YuMi Deadly Maths
North Lakes Project

Maths Fiesta

Lesson Plans and Activities
Years P–6

North Lakes State College
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Prepared by the YuMi Deadly Centre
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ACKNOWLEDGEMENT

We acknowledge the traditional owners and custodians of the lands
in which the mathematics ideas for this resource were developed,
refined and presented in professional development sessions.

YUMI DEADLY CENTRE

The YuMi Deadly Centre is a research centre within the Faculty of Education at QUT which is dedicated to enhancing the learning of Indigenous and non-Indigenous children, young people and adults to improve their opportunities for further education, training and employment, and to equip them for lifelong learning.

"YuMi" is a Torres Strait Islander Creole word meaning "you and me" but is used here with permission from the Torres Strait Islanders' Regional Education Council to mean working together as a community for the betterment of education for all. "Deadly" is an Aboriginal word used widely across Australia to mean smart in terms of being the best one can be in learning and life.

The YuMi Deadly Centre's motif was developed by Blacklines to depict learning, empowerment, and growth within country/community. The three key elements are the individual (represented by the inner seed), the community (represented by the leaf), and the journey/pathway of learning (represented by the curved line which winds around and up through the leaf). As such, the motif illustrates the YuMi Deadly Centre's vision: *Growing community through education*.

The YuMi Deadly Centre can be contacted at ydc@qut.edu.au. Its website is http://ydc.qut.edu.au.

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1 Years P–6 Lesson Plans

1.1 Year Prep: Numbers 1 to 3

Learning goal: Recognising numbers 1 to 3.

Big ideas: Language ←→symbol ←→ picture ←→materials ←→ action.
Visualising through kinaesthetic activity.

Resources: Items from classroom (small toys) and from nature (leaves, stones/pebbles, seeds, shells).

Reality

Prior experience	Rote counting – collections at home, in daycare/kindy; candles on birthday cake matching age.
Local knowledge	Noticing numbers on road signs, shops, clocks, car number plates, TV, phones.
Kinaesthetic	Writing numbers in sand, feeling numbers on card – numbers made from fabric glued on card or draw number on card with glue and scatter sand over number shape (allow to dry).

Abstraction

Body	For each number 1, 2 and 3 in turn – items counted to get the numbers, the numerals are drawn and the children copy the number with their bodies. Roll over any students who are inverting the numbers.
Reversing	Children watch teacher on floor, walking and moving finger in air and stating the number. Children walk the number and draw it out in air with hand. Children write numbers on the back of a friend. Friend guesses what is being written on their back.
Hand	Match a number card with the amount of objects; write the number on a piece of paper. Make number 1, 2 and 3 out of play dough.
Mind	Visualise the number – teacher gives directions for movement of fingers, children move fingers and teacher checks that children are doing it correctly.
Creativity	Children make up their own symbols for the numbers.

Mathematics

Language/ symbols	Say name ←→ children draw symbol. Extend to pictures and materials.
Practice	Hide objects behind a piece of fabric. Reveal the objects briefly. Children say how many they think are there or hold up a card with the number on it. Add or take an object away. Repeat, hiding a different number of objects behind the fabric.
Connections	Spend time on going from symbol to language to actions to objects to pictures and then reversing.

Reflection

Application/ Validation	Do a poster of 1s, 2s and 3s in the world. Do a walk around the school to find 1s, 2s and 3s in the various forms (three objects, symbol 3).
Extension	Game: Clown with circles drawn on the pants. Child rolls die. Child counts out that number of counters. The counters are put onto the circles on the clown's pants. The next child rolls the die and does the same.

1.2 Year 1: Early Number/Measurement – Identifying parts of a collection

Learning goal: Sort and classify familiar objects and explain the basis for these classifications. Describe collections by referring to the parts and the whole.

Big ideas: Identifying attributes and sorting by attribute.

Resources: Items from: nature (leaves, pebbles, shells, seeds); home (buttons, plastic toys, jar lids).

Reality

Prior experience Sorting clothing, food, toys, books.

Local knowledge Shops – arrangement of goods, e.g. in a supermarket, toy shop

Kinaesthetic Get students to sort and classify themselves.
Go for a collection walk and gather a variety of material to sort and classify. Discuss one object – describing it in many ways, then pick a classification and put objects into it.

Abstraction

Body Children sit together on the floor. "The whole group of students go to North Lakes College. What else can we say about this group of children?" (They are all in the same class). "How many children are there in this group?"

All children stand up. "Children who are wearing black shoes go to that side of the room and stand together." "How many children in the group are wearing black shoes?" "Children who are not wearing black shoes go to that side of the room." "Which group has the most in it?" What can we say about this (the other) group? (It doesn't have as many. It has less.)

Hand Children sit on the floor in pairs. Each pair is given some leaves, pebbles, shells, and buttons. "Think of a way you might sort your things. Show your partner how you would sort the items. Let your partner sort them in a different way."

Mind "Tell your partner how many items are in the group you've made. Now put them back together and work out a different way to sort them."

Visit a supermarket or construct a "supermarket" in the classroom from pictures of supermarket goods from advertisements, etc. "Close your eyes. Imagine walking into a supermarket. I want to buy cornflakes. Keep your eyes closed and imagine walking along the aisles. What group of items are you going to look for that will include cornflakes? What could we call that group of food?" (breakfast cereals) "Put the cornflakes in your imaginary trolley. Keep your eyes closed. Next thing on my list is milk. What other items are with the milk?" (cream, yoghurt). "Where are we going to walk to?" (fridge section) "What's a good name for that group of food?"

Creativity Looking closely at leaves and drawing them to put in groups on a mural.

Mathematics

Language More, less, the same, long, short, fat, thin, wide, narrow, etc.

Practice Use sorting incidentally throughout the school day, e.g. when lining up to move from class, reading books and returning to the shelves/boxes, etc.

Connections: Children look at the contents of their lunchboxes and decide which food aisle the items were bought from.

Reflection

Application Sort things in students' world (e.g. cars, TV programs, etc.)

Extension Sort items from different groups, e.g. mix leaves and buttons together. Children explain the reasons why they have grouped the items, e.g. "This leaf goes with the buttons because it has two holes in it. This button goes with these leaves because it's brown."

1.3 Year 2: Measurement Time – Calendars

Learning goal: Students will:

- construct a calendar
- order days and months
- determine the number of days in each month
- connect each month with the corresponding number of days
- connect months and seasons
- know that there are different ways to measure and compare time.

Big ideas: Time as sequence of time (also a little on point and duration of time).

Resources: Mat, whiteboards, numbers, calendars, stories.

Reality

Prior experience

Students discuss small and large amounts of time:

- What do you use to keep track of time? What different units of time do you use?
- What do you do at different times?
- How can you measure time?

Refer to classroom calendar if necessary.

Kinaesthetic

Use Mat. Ask students to construct a calendar for February. "What parts do you need? How do you know how many? Why are they grouped in sevens? How many groups of seven are there? What do we call these? Where will Day 1 go? Who has a birthday in February? What day could it go on?" Have every student place a number on a day. Can they self-correct or work with each other to do this? Invite other students to build on the ideas constructed. "What day of the week is the last day of the month? What is the next month? Where will it begin? What will be the first day of March?"

Abstraction

Body

As above

Hand

Do the following:

- Have students construct calendars with a range of materials/medium.
- Have them place significant events on their calendar.
- Have students study a variety of standard calendars and make comparisons.
- What do they discover? Do all calendars use the same conventions?
- Read a range of "calendar" stories.
- Explore seasonal activities.

Mind

"Close your eyes and imagine … winter. What do you see, feel, smell, do?" etc.

Make a season collection, birthday chart.

Mathematics

Formality

Have students construct a calendar in their books, read, write and say the labels for month, days, season.

Have them place significant events on the calendar and tell /discuss 'time' stories.

Identify month commonalities and differences. Identify and examine season sequences.

Connections

Have students study a variety of standard calendars and make comparisons. What always remains the same? What do they discover? Identify number of days in a year,a season, a month, a week. Do all calendars use the same conventions?

What different calendars are there for different purposes?

Have students research calendars used in other cultures. Do they work the same way?

Reflection

Application/ Validation

Find things of interest in our calendar.

Extension

Extend to point and duration of time:

- Calendars are good for days, weeks, months and years, what do we use to measure smaller units of time?
- I heard there is bad luck on the 13th, especially Friday 13th. What months have a Friday the 13th this year?
- What is something you do in summer that you do not do in any other season?
- I know two people who have a birthday in the month before you and two who have a birthday in the month after yours. Who might they be?
- What is something we do that takes about a month?
- Investigate does everyone have the same season at the same time? Does everyone have seasons?

1.4 Year 3: Fractions – Sharing it out

Learning goal: Students will:

- represent fractions using linear materials and recognise key equivalent fractions
- share collections equally to solve simple problems (halves, quarters and eighths).

Big ideas: Part-whole; whole-part; multiples.

Resources: Rope (20m long); fraction flags on sticks; fraction flashcards; equal strips of coloured paper; fraction walls.

Reality

Prior experience Check students' vocabulary of fractional parts and their experience in finding halves, fourths and eighths of shapes and objects.

Local knowledge Cutting oranges into halves, quarters, eighths for sports' days.

Kinaesthetic Lay the rope out marking the starting point (always zero) and the whole (1 rope):

- Walk the whole length of the rope.
- Predict where ½ the rope would be. Lay marker at estimate.
- Check accuracy of estimation by taking the end of the rope back to the start. Hammer in the marker.
- Divide the rope into ½, walk the distance.
- Repeat for ¼ and ⅛, walk each distance.
- At each division, place a marker showing ½, ¼, ⅛.

Abstraction

Body Game: Relay Race to Rope Fractions (flags left beside rope):

- Four equal teams with students behind their leaders at the starting line.
- Teacher shows a random fraction card.
- First student runs to that fraction and back; taps the next student's hand and goes to the end.
- Another random fraction card is shown. Repeat process. First team with all its members back is the winner.

Hand Using equal paper strips of different colours, students glue a whole strip onto a blank sheet of paper and write the name/numeral beside it (1 whole, 1/1).

Fold another strip (different colour) into halves, draw a black line over the fold and paste it under the whole and write 2 halves = one whole beside it.

Repeat for quarters and eighths.

Mind Close your eyes and in your mind see a whole cake, see ½, ¼, ⅛ (called randomly). Students suggest other items to be cut into fractions, e.g. pizza.

With your eyes closed, draw half a circle etc. in the air. Draw half/quarter/eighth of a circle on your partner's back.

Creativity Students draw/tell stories of fraction objects they have seen. Students divide bodies into ½, ¼, ⅛

Mathematics

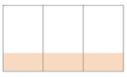
Language Fraction, partition, equal, not equal, parts, half, halves, halving, quarter, quarters, fourths, eights, whole, same, shape, object, benchmark, compare, share, solve, equivalent.

Practice Record drawings of the rope activity, naming each part.

- Using fraction walls, find and trace the vertical lines that show equivalent fractions.

- Shade various area models to show half, quarters, eighths. Compare the size of fractions – bigger/smaller than, equal to.
- Partition pizzas, chocolate bars into halves/quarters/eighths. Use colour codes for distribution of various fractions to given people. Note that one half given to Sam is the same as the other half given to Jan. Draw the half slice beside each person.
- Virtual area/linear activities to represent, compare and share halves, quarters and eighths: www.apples4theteacher.com/math.html; www.ixl.com/math/

Connections

Explore non-examples of unit fractions to develop an understanding of the fractional relationship between parts and the whole (visually distracting elements) as a basis for multiplication of fractions: Share one quarter of this shape  as 

Compare $^{2}/_{4}$ and $^{4}/_{8}$ to the whole.

Explore relation to division, process and symbol.

Reflection

Application/ Validation

Get students to explore fractions in everyday life – make a poster.

Generalisation

What would we call fractions that are broken into 6, 9, 11 bits?

What happens when you break the whole into more pieces? The bottom number tells us how many parts the whole has been cut into. When the whole is divided into fractions, each part is of equal size.

Application

Provide applications and problems for students to apply to different real-world contexts independently, e.g. sharing a chocolate block.

Extension

Provide further opportunities for students to reinforce the halving strategy using real-life objects or concrete materials. Use the Thinkboard for students to solve real-life problems.

- Reversal: Here is a half/quarter/eighth, make the whole.
- Are all wholes the same? (2 differently sized apples, 2 differently sized ropes, different family groups).
- Are all halves the same? (Yes, if they're part of the same whole; No, if the half came from different wholes).
- What would we call fractions that are broken into Fred bits? (Fred**ths**).

1.5 Year 3: Measurement Time – Clocks

Learning goal: Students will:

- tell time to 5-minute intervals
- represent 5-minute interval on the analogue clock.

Big ideas: Time: Point of time (and sequence of time and duration of time).

Resources: Whiteboards; pens; paddlepop sticks; music/alarm.

Reality

Prior experience Students discuss small and large amounts of time.

- What do you use to keep track of time? What different units of time do you use?
- What do you do at different times?
- How can you measure time? Students describe the different units of time we use.

Kinaesthetic Do time-guessing activity:

- How many claps to walk across the space? (Informal measure – non-standard units)
- Estimate how long a minute is (comparative measure).

Discuss the mechanics of an analogue clock.

Abstraction

Body Outside or in the hall or some big space:

- Students make a human clock, write numbers on their whiteboard, two students are hands.
- Have them decide and construct what is needed. Numbers 1–12. "Where will we put these?"
- "Are you happy with their placement?" Continue until students are satisfied. "How will I tell the time?" Build hands from elastics with a student as centre spot, one each for end of elastic hand. Or just use body. Have students tell significant times to the hands to make. For example, lunch time, bed time, home time etc. Go forwards 1 hour, go backwards one hour, etc.
- Others tell time stories for the clocks to represent.
- Have students walk around clock counting in 5-minute intervals.

Go both ways – language → clock and clock → language (e.g. clock makes times for rest to read).

Hand Use materials:

- Teacher gives time to make with 5-minute intervals.
- Construct minute intervals with paddlepop sticks.
- Students make times with 5-minute intervals for teacher/others to read.
- Students construct peek-a-boo clocks using paper plates and hair pins.
- Students manipulate clock dials with reversing games.
- Students draw own clocks and label times on whiteboards to the 5 minutes.

Mind Students shut eyes and move fingers to show time and time changes while teacher watches.

Mathematics

Practice Practise time-telling to 5 minutes. Students record some significant 5-minute times. They read and give instructions for 5-minute times in hours and minutes. They can work as partners with their peek-a-boo clocks and make times each then tell the difference between their two times.

Reflection

Validation

Students look at time in their world, for example:

- What is something we can do that takes exactly 5 minutes?
- Draw a clock and show what time is 5 minutes after you go to bed.
- What is something you do that takes about an hour?
- What different ways can you find minutes represented on clock faces?

Extension

Look at 1-minute intervals:

- How many minutes in one hour? How many minutes in two hours?

Problem: What would a clock look like if we had 20 hours a day and 100 minutes per hour (e.g. different lengths for hours and minutes, different clock face?)

1.6 Year 4: Fractions – Walking the rope

Learning goal: Students will:

- develop an understanding of the proportion and relationships between fractions in the third, sixth and ninth family
- represent fractions using linear models and symbols
- form a generalisation about fractions equivalent to one whole.

Big ideas: Part-whole; whole-part; multiples.

Resources: Rope (20m long); fraction flags on sticks; fraction flashcards; equal strips of coloured paper; fraction walls.

Reality

Prior experience Check students' knowledge of terms – numerator, denominator, vinculum, symbol for fractions and their experience in finding halves and quarters of shapes and objects.

Local knowledge Cutting blocks of chocolates, cakes, pizzas into parts to give each person an equal share.

Kinaesthetic Lay the rope out marking the starting point (always zero) and the whole (1 rope):

- Walk the whole length of the rope.
- Predict where ½ the rope would be. Lay marker at estimate.
- Check accuracy of estimation by taking the end of the rope back to the start. Hammer in the marker.
- Divide the rope into ½, walk the distance.
- Repeat for ⅓, ⅕, $^1/_6$, $^1/_9$, walk each distance.
- At each division, place a marker showing ½, ¼, ⅛.

Abstraction

Body Game: Bean Bag Toss (flags left beside rope) ½, ⅓, ⅕, $^1/_6$, $^1/_9$.

- Four equal teams with students behind their leaders at the starting line.
- Teacher shows a random fraction card.
- First student in each team attempts to toss their bean bag to the nominated fraction. Team whose student has the closest toss is awarded a point.
- Another random fraction card is shown. Repeat process. Team with the most points is the winner.

Hand Using coloured paper strips of equal size, students glue a whole strip onto a landscape A4 blank sheet of paper and write the name/numeral beside it.

- Partition another strip into thirds, i.e. fold the paper into a circle and a half so that there are three equal parts, crease, cut out one third of the strip and paste under the whole. Write fraction and name.
- Halve the third to make one sixth, cut and paste under the third. Write fraction and name.
- Partition into ninths by folding it into four and a half circles, crease, cut and paste under the sixth circle. Write fraction and name.

Mind Close your eyes and in your mind see a whole cake, see thirds, sixths and ninths (called randomly).

Creativity Students divide bodies into thirds, sixths, ninths. Design a poster that has thirds, sixths, ninths featured.

Reversing Worksheet with line segments on paper showing thirds, sixths, ninths. Make the whole.

Mathematics

Language Partition, halve, half, third, sixth, ninth, unit fraction, numerator, denominator, vinculum, equivalent fraction, one whole.

Practice

Record drawings of the rope activity, naming each part.

- Using fraction walls, find and trace the vertical lines that show equivalent fractions.
- Students represent, shade and name thirds, sixths, ninths and their multiples on various linear models using symbols and words.
- Use the fraction mat to identify equivalent fractions and record these in symbols, e.g. $^3/_3 = 1$.

Connections

Explore relation to division, process and symbol.

Reflection

Application

Provide applications and problems for students to apply to different contexts independently e.g. partition a broad range of materials and diagrams, investigating how to create successively smaller fractions with larger denominators through repetitive halving/thirding.

Extension

Equivalent fractions are made by multiplying the fraction by 1 in its relevant form, e.g. $^1/_3 \times {}^2/_2 = {}^2/_6$. Use the Thinkboard for students to solve real-life problems. What do we call fractions that are broken into Fred bits? (Fred**ths**).

Generalisation

When the whole is partitioned into more pieces, the pieces get smaller, e.g. sixths are smaller than thirds and ninths are smaller again. The more pieces we cut the whole into, the less we have in each piece.

The same number of pieces in the numerator as there are in the denominator are needed to make a whole. One whole can be represented in an infinite number of ways, e.g. $1 = {}^2/_2, {}^3/_3, {}^4/_4, {}^5/_5, {}^6/_6$ ...

1.7 Year 5: Comparing and Ordering Fractions

Learning goal: Students will learn to represent unit fractions in many different forms:

- ACMNA 102 (Compare and order common unit fractions and locate and represent them on a number line.)
- ACMNA103 (Investigate strategies to solve problems with addition and subtraction of fractions with the same denominator.)

Big ideas: Part-whole; whole-part.

Resources: Maths Mat and elastics, tape and cards, squared paper, other fraction representations.

Reality

Prior experience Brainstorm where students hear about and see fractions (incidental fraction representations).

Local knowledge Discuss pizza, chocolate, sharing of food, floor tiles, sports grounds/courts.

Kinaesthetic Do a fraction search in the classroom, in the school grounds.

Abstraction

Body Maths Mat with elastics to represent unit fractions. Look at several different ones outlined. Label them with word cards, compare the number of squares. Use labels on the number line to indicate their position.

Hand Squared paper to record different common fractions as a mathematical model of the mat.

Mind Practise imagining with different-sized grids, e.g. 12 squares – what fractions could we make?

Creativity Choose any 2D shape and describe a unit fraction of it ... one half or one third, etc.

Mathematics

Language/symbols Use the Thinkboard to represent a specific fraction in many ways including symbolic.

Practice Draw, or record with materials, fractions in area, set or length models.

Range of materials:

- Measurement Mat
- Geoboards
- Pattern blocks
- Number line
- Pegs on a rope
- Fraction circles, rectangles, straws
- Cuisenaire
- Thinkboard
- Squared paper

Connections Connect to spatial, length (1 dimension), area (2D), volume (3D), decimals, percentage, ratio if they come up incidentally.

Reflection

Application Everyday use of fractions, e.g. strip of material, box of chocolates, container of liquid like a tin of paint.

Extension Problem solving using fractions which are not unitary. What if the shape or object was not regular? e.g. a triangle, a cylinder, a class of students, a DVD?

Generalisation What has been learned with the different materials? Part of a whole, number of parts, number of parts considered.

1.8 Year 6: Equivalence and fraction addition-subtraction

Learning goal: Kinaesthetic understanding of addition and subtraction of fractions using equivalence.

Big ideas: Add like things (denominator describes the fraction, equivalence leads to like thing). Equivalence is multiplying by 1 (= $^2/_2 = {}^3/_3 = {}^4/_4$ = and so on).

Resources: Students themselves, fraction sticks (see end of lesson plan), pen-paper for recording.

Reality

Prerequisites

Understanding of fractions (part of a whole, part of a set, and division), some experience with equivalence (it is possible for two different fractions to have the same value) with area and set model, some experience with addition and subtraction (same denominator).

Understand addition and subtraction require like things (3 apples + 2 pears? Is this 5 pears?).

Local knowledge

Is it possible to share when you have more parts than the number of people sharing? What situations lead to fair sharing (e.g. pizza of 8 pieces is OK for sharing amongst 2 but what about 3?). What situations are OK – what are difficult?

Kinaesthetic

For example, form a pizza with 8 people in a circle. Share the pizza amongst 2 people, 4 people, 3 people? What is easy? what is difficult?

What if we had a pizza cut in half. Get students in pairs to act out the pizza. How could we divide among 4 people? How could we show this? What about 3 people?

Get 8 people to act like a pizza – $^3/_8$ is eaten leaving $^5/_8$ and then $^2/_8$ is eaten – how much is eaten? ($^3/_8 + {}^2/_8 = {}^5/_8$); how much is left? ($^5/_8 - {}^2/_8 = {}^3/_8$).

Abstraction

Body

Act out wholes with different numbers of students and act out various fractions.

- Two students – act out $^1/_2$, $^2/_4$, $^3/_6$, $^4/_8$, $^5/_{10}$ and $^{10}/_{20}$ – write a list of fractions the same as $^1/_2$. Try to show $^1/_3$.
- Four students – act out $^3/_4$, $^6/_8$, $^{12}/_{16}$, $^{30}/_{40}$ and so on – write a list of fractions equivalent to $^3/_4$. What about $^2/_5$? $^2/_3$?
- Three students – act out $^2/_3$, $^4/_6$, $^6/_9$, $^{10}/_{15}$? Write a list of fractions equivalent to $^2/_3$. What about $^1/_2$? $^2/_5$?

Act out adding two fractions – focus on the two representations being the same fraction name – do the three types of fraction below (same denominator, different denominator but related by equivalence and only one fraction need be changed, different denominator):

- $^1/_5 + {}^2/_5$: put the fifths together and get $^3/_5$
- $^1/_4 + {}^1/_2$: $^1/_2$ can become $^2/_4$ and so have one quarter + 2 quarters = 3 quarters
- $^1/_2 + {}^1/_3$: $^1/_2$ can become $^3/_6$ and $^1/_3$ can become $^2/_6$, so answer is $^5/_6$

Do the same for subtraction. Show that $^2/_3$ can become $^8/_{12}$ if each of the 2 is a 4 and each of the three in the whole is a 4; that is, 2 standing out of 3 and 1 sitting ($^2/_3$) becomes 2 standing with 4 fingers each in the air and 1 sitting with four fingers in the air ($^8/_{12}$).

Hand

Use the **fraction sticks** to represent fractions as in the example at the end of this lesson plan:

- Make fraction such as $^2/_3$ – realise that the sticks make a list of fractions equivalent to $^2/_3$. Look at list and find pattern for fractions equivalent to $^2/_3$.
- Ensure students see that pattern is more than top goes up by 2 and bottom goes up by 3. Put the pattern in terms of multiplying by 1: $^2/_3 \times 1 = {}^2/_3$, $^2/_3 \times {}^2/_2 = {}^4/_6$, $^2/_3 \times {}^3/_3 = {}^6/_9$, and so on.
- Discuss the rule for equivalent fractions – both fractions are equivalent to a starting fraction by ×1. Reverse this relationship to cancel down the fractions – if cancel down to the same thing, means fractions are equivalent.

Use sticks as at the end of this lesson plan to use equivalence to add and subtract fractions. Note that the equivalent fractions have denominator that is a multiple of both denominators.

Mind Act out the process above in the mind.

Mathematics

Language/Symbol Introduce language and symbols for equations.

Practice Use sticks to do additions and subtractions. Try to learn process so can do it without sticks.

Connections Relate process to multiplication and division.

Reflection

Application/ Validation See if there are many uses for adding fractions in the world of students.

Extension Ensure reverse and be flexible.

Try to generalise the process – what would you do if I gave you any two fractions? How would you find equivalent denominator? How would the numerators change?

See if any students could work out the process for $\frac{a}{b} + \frac{c}{d} = \frac{(ad+bc)}{bd}$

Fraction sticks

The fraction sticks are an interesting material. A set is like below:

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

A fraction is made by putting two rows together, for example, $^{2}/_{5}$:

2	4	6	8	10	12	14	16	18	20
5	10	15	20	25	30	35	40	45	50

This can be used to show the pattern for equivalent fractions. Two of these can be used to compare, add or subtract fractions (e.g. $^{3}/_{7}$ and $^{2}/_{5}$) by aligning the "common denominator":

3	6	9	12	15	18	21	24	27	30
7	14	21	28	**35**	42	49	56	63	70

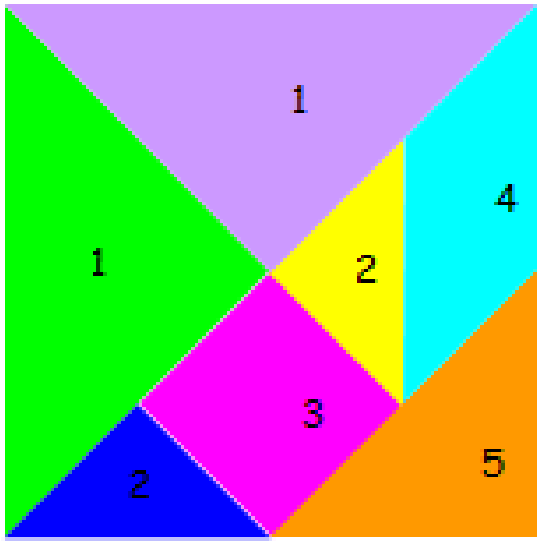
2	4	6	8	10	12	14	16	18	20
5	10	15	20	25	30	**35**	40	45	50

2.1 Terrific Tangrams

Terrific Tangrams

Use tangram pieces to make one of the pictures.

TANGRAMS

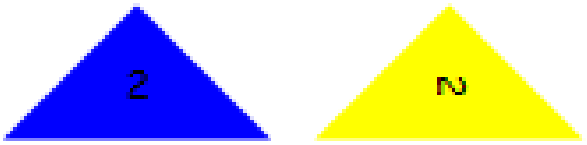


CUT OUT
THE PIECES!

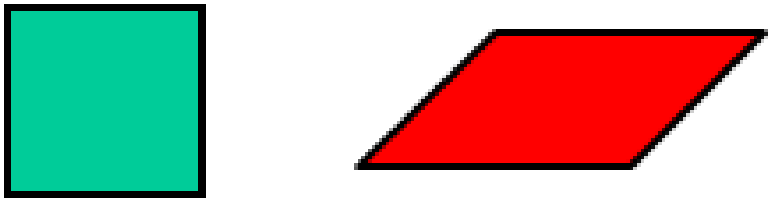
Triangles here

Quadrilaterals here

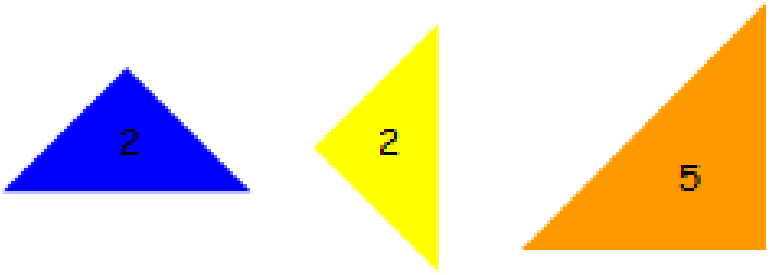
USE THE TWO SMALLTRIANGLES...



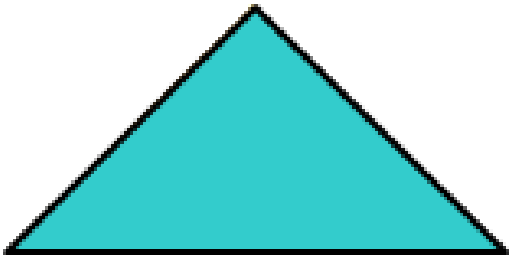
..TO MAKE THE SQUARE AND THE PARALLELOGRAM



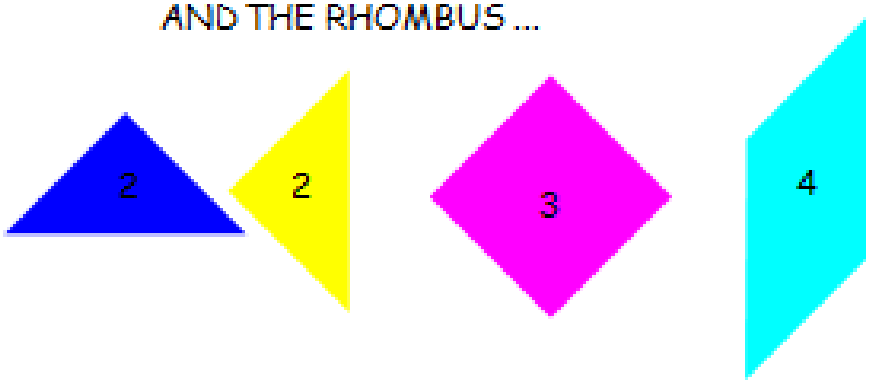
USE THESE THREE TRIANGLES...



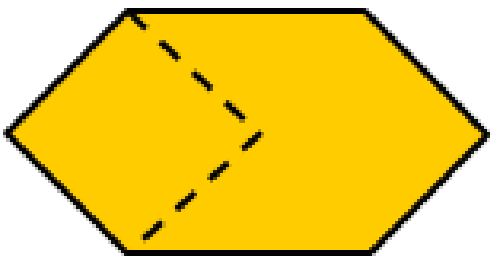
.. TO MAKE A LARGE TRIANGLE!



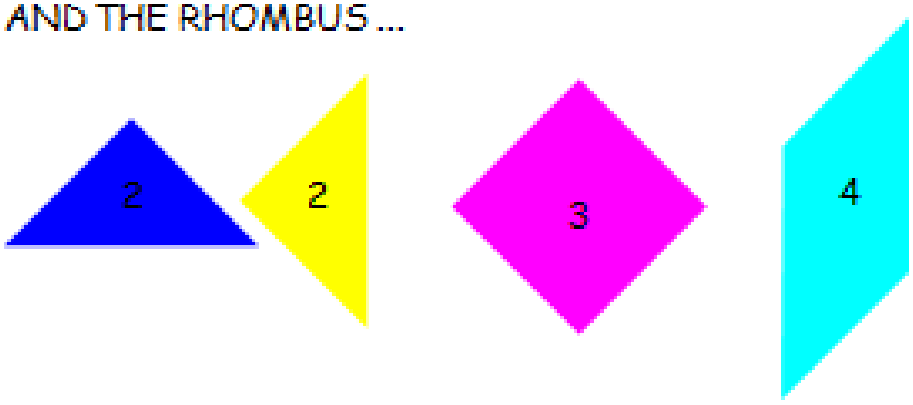
USE THE TWO SMALL TRIANGLES, THE SQUARE AND THE RHOMBUS ...



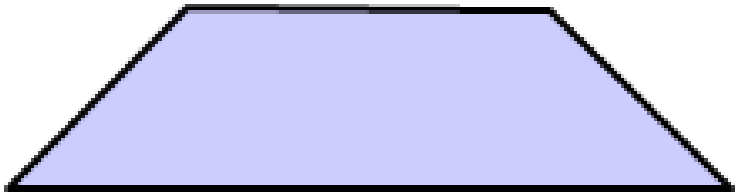
.. TO MAKE THIS HEXAGON!



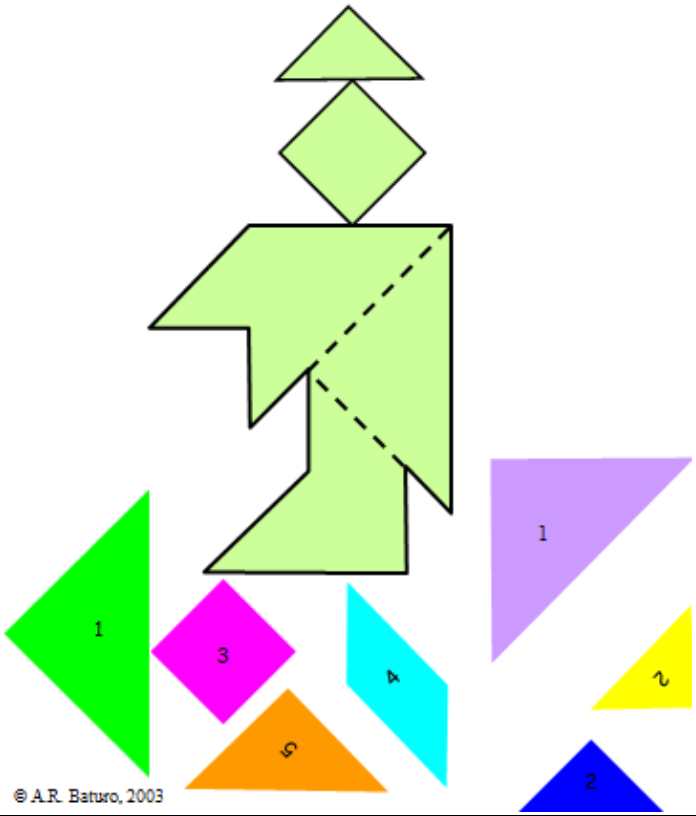
USE THE TWO SMALL TRIANGLES, THE SQUARE AND THE RHOMBUS ...



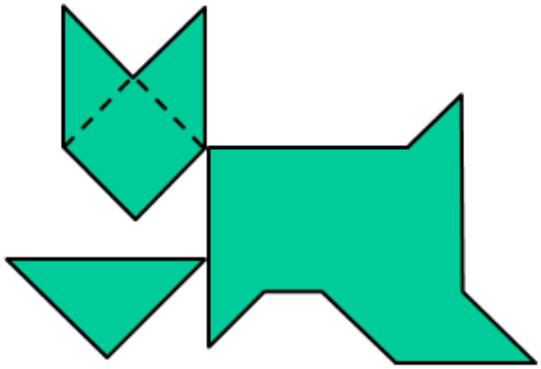
.. TO MAKE A TRAPEZIUM!

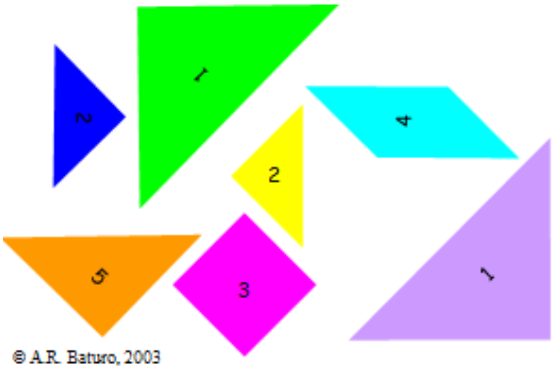


USE ALL THE TANGRAM PIECES TO MAKE THIS LITTLE MAN!

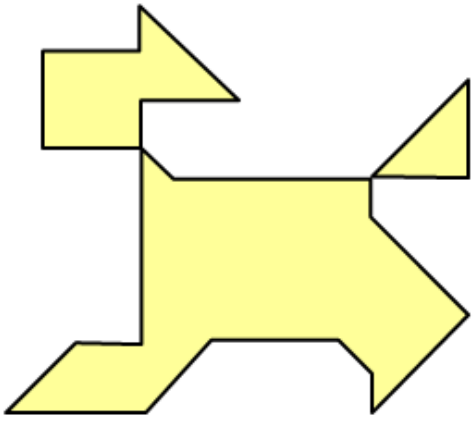


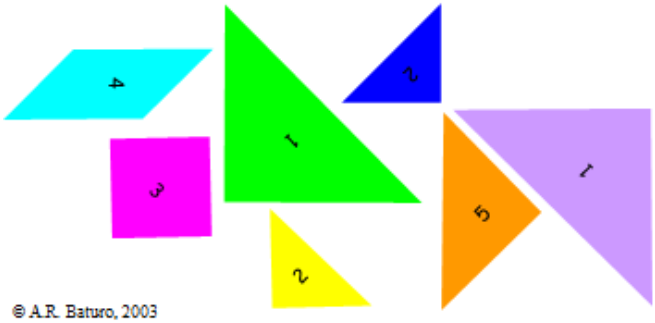
USE ALL THE TANGRAM PIECES TO MAKE
THE CAT!



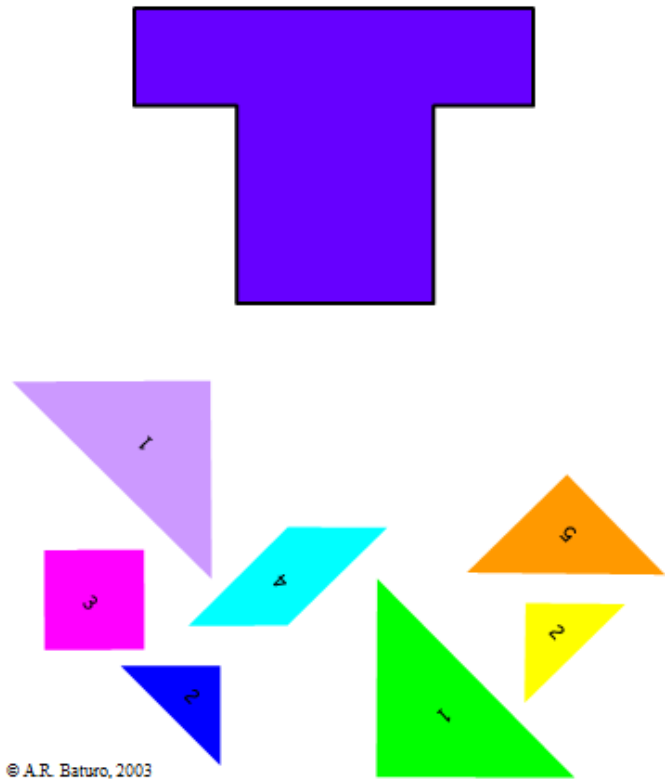


USE ALL THE TANGRAM PIECES TO MAKE
THE DOG!

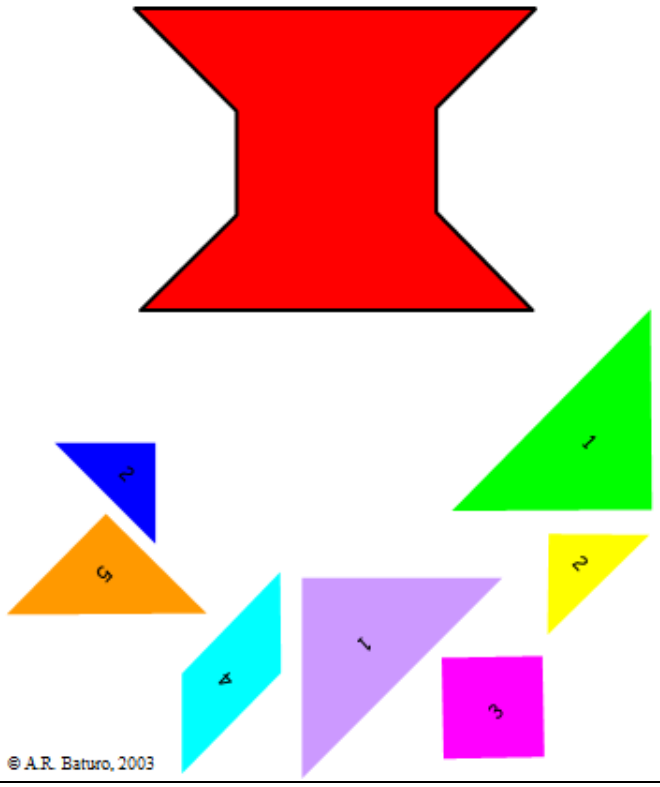




USE ALL THE TANGRAM PIECES TO MAKE A T!



USE ALL THE TANGRAM PIECES TO MAKE AN I!



Card Calculations

Measure the items with playing cards.

Write how many cards long they are in the space on your passport.

Graphing Greatness

1. Put a cross next to school house you are in on your passport.
2. Cut out the coloured square that matches your school house colour.
3. Find the column on your class's graph that is your school house.
4. Glue the square in the column.

Name of class:

Number of children in house					
	8				
	7				
	6				
	5				
	4				
	3				
	2				
	1				
		Anzac	Discovery	Halpine	Kinsellas
		House names			

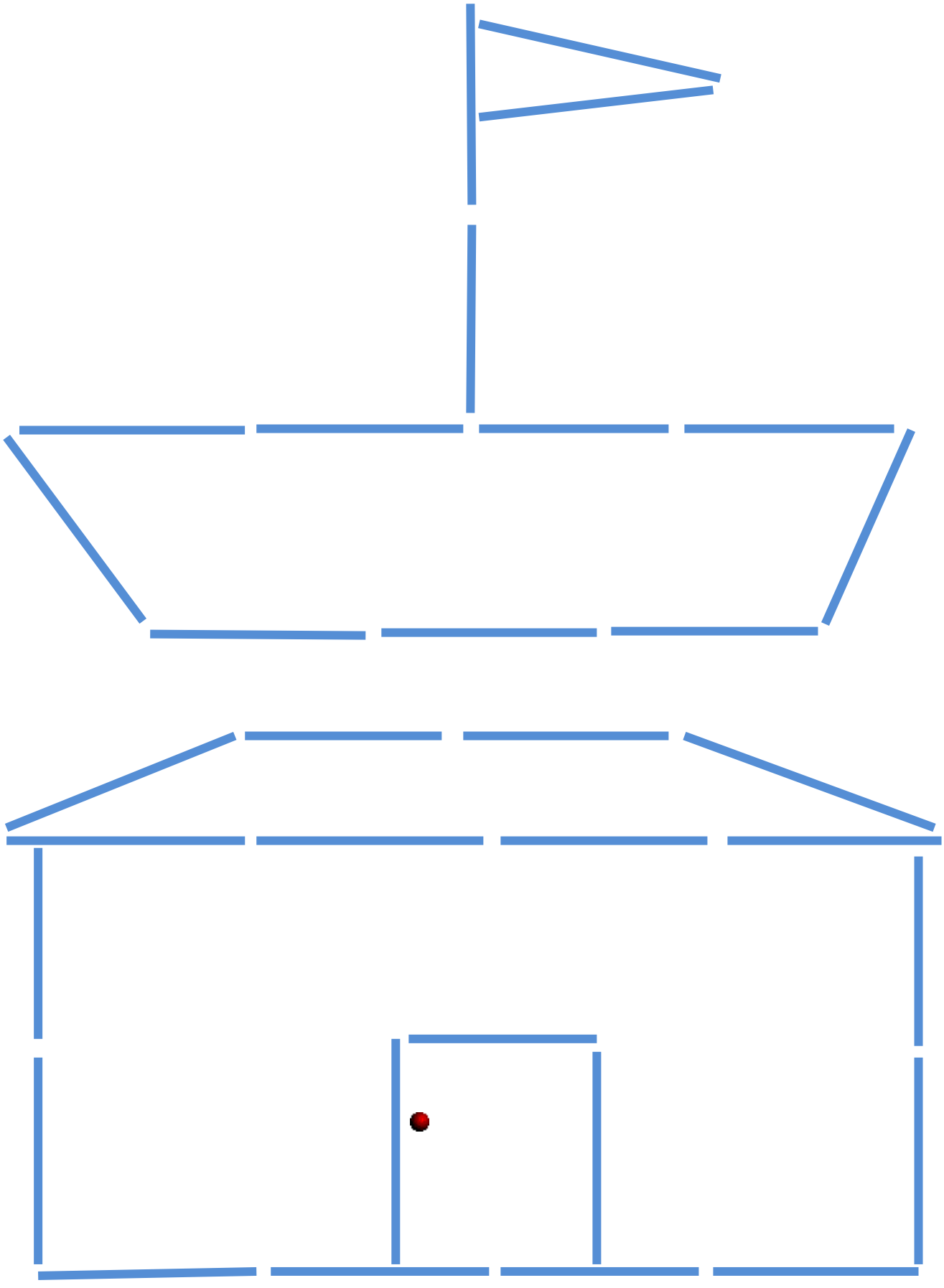
House colours

Anzac	Anzac
Discovery	Discovery
Halpine	Halpine
Kinsellas	Kinsellas

Matchstick Magic

Level 1 – Make a boat or house with matchsticks like the one on the sheet.

Level 2 – Make your own picture with matchsticks and draw it on your passport.



Measurement Mania

Level 1 – Measure how long a friend is with paddlepop sticks.
Write how many sticks they are on their passport.

Level 2 – Measure how long a friend is with pegs.
Then let them measure you.
Write how many pegs long you are on your passport.

Pasta Party – Level 1 Pasta Patterns

1. Make a repeating pattern with the pasta.
2. Ask a friend to continue it.
3. Draw the repeating part of the pattern on your passport.

Pasta Party – Level 2
Pasta Pick

1. Put a small handful of pasta on a plate.
2. Read the Pasta Value Chart and calculate the value of the pasta on the plate.
3. Write the answer on your passport.

Pasta Value Chart

10	5	1

Mass Magic

Level 1

Heft 3 different veggies.
Put them in order heaviest to lightest.

Mass Magic
Level 2

1. How many onions weigh about the same as the cabbage?
2. How many apples weigh about the same as the sweet potato?
3. Find two fruit or vegetables that are the same weight.

Sensational Tessellations

Level 1 – Sort the shapes that go together

Level 2 – Use the shapes to make patterns that fit together.

Busy Blocks

Level 1 – Create a model from the cubes.

Level 2 – Try to make a model that is the same as one that a friend has made.

Calendar Capers

1. Put the days of the week in order starting with Sunday.
2. Put the months of the year in order.
3. Look at a 2014 calendar. What day of the week does your birthday fall on this year? Write it on your passport.

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Sunday

January

February

March

April

May

June

July

August

September

October

November

December

Super Symmetry

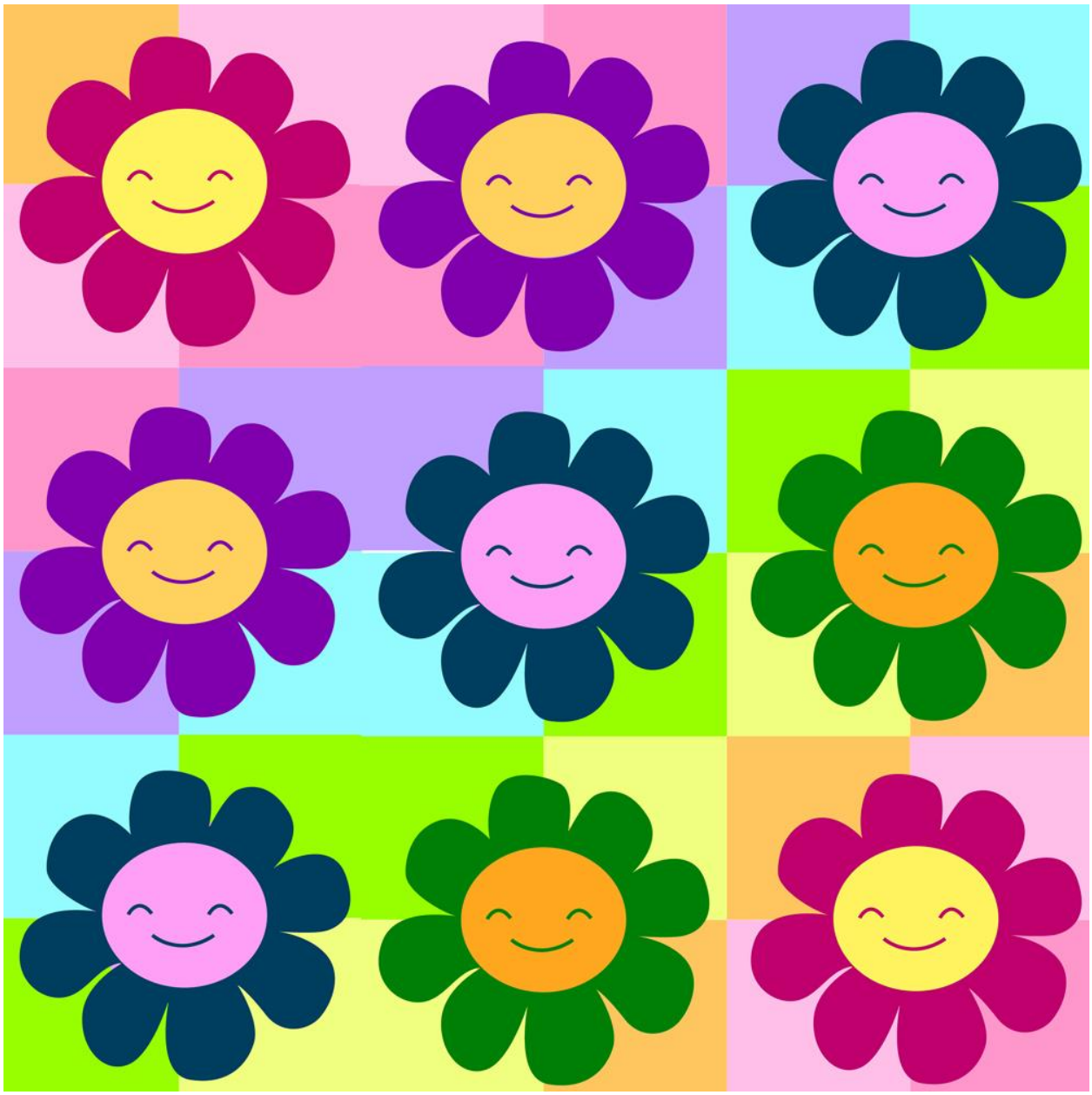
Level 1 – Match the pictures with their other halves.

Level 2 – Draw the other half of the shapes.

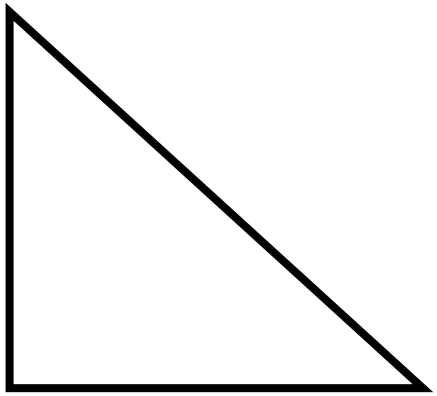
Level 3 – Draw half an object or animal in the space on your passport and ask a friend to draw the other half.

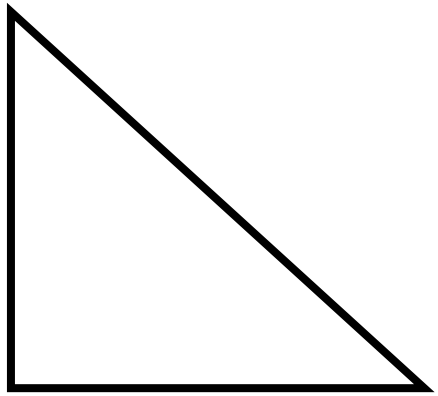
Super Symmetry level 1: Match the pictures with their other halves

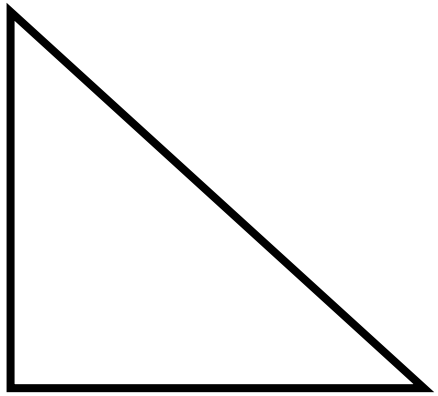
[cut flowers out and then cut each flower in half]

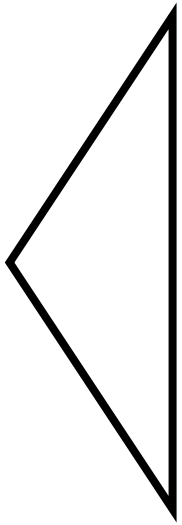


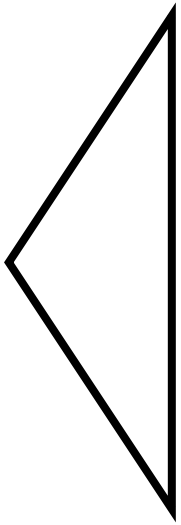
Super Symmetry level 2: Draw the other half of the shapes

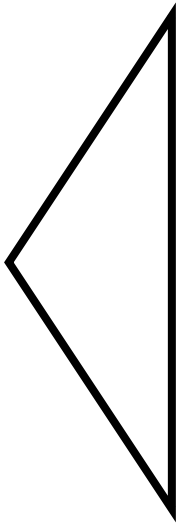


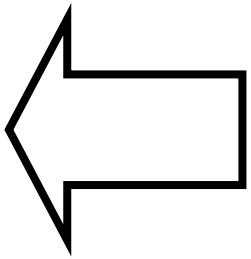


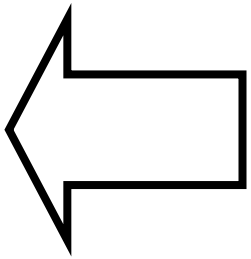


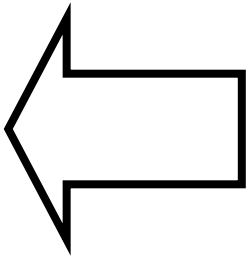












Mathaerobics

(Record the numbers on your passport)

Level 1 – How many times can you jump up and down in one minute?

Level 2 – How many times can you do 'heads, shoulders, knees and toes' in one minute?

Level 3 – How many push-ups can you do in one minute?

3.1 Simple Symmetry

Simple Symmetry

Draw the other half of the monkey's face.

Draw half of a different face on your passport

Ask a friend to draw the matching half.

Symmetry – monkey faces

3.2 Terrific Tangrams

(Use tangram resource pages from 2.1)

Terrific Tangrams

Use one set of tangrams to make the pictures.

Winning Ways

Play *Slither* with a partner.

Write down a winning strategy on your passport.

Winning Ways

SLITHER

Number of players: 2

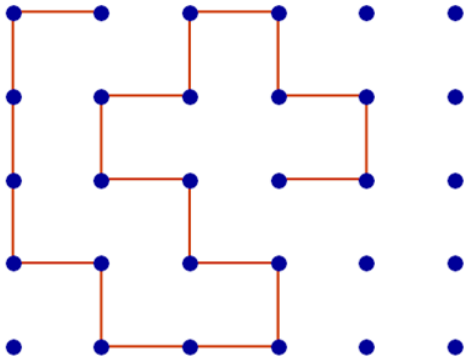
Materials: Textas, dotted paper

Object of game:

- To force your opponent to close the path.

Rules:

- Players take turns to draw a line joining pairs of dots either horizontally or vertically.
- The line must be drawn on either end of the line already formed.
- No dot may have more than two lines going to it.



Super Soma

A set of Soma cubes has 7 pieces.

Use one Soma set to make some of the models that are on the sheet provided with the Soma cubes.

Tuckshop Totals

Look at the menus.

You have $10 to spend.

What can you order for morning tea and lunch?

Tuckshop menus


Tropical punch
or
Orange juice
$0.50
a cup
Ham
and
cheese
sandwich
$3.60
Hummus
and carrot
sticks
$1.50
Pita bread
with cream
cheese
and
carrot
$3.80
Cheese
and rice
crackers
$1.70
Mini vege
quiche
$1.35
Baked
Macaroni
Mini
healthy pizza
$2.20
Baked macaroni or
Mini cheese and
vegemite muffin
$2.50
each

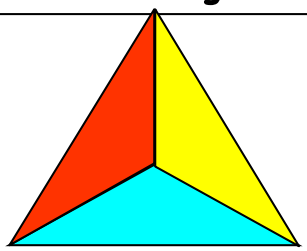
McMahon's Triangles

Using the single triangles provided, see if you can make 24 × 3-colour triangles that are all coloured differently.

The first one is done for you.

McMahon's 4-COLOUR triangles – Wksheet 1

This triangle …

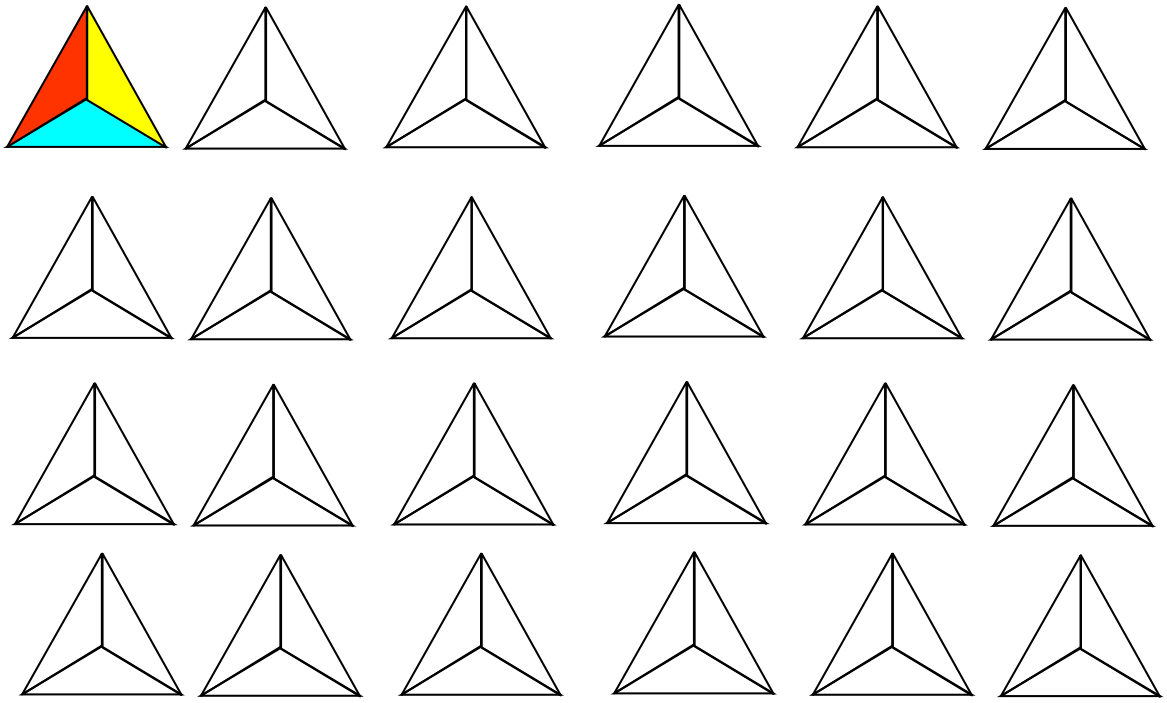


… was made from 3 of these coloured triangles.

Make another 23 triangles that are all coloured differently.

However, if you can rotate one of the triangles so that it is the same as another triangle, then it is NOT a different triangle.

GOOD LUCK!



Vege Values

1. Write down the name of a vegetable on the sheet.
2. Estimate its mass and write it on the sheet.
3. Weigh the vegetable and see how accurate your estimation was. Write the weight on the sheet.

Vege Values worksheet

VEGETABLE	ESTIMATE	MASS

Sensational Tessellations

(Tessellations are patterns made with shapes that go together without gaps or overlaps.)

Create a tessellation with 2 shapes.

See if you can make one with 3 shapes.

Challenge: Try to make one with 5 shapes.

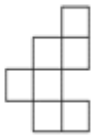
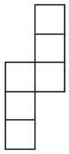
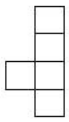
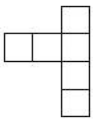
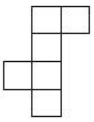
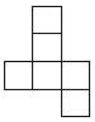
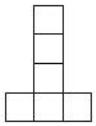
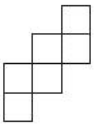
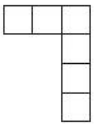
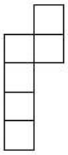
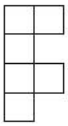
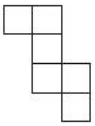
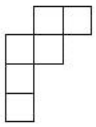
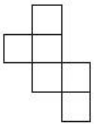
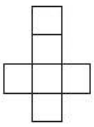
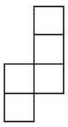
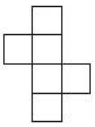
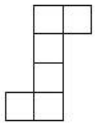
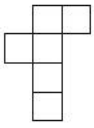
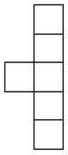
Clever Cubes

There are 24 nets on the card.
11 of them make a cube.

In the boxes on your passport, write the numbers of the nets that make a cube.

Clever Cubes

Which of the nets below can be folded into a cube? If in doubt, use the plastic square polydrons to make the nets and then clip together to construct a cube. Keep a record of the numbers that make a cube. We've ticked one for you.

1. 	2. 	3. 	4. 	5. 	6. 
7. 	8. 	9. 	10. 	11. 	12. 
13. 	14. 	15. 	16.  	17. 	18. 
19. 	20. 	21. 	22. 	23. 	24. 

Calendar Capers

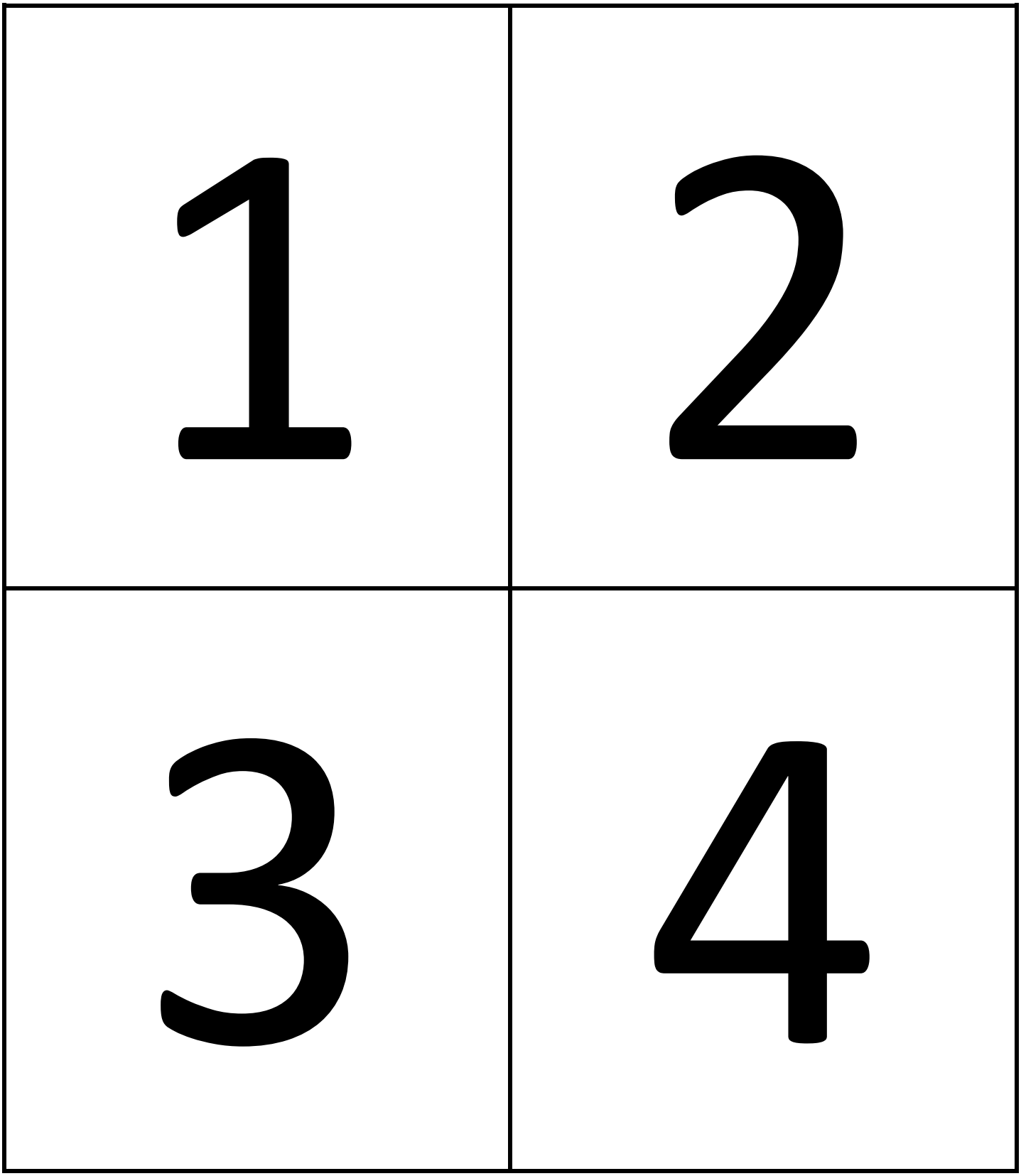
Make the Maths Mat into a calendar.

1. Put the days of the week in order at the top.
2. Place all the numbers in order starting with 1 on Wednesday.
3. Answer the questions that are on your passport.

Calendar Capers questions

1. What day of the week does the 13th fall on?
2. What are the dates for the Mondays?
3. What is the date 2 weeks after the 3rd?
4. Look at a 2014 calendar. Find out what day of the week your birthday falls on this year.

Calendar numbers 1–31



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	

Pasta Pick

1. Put a small handful of pasta on a plate.
2. Read the Pasta Value Chart and calculate the value of the pasta on the plate.
3. Write the answer on your passport.

Pasta Value Chart

100	50	10

3.12 Mathaerobics

Mathaerobics

How many push-ups can you do in one minute?

4 Appendices

4.1 Activities and resources: Years P–3

	Activity description	Resources
1	***Terrific Tangrams*** Use tangram pieces to make one of the pictures.	Tangrams, matching pictures, animal pictures.
2	***Card Calculations*** Measure the items with playing cards. Write how long they are in the space on your passport.	Playing cards, softball bat, cricket bat, didgeridoo.
3	***Graphing Greatness*** On your passport, put a cross in the box next to which school house you are in. Cut out a coloured square that matches your school house colour. Find the column on your class's graph that is your school house. Glue the square in the column.	Large bar graph with name of school house colour written on the bottom axis, sheet indicating house colours, 3cm grid paper printed in house colours, cut into strips.
4	***Matchstick Magic*** Level 1 – Make a boat or house like the one on the sheet with matchsticks. Level 2 – Make your own picture with matchsticks and draw it on your passport.	Matchsticks, pictures to copy.
5	***Measurement Mania*** Level 1 – Measure how long a friend is with paddlepop sticks. Write how many sticks long they are on their passport. Level 2 – Measure how long a friend is with pegs. Then let them measure you. Write your length in pegs on your passport.	Pegs, paddlepop sticks.
6	***Pasta Party*** Level 1 – Pasta Patterns – Make a pattern with the pasta. Ask a friend to continue it. Draw the pattern on your passport. Level 2 – Pasta Pick – Put a small handful of pasta on a plate. Read the Pasta Value Chart and calculate the value of the pasta on the plate. Write the answer on your passport.	Level 1 – Pasta shapes for patterns. Level 2 – Paper plates, 3 different kinds of pasta, 3-column chart with a different piece of pasta glued at top of each column, e.g. shell = 1, penne = 5, spiral = 10.
7	***Mass Magic*** Level 1 – Heft 3 different fruit and vegies and put them in order heaviest to lightest. Level 2 – How many onions weigh about the same as the cabbage? How many apples weigh about the same as the sweet potato? Find 2 fruit or vegetables that weigh the same.	Level 1 – Pumpkin, cabbage, capsicum. Level 2 – Balance scales, onions, apples, carrots, sweet potato, potatoes.
8	***Sensational Tessellations*** Level 1 – Sort the shapes that go together. Level 2 – Use the shapes to make patterns that fit together.	Pattern blocks.
9	***Busy Blocks*** Level 1 – Create a building from the cubes. Level 2 – Try to make a model that is the same as one that a friend has made.	Multilink cubes.
10	***Calendar Capers*** Level 1 – Put the days of the week in order starting with Sunday. Level 2 – Put the months of the year in order. Level 3 – Look at a 2014 calendar. On your passport write what day of the week your birthday falls on this year.	Days of the week, months of the year on card, 2014 calendars.
11	***Super Symmetry*** Level 1 – Find the two matching halves of a flower picture. Level 2 – Draw the other half of the shapes. Level 3 – Draw half an object or animal in the space on your passport and ask a friend can draw the other half.	Flower pictures cut in half. A4 sheets with half shapes drawn on them.
12	***Mathaerobics*** Level 1 – How many times can you jump up and down in 1 minute? Level 2 – How many times can you do 'heads, shoulders, knees and toes' in 1 minute? Level 3 – How many push-ups can you do in 1 minute? Record the numbers on your passport.	One-minute egg timers.

4.2 Activities and resources: Years 4–6

	Activity description	Resources
1	***Simple Symmetry*** Draw the other half of the monkey's face. Draw half of a different face and ask a friend to draw the matching half.	Monkey faces.
2	***Terrific Tangrams*** Use a set of tangrams to make the pictures.	Sets of tangrams, copies of tangram pictures.
3	***Winning Ways*** Play Slither with a partner. Write down a winning strategy on your passport.	3cm dotted paper.
4	***Super Soma*** A set of Soma cubes has 7 pieces. Use one Soma set to make some of the models that are on the sheet.	Soma cubes.
5	***Tuckshop Totals*** Look at the menus. What can you order for morning tea and lunch and spend no more than $10?	Tuckshop menus × 3 in plastic sleeves.
6	***McMahon's Triangles*** Using the single triangles provided, see if you can make 24 x 3-colour triangles that are all coloured differently. The first one is done for you.	McMahon's Triangles copied onto 4 different colours of paper; triangles cut out so they are individual triangles; worksheet.
7	***Vege Values*** Write down which vegetable you think matches the weights written on the sheet. Weigh the vegetables and see how accurate your estimation was.	Worksheet with columns for vegetable name, estimated weight, actual weight.
8	***Sensational Tessellations*** Create a tessellation with 2 shapes. See if you can make one with 3 shapes. Challenge: Try to make one with 5 shapes	Boxes of pattern blocks.
9	***Clever Cubes*** There are 24 nets on the card. 11 of them make a cube. Write the numbers of the ones that make a cube on your passport.	Clever Cubes sheet with 24 cube nets; magnetic polydrons, Zaks.
10	***Calendar Capers*** Make the Maths Mat into a calendar. Put the days of the week in order at the top. Place all the numbers in order starting with 1 on Wednesday. Answer the calendar questions that are on your passport.	Maths Mat, cards with numbers 1–31 on them, days of the week, months of the year, 2014 calendars.
11	***Pasta Pick*** Put a small handful of pasta on a plate. Read the Pasta Value Chart and calculate the value of the pasta on the plate.	Paper plates, 3 different kinds of pasta, 3-column chart with a different piece of pasta glued at top of each column, e.g. shell = 100, penne = 50, spiral = 10
12	***Mathaerobics*** How many push-ups can you do in one minute?	One-minute egg timers.

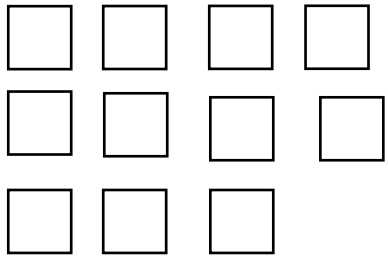
4.3 Student passport: Years P–3

NAME: _____ **CLASS:** _____

Mass Magic Level 1 – Which is the heaviest vegetable? _____ Level 2 – ☐ sweet potato = ☐ s	**Graphing Greatness** Put a X in the box next to which house you are in. Anzac ☐ Discovery ☐ Kinsellas ☐ Halpine ☐	**Card Calculations** Softball bat ☐ Cricket bat ☐ Other items _____ ☐ _____ ☐
Busy Blocks	**Super Symmetry** 	**Terrific Tangrams** Draw or write down the name of a picture that you made.
Matchstick Magic This is my matchstick picture.	**Sensational Tessellations** Can you draw a tessellation made with 2 shapes?	**Calendar Capers** My birthday falls on a _____ this year.
Measurement Mania **Level 1** – I am ☐ paddlepop sticks long. --- **Level 2** – I am ☐ long.	**Mathaerobics** How many can you do in one minute? **Level 1** – jumps ☐ --- **Level 2** – Heads, shoulders, knees & toes ☐ --- **Level 3** – Push ups ☐	**Pasta Party** **Level 1** – This is my pasta pattern. --- **Level 2** – My handful of pasta added up to ☐

4.4 Student passport: Years 4–6

NAME: _____ **CLASS:** _____

Vege Values What vegetable weighed the most? _____ Which one weighed the least? _____	**Winning Ways** What was your winning strategy? _____ _____ _____ _____ _____ _____ _____	**Super Soma** How many pieces are in a Soma cube? ___ How many models did you make? ___
Tuckshop Totals What did you buy? _____ _____ _____ _____ How much did it cost? _____	**Simple Symmetry** 	**Terrific Tangrams**
McMahon's Triangles	**Sensational Tessellations** Draw a tessellation made with 2 shapes.	**Calendar Capers** 1.The 13th falls on a _____ 2.The dates for Mondays are: _____ 3.The date 2 weeks after the 3rd is:_____ My birthday falls on a _____this year.
Clever Cubes Which nets made a cube? Write the numbers in the boxes below. 	**Mathaerobics** How many in one minute? **You** **Friend** **Sit-ups** **Push ups** **Star jumps** **Touch toes**	**Pasta Pick** My first handful of pasta added up to _____ My second handful added up to _____

4.5 Timetable 10 February: Years P–6 Lessons

Morning Session **Session One**

P-3			4-6			
Time	**YDC Tchr 1**	**YDC Tchr 2**	**Time**	**YDC Tchr 3**	**YDC Tchr 4**	**YDC Tchr 5**
8:50– 9:10	Prep A	Year 2 C	8:55 – 9:15	Year 3 E	Year 5 E	Year 6 A
9:15 –9:35	Prep B	Year 2 D	9:20 – 9:40	Year 3 F	Year 5 F	Year 6 F
9:40 –10:00	Prep C	Year 2 E	9:45 – 10:05		Year 5 C	Year 6 H
10:05 –10:25	Prep D	Year 2 A				

Middle Session **Session Two**

P-3			4-6			
Time	**YDC Tchr 1**	**YDC Tchr 2**	**Time**	**YDC Tchr 3**	**YDC Tchr 4**	**YDC Tchr 5**
11:15 – 11:35	Year 1 C	Year 2 B	10:20 –10:40	Year 4 A	Year 5 D	Year 6 B
11:40 – 12:00	Year P1 E	Year 3 A	10:45–11:05	Year 4 B	Year 5 A	Year 6 C
12:05 – 12:25	Year 1 B	Year 3 C	11:10–11:30	Year 4 C	Year 5 B	Year 6 D
12:30 – 12: 55	Year 1/2 F	Year 2/3 G				

Afternoon Session **Session Three**

P-3			4-6			
Time	**YDC Tchr 1 -**	**YDC Tchr 2 -**	**Time**	**YDC Tchr 3**	**YDC Tchr 4**	**YDC Tchr 5**
1:45 – 2:05	Year 1 A	Year 3 B	12:00 –12:20	Year 4 D	Year 5/6	Year 6 E
2:10 – 2:30	Year 1 D	Year 3 D	12:25–12:45	Year 4 E		
			12:50 – 1:10	Year 4 F		

Five teachers will demonstrate a part of the RAMR cycle to these classes. The same lesson will be modelled to the next class in the vertical rotation. The venue: classroom, undercover area or oval, will depend on the lesson content and availability of outside space.

4.6 Timetable 17 February: Years P–6 Hall Activities

Class rotations will be conducted in each of the three sessions. The hall will be divided into four areas with twelve tables so that the activities are available for each session. **YDC staff will be present in each of the areas.**

Timetable

Morning Session **Session One**

P-3			4-6		
Time	**Stage**	**Area One**	**Time**	**Area Two**	**Area Three**
8:50 – 9:40	Year 1: A, B & C	Year 1: P1E,D	8:55 – 10:05	Year 4: A, B, C	Year 6: A & H
9:45 – 10:30	Prep: A, B	Prep: C & D			

Middle Session **Session Two**

P-3			4-6		
Time	**Stage**	**Area One**	**Time**	**Area Two**	**Area Three**
11:15 – 12:10	Year 3: A & B	Year 3: C & D	10:20 – 11:30	Year 4: D, E & F	Year 6: C & D
12:15 – 1:05	Year 2: A & B	Year 3: E & F			

Session Three

4-6		
Time	**Area Two**	**Area Three**
12:05 – 1:10	Year 5: A, D & E	Year 6: E & F

Afternoon Session **Session Four**

P-3			4-6		
Time	**Stage**	**Area One**	**Time**	**Area Two**	**Area Three**
1:45 – 2:35	Year 1-2 F Year 2-3 G	Year 2: D,C,E	1:55 – 2:55	Year 5: B, C & F	Year 5/6 & Year 6: B

Each area will repeat the twelve year-level appropriate activities.

YuMiDeadly

Growing community through education

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