 is half way, so 268.7 is nearer to 300.

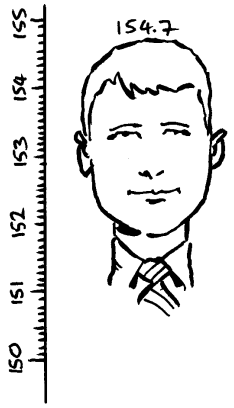
What is my height?

a) to the nearest millimetre

b) to the nearest centimetre

c) to the nearest 10cm

d) to the nearest 100cm



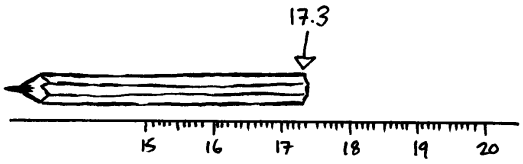
2 What is the length of the pencil

a) to the nearest millimetre

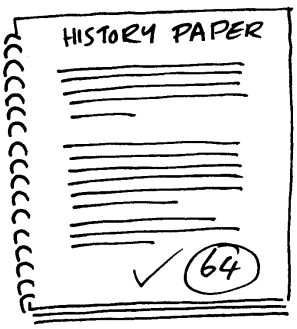
b) to the nearest centimetre

c) to the nearest 5cm

d) to the nearest 10cm



3 The results for a history test were 28, 63, 79, 65 and 6. Rewrite each to the nearest 10.



4 Here are the attendance figures for five football matches. Rewrite each to the nearest 100.

7359 6107 13423 25423 9950

ROUNDING UP OR DOWN

5 **4.32 to 1 decimal place is 4.3** **4.3|2 → 4.3**

4.37 to 1 decimal place is 4.4 **4.3|7 → 4.4** **REMEMBER – THE 5 ROUNDS UP**

4.35 to 1 decimal place is 4.4 **4.3|5 → 4.4**

Write each of the numbers to 1 decimal place.

a) 4.63	b) 4.78	c) 5.03	d) 6.65	e) 7.93
f) 8.97	g) 13.47	h) 10.03	i) 25.93	j) 36.97
k) 94.23	l) 154.35	m) 742.07	n) 184.96	o) 179.99

6 **On my calculator 2 □ 3 is 0.6666666. To write this to 2 decimal places I count 2 digits after the decimal point. The next digit is 6. As this is more than 5 I add 1 to my last digit to give 0.67.**

Use a calculator to do these calculations and write the answers to 2 decimal places.

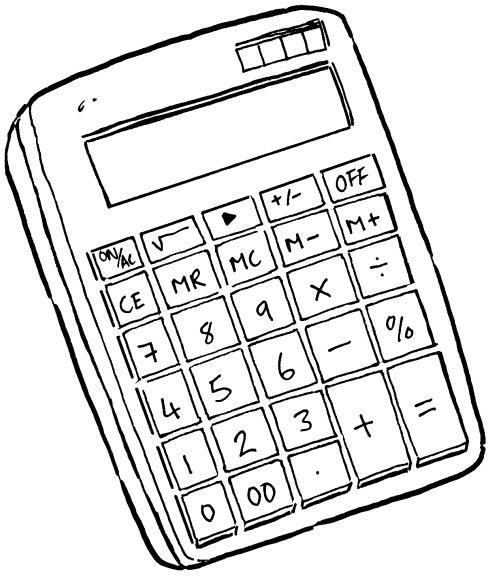
a) 1□3	b) 4□6	c) 12□7	d) 9□5	e) 11□17
f) 100□3	g) 95□6	h) 96□9	i) 52□7	j) 45□8
k) 61□6	l) 45□16	m) 17□4	n) 86□4	o) 72□3

7 162 people are going on a coach trip. Each coach holds 43 people.
How many coaches are needed?

8 I need to cut a 1 metre piece of ribbon into 3 equal pieces. How long will each piece be?

9 30 sweets are to be shared equally between 4 friends. How many do they get each?

10 A meal costs £125 between six people.
How much do they each have to pay?



THE FOUR RULES

Learning objective When you have finished this worksheet you will be able to:
• add, subtract, multiply, and divide using negative numbers.

Resources required None.

1 **3 > 2 means that 3 is greater than 2.** **3 < 5 means that 3 is less than 5.**

Write > or < between each pair of numbers

a) 3 2 b) 2 3 c) 0 5 d) 0 ⁻2 e) ⁻4 0

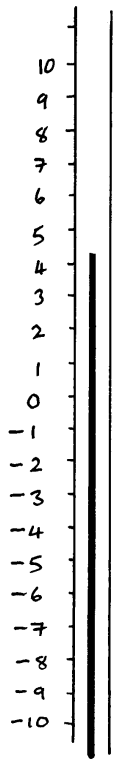
f) 5 2 g) 5 ⁻2 h) ⁻2 5 i) ⁻2 ⁻5 j) ⁻5 ⁻2

2 Put these sets of numbers in order from lowest to highest. The scale in the illustration will help you.

a) 5 1 7 2 3 b) ⁻3 ⁻5 4 1 ⁻1

c) ⁻1 ⁻4 0 ⁻5 ⁻7 d) ⁻2 ⁻3 ⁻1 ⁻5 ⁻9

e) 10 ⁻10 5 ⁻1 1 ⁻5 f) 23 17 ⁻15 ⁻2 5



3 **Use the scale in the illustration to help you with this Activity.**

To increase 2 by 3, start at 2 and go up 3 steps. This will take you to 5.
So 2 + 3 = 5. To decrease do the same but this time go down the scale.

a) increase 5 by 3

b) decrease 3 by 7

c) increase ⁻5 by 3

d) decrease ⁻3 by 7

e) increase ⁻1 by 4

f) decrease 4 by 9

g) increase ⁻3 by 2

h) decrease ⁻2 by 5

THE FOUR RULES

4 **$^{-}5 + 2 = {}^{-}3$** **$^{-}2 + 6 = 4$** **$^{-}2 + {}^{-}3 = -5$** **$5 + {}^{-}3 = 2$**

a) $^{-}3 + 2 =$ b) $^{-}5 + 5 =$ c) $^{-}4 + 7 =$

d) $^{-}10 + 8 =$ e) $^{-}5 + -3 =$ f) $^{-}4 + -6 =$

g) $3 + -5 =$ h) $4 + {}^{-}7 =$ i) $^{-}12 + 6 =$

j) $^{-}15 + -3 =$ k) $^{-}21 + 14 =$ l) $^{-}18 + 9 =$

m) $-35 + {}^{-}15 =$ n) $23 + {}^{-}3 =$ o) $^{-}15 + {}^{-}12 =$

5 **$2 - 5 = {}^{-}3$** **$^{-}4 - 3 = {}^{-}7$** **$5 - {}^{-}2 = 7$** **$^{-}5 - {}^{-}2 = {}^{-}3$**

a) $3 - 4 =$ b) $2 - 7 =$ c) $^{-}2 - 5 =$

d) $^{-}5 - 5 =$ e) $5 - {}^{-}3 =$ f) $3 - {}^{-}4 =$

g) $^{-}3 - -2 =$ h) $^{-}6 - {}^{-}6 =$ i) $10 - {}^{-}3 =$

j) $^{-}12 - 3 =$ k) $^{-}9 - {}^{-}2 =$ l) $^{-}23 - 6 =$

m) $^{-}32 - -5 =$ n) $^{-}14 - {}^{-}17 =$ o) $^{-}42 - 12 =$

6 **$3 \times 5 = 15$** **$^{-}3 \times 5 = -15$** **$3 \times {}^{-}5 = {}^{-}15$** **$^{-}3 \times {}^{-}5 = 15$**

a) $4 \times 5 =$ b) $^{-}4 \times 3 =$ c) $^{-}6 \times 5 =$

d) $7 \times {}^{-}3 =$ e) $^{-}3 \times {}^{-}4 =$ f) $^{-}5 \times 8 =$

g) $^{-}7 \times {}^{-}4 =$ h) $6 \times {}^{-}7 =$ i) $12 \times {}^{-}3 =$

j) $^{-}7 \times {}^{-}12 =$ k) $8 \times {}^{-}11 =$ l0 $9 \times {}^{-}9 =$

m) $^{-}8 \times {}^{-}8 =$ n) $15 \times {}^{-}4 =$ o) $^{-}12 \times {}^{-}9 =$

7 **$8 \square 2 = 4$** **$^{-}8 \square 2 = {}^{-}4$** **$8 \square {}^{-}2 = {}^{-}4$** **$^{-}8 \square {}^{-}2 = 4$**

a) $12 \square 3 =$ b) $^{-}15 \square 5 =$ c) $^{-}20 \square 4 =$

d) $24 \square -8 =$ e) $16 \square {}^{-}2 =$ f) $^{-}25 \square {}^{-}5 =$

g) $^{-}27 \square -9 =$ h) $18 \square {}^{-}6 =$ i) $32 \square {}^{-}4 =$

j) $^{-}45 \square 9 =$ k) $^{-}48 \square {}^{-}6 =$ l) $72 \square {}^{-}9 =$

m) $^{-}63 \square {}^{-}7 =$ n) $^{-}81 \square 9 =$ o) $51 \square {}^{-}3 =$

8 a) $15 \square 3 =$ b) $^{-}16 \times 4 =$ c) $16 - 5 =$

d) $13 + {}^{-}2 =$ e) $^{-}16 - 5 =$ f) $^{-}7 \times {}^{-}6 =$

g) $^{-}5 + {}^{-}15 =$ h) $^{-}17 - {}^{-}6 =$ i) $18 \square {}^{-}3 =$

j) $^{-}21 \square {}^{-}7 =$ k) $14 \times {}^{-}3 =$ l) $^{-}21 + 36 =$

m) $-12 \times -4 =$ n) $-42 \square -7 =$ o) $16 + -25 =$

MULTIPLES, FACTORS AND PRIMES

Learning objective When you have finished this worksheet you will be able to:
- find multiples and factors of numbers
- know the prime numbers up to 20.

Resources required None.

1 The multiples of 3 are 3, 6, 9, 12, 15, 18, 21 ...
They all appear in the 3 times table. They can all be divided exactly by 3.

12 18 21 25 14 9 27 35 15 24

List those numbers in the list above which are multiples of

a) 2 b) 5 c) 3 d) 6 e) 7

2 The factors of 24 are 1, 2, 3, 4, 6, 8, 12, 24 ...
They all divide exactly into 24.

For example, 3 x 8 = 24 so 3 and 8 are factors of 24.

List all the factors of

a) 6 b) 12 c) 15 d) 25 e) 19

3 Digit sums

25 → 2 + 5 = 7

72 → 7 + 2 = 9

86 → 8 + 6 = 14 → 1 + 4 = 5

129 → 1 + 2 + 9 = 12 → 1 + 2 = 3

A number will divide exactly by 2 if the last digit is 0, 2, 4, 6 or 8

A number will divide exactly by 3 if the digit sum is 3, 6 or 9

A number will divide exactly by 5 if last digit is 0 or 5

A number will divide exactly by 9 if the digit sum is 9

Use these rules to find factors of

a) 51 b) 75 c) 108 d) 62 e) 31

MULTIPLES, FACTORS AND PRIMES

4 A number with only two factors is a prime number.

Find all the prime numbers between 1 and 20.
There are eight.

5 List the first five multiples of 4.
List the first five multiples of 5.
Which number is common to both lists?
This is the lowest common multiple.

By making lists of multiples, find the lowest common multiple of

a) 6 and 8 b) 4 and 6
c) 5 and 7 d) 3 and 6

6 List all the factors of 18.
List all the factors of 24.
What numbers are in both lists?
The largest number in both lists is the highest common factor.

By making lists of factors, find the highest common factor of

a) 24 and 32 b) 12 and 18
c) 10 and 25 d) 7 and 12

7 Which numbers less than 100 have exactly three factors?

8 List the prime numbers less than 10.

Using the hundred square, shade the multiples of each prime number except the number itself. The multiples of 2 are 2, 4, 6, 8, 10, etc – so shade each number except 2.

What can you say about each number that is not shaded?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100