

S i n e

Growth Point Activities

Volume Two



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CONTENTS PAGE

COUNTING

| | |
|-------------------------|------------|
| Index Page | Pg 1 - 2 |
| Growth Point Activities | Pg 3 – 19 |
| Worksheets | Pg 20 – 39 |

PLACE VALUE

| | |
|-------------------------|------------|
| Index Page | Pg 40 – 41 |
| Growth Point Activities | Pg 42 – 56 |
| Worksheets | Pg 57 – 69 |

ADDITION & SUBTRACTION STRATEGIES

| | |
|-------------------------|-------------|
| Index Page | Pg 70 – 71 |
| Growth Point Activities | Pg 72 – 87 |
| Worksheets | Pg 88 – 100 |

MULTIPLICATION & DIVISION STRATEGIES

| | |
|-------------------------|--------------|
| Index Page | Pg 101 – 102 |
| Growth Point Activities | Pg 103 – 117 |
| Worksheets | Pg 118 – 138 |

APPENDICES

| | |
|-------------------|--------|
| Flashcards 1 – 50 | Pg 139 |
|-------------------|--------|

**These activities have been prepared by
Andrea Dineen**

Bibliography

Dice Dilemmas. Paul Swan

Short Flexible Maths Games Peter Sullivan – 6th Annual Mathematics Conference for primary and secondary coordinators and teachers. Mathematics Teaching and Learning Centre, Australian Catholic University, 1998.

Shuffling into Mathematics – with games for Kindergarten to Grade 3, Box Cars and One Eyed Jacks, Canada, 1997.

Count Me In Too Developing Efficient Numeracy Strategies, Stage 1. Department of Education and Training, NSW 1999.

The Constant Operator Teaching Mathematics K-6. Calculators in K-6 Maths, Board of Studies, NSW 1993.

The Mathematics Curriculum and Teaching Program, Activity Bank, Charles Lovitt and Doug Clarke, Curriculum Development Centre, Canberra, 1988.

Six Thinking Hats Edward De Bono



Growth Point Activities – COUNTING

0. Not apparent

- | | |
|------------------------------------|------|
| a. Teddy Bear Match * | pg 3 |
| b. Farm Play * (Worksheet 1 pg 20) | pg 3 |
| c. Dial My Number | pg 3 |
| d. Match Up | pg 4 |
| e. Peg Boxes | pg 4 |
| f. Ten Little Indians | pg 4 |
| g. Sorting Sticks | pg 4 |
| h. Step Up | pg 4 |
| i. Who Lives Here? | pg 5 |

* Denotes activities which are developing one to one correspondence

1. Rote counting

- | | |
|--|------|
| a. Numbers or Nonsense (Worksheet 2 pg 21) | pg 6 |
| b. Number Match | pg 6 |
| c. Birthdates (Worksheet 3 pg 22) | pg 6 |
| d. Counting Frame | pg 6 |
| e. Caterpillar Walk | pg 7 |
| f. Flash | pg 7 |
| g. Stick Up | pg 7 |

2. Counting Collections

- | | |
|---|------|
| a. Snap Cards | pg 8 |
| b. Wool Tie | pg 8 |
| c. Freckleface (Worksheet 4 pg 23) | pg 8 |
| d. Count Your Own Bingo (Worksheet 5 pg 24) | pg 8 |
| e. Dog Wash (Worksheet 6 pg 25) | pg 9 |
| f. Schools of Fish (Worksheet 7 pgs 26-29) | pg 9 |

3. Counting by 1s (forward/backward, including variable starting points;

before/after)

- | | |
|---|-------|
| a. Dot to dots | pg 10 |
| b. Who am I? | pg 10 |
| c. Up and Down Ladder (Worksheet 8 pg 30) | pg 10 |
| d. Marble Count | pg 11 |
| e. Missing Numbers (Worksheet 9 pg 31) | pg 11 |
| f. Footy Finals | pg 11 |

4. Counting from 0 by 2s, 5s and 10s

- a. Ducks Legs pg 13
- b. 5s Walk pg 13
- c. Ice Cream Bundles pg 13
- d. Caterpillar Crawl (Worksheet 10 pg 32) pg 13
- e. Frog Hop pg 14

5. Counting from x (where $x > 0$) by 2s, 5s and 10s

- a. Make Your Counters Count (Worksheet 11 pg 33) pg 15
- b. Dice Count pg 15
- c. Stand Up Sit Down pg 15
- d. How Does Your Garden Grow? (W'sheet 12 pg 34) pg 16
- e. Choose Your Own Bingo (Worksheet 13 pg 35) pg 17

6. Extending and applying counting skills

- a. Jigsaw Numbers (Worksheet 14 pg 36) pg 18
- b. Counting Patterns (Worksheet 15 pg 37) pg 18
- c. Hangman (Worksheet 16 pg 38) pg 18
- d. Times Ten You Win pg 19
- e. Whose Legs? (Worksheet 17 pg 39) pg 19

Growth Point Activities – COUNTING

0. Not Apparent

Not yet able to state the sequence of number names to 20.

*The first two activities are designed to develop one to one correspondence. As this skill develops, introduce the sequence of number words when completing the activity.

a. Teddy Bear Match*

Materials: Purchase 2 large pieces of the same wrapping paper, which has a single, repeated, simple design on it, such as teddy bears. Laminate one whole sheet of the paper and cut the other into the individual designs, laminate these and place a small piece of Velcro onto the back of each shape, and onto the master sheet.

Group size: Pairs or individual

Students then simply match the shape onto the board.

As skills develop, students can count the number of teddy bears.

b. Farm Play* (Worksheet 1)

Materials: Activity sheet, animal stamps

Group size: Pairs or individual

Students use animal stamps to stamp one animal per paddock.

As skills develop, students can count the number of animals.



c. Dial My Number

Materials: disconnected telephone, chalkboard

Group size: Small group

Teacher records an eight digit telephone number on the board, group reads the number to student who has to “dial” the number on the telephone. Student can role play speaking to someone before “hanging up” and passing onto the next student.

Teacher checks to ensure that child is “dialling” the correct digits.

d. Match Up

Materials: 2 sets of cards with numerals 1 – 10, one set red, one set blue.

Group size: Pairs

Students play memory with the two sets of cards.

e. Peg Boxes

Materials: Ten shoeboxes numbered 1 – 10, pegs

Group size: Pairs

Students peg on to the box, the corresponding number of pegs. Partner to check for accuracy.

f. “Ten Little Indians”

Materials: ten pegs with feathers, one cardboard “teepee”

Group size: Whole class

Children sing “Ten Little Indians” as peg Indians are added to the class teepee.



g. Sorting Sticks

Materials: 10 sticks of increasing length, numbered from 1- 10, shortest to longest.

Group Size: Pairs or individual

Student orders sticks in increasing length and will then find numbers correspond, counting from 1 – 10. Read numbers to teacher, “Pass me stick number 4” etc

h. Step Up

Materials: one single unifix cube, one tower of 15 unifix cubes, unifix cubes, cards numbered 1 - 15

Group size: Pairs

Students begin with single unifix cube, and then continue to make steps, i.e. towers with 2, 3, 4 etc cubes to build a staircase to the 15 cube tower.

Match numeral with corresponding tower.

i. Who lives here?

Materials: Ten shoeboxes made to look like houses, numbered 11 – 20. Ten teddy bears numbered 11 – 20.

Group size: Whole class.

Student matches numbered teddy bear to corresponding home.

Teacher to question “Who lives next door to teddy number 16?” etc.

1. Rote Counting

Rote counts the number sequence to at least 20, but is not yet able to reliably count a collection of that size.

a. Numbers or Nonsense (Worksheet 2)

Materials: Activity card per pair

Group size: Pairs or individual

Shuffle cards and have students divide them into two piles, one with the numbers, the other with the nonsense squiggles. Partner to check for accuracy.

b. Number Match

Materials: Set of flashcards with numbers 1-20 written in words and in numerals

Group size: Pairs or individual

Shuffle cards and students match the written numbers with the numerals.

Extension: Flashcards with numbers represented by dots could be added and matched also.

c. Birthdates (Worksheet 3)

Materials: Birthdates Template (recommend use as A3 size)

Group size: Whole class

Teacher records child's birthdate (regardless of month) on the calendar in the relevant box.

Questions such as "How many people were born on the 2nd of the month?" etc.



d. Counting Frame

Materials: counting frame, two sets of numerals 1-10

Group size: Pairs or individual

Students use counting frame to represent numbers 1 –10, on the left hand side of each row. They then peg on corresponding digit.

Extension: Encourage students to study the right hand side of each row. Peg on the corresponding digit to that side. Can they see a pattern?

e. Caterpillar Walk

Materials: playdough, toothpicks, flashcards with numbers 1-20

Group size: Pairs



Student draws a card from the pile and then makes a playdough sausage or caterpillar, and adds the number of legs indicated by the card. Partner to check for accuracy.

f. Flash

Materials: set of dot plates 1-20, each pair of students has set of cards numbered 1-20

Group size: Whole class

Teacher flashes up a dot plate at random. In pairs, students determine how many dots there are and hold up corresponding numeral.

g. Stick Up

Materials: stickers numbered 1-number of students in class

Group size: Whole class

Each student is given a sticker on the front of their jumper. They then work as a class to order themselves from smallest to largest (or largest to smallest).

Variation: Ask one or two students to be the ones to place the rest of the class in order.

2. Counting Collections

Confidently counts a collection of around 20 objects.

a. Snap Cards

Materials: set of flashcards with numbers 1-30, set of dot cards with numbers 1-30

Group size: Pairs

Shuffle cards and have students play snap.

b. Wool Tie

Materials: assorted collections of everyday classroom things (eg.unifix, buttons, pencils etc) into groups representing 15-30; set of flashcards numbered 15-30; fifteen lengths of wool

Group size: Whole Class

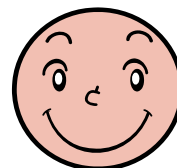
Groups of objects are randomly arranged along one side of the floor space, and the numbered cards randomly arranged along the other side.

Whole class counts groups of objects together, and then individual student uses wool to connect the group to the corresponding numeral.

c. Freckleface (Worksheet 5)

Materials: One activity card per student; blu-tack

Group size: Small group



Each paper plate face has a numeral from 20-40 written on the back. Students need to use the blu tak to make this number of freckles to place on the face. Partner to check for accuracy.

d. Count Your Own Bingo (Worksheet 5)

Materials: Cloth bags containing groups of counters from 15-40; one game card per student

Group size: Small group

Each student has a game card. Students take turns to select a bag. They must then count the number of counters in the bag which becomes the “bingo” number. First student to cover all four of their “bingo” numbers wins.

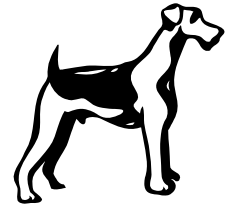
e. Dog Wash (Worksheet 6)

Materials: One worksheet per student; blu-tack “fleas”, dice with numerals 1-6

Group size: Small group

Students take turns to roll the dice. They then add this number of “fleas” to their dog.

When their dog has forty “fleas” it gets a “wash” and they win the game.



f. Schools of Fish (Worksheet 7)

Materials: cards with pictures of groups of fish from 10-30; flashcards with numerals 10-30 with paperclips; one magnet “fishing rod”

Group size: Pairs

Students “fish” for a card and then match it up with the corresponding picture card.

3. Counting by 1s (forward/backward, including variable starting points; before/after)

Counts forwards and backwards from various starting points between 1 and 100; knows numbers before and after a given number.

a. Dot to Dots

Materials: Regular, commercially available dot to dot pictures can have numbers altered to be counting by 1s, beginning from a variety of starting numbers other than one. Similarly they can be used to count backwards by ones, beginning from any number up to 100.

Group size: Individual

Variation: Count forwards or backwards by 2's , 5's, 10's etc.

Students follow the dots by counting as instructed to complete the picture.

b. Who am I?

Materials: Set of cards, in counting order from 1 to 28 (or otherwise), one for each student

Group size: Whole class

Teacher randomly selects a number from 1 to 28 and gives a simple statement such as "I am one less than 22. Who am I?" The student then responds "I am 21" and moves to the front of the class. Teacher follows with "I am the number after 14".

Student responds with "I am 15" and then places themselves in an appropriate position to the left of Student 21. At the conclusion of the session, all of the students should be in numerical order across the room.

c. Up and Down Ladder (Worksheet 8)

Materials: Worksheet with vertical ladder, numbered from 1 to 50, with 25 as the START position; Spinner with the sections marked as +1, +2, +3, -1, -2, -3.

Group size: Pairs or small group



Each student places a counter on the Start at 25. They then take turns to spin and move their counter either up or down the ladder accordingly. The first to reach either 1 or 50 wins.

d. Marble Count

Materials: Tin, marbles (or other small, heavy objects)

Group size: Whole class

Ask the students to close their eyes and listen as each marble drops into the tin, counting silently to themselves as they go. When the teacher stops dropping marbles asks students to volunteer the number that they had counted. To check answer, whole class can orally count as they are dropped again.

Variation: Begin with a number of marbles already in the tin, to allow students practise at not always starting from zero.

e. Missing Numbers (Worksheet 9)

Materials: Worksheet

Group size: Individual or pairs.

Students complete worksheet by filling in the numbers that are missing.

Variation: Or by way of introduction, use 1 to 100 number chart to remove some numbers and ask students to identify the numbers that are missing. Encourage strategies such as “check by looking at the number before or after the one that is missing”. Discussion could also follow about the patterns in the vertical columns and how this might be useful as well.

f. Footy Finals

Materials: Four coloured counters in a cloth bag, one representing each football team; a dice with faces +1, +1, -1, -1, 0, 0.



Group size: Group of four.

Four football teams – Red Ravens, Blue Budgies, Green Galahs and Black Cockatoos have made the finals, and need to play one another to find the Premiership team. Each team begins with a score of 10 points, and each student becomes the “Coach” for one of these teams. To simulate each finals game, the student draws a counter from the bag and “plays” the other team represented by the coloured counter. The student then rolls the dice to determine the outcome of the

game. If +1 is rolled their team has won and scores one point, and conversely the opposition must -1 point for losing. Similarly if the dice rolls -1, the roller must subtract one point and the opposition adds one. A roll of "0" represents a draw and no points are scored by either team. NB. If the student draws their own team's counter this is considered to be a "bye" and they lose their turn.

(Counters are replaced after each draw)

| | | |
|-----|----------------------------|----------------------------|
| eg. | Red Ravens turn. | Draws out green counter |
| | Red Ravens v. Green Galahs | |
| | Red Ravens rolls dice | +1 |
| | Red Ravens +1 to score | Green Galahs -1 from score |

First team to score 20 points is the winner of the Premiership.

NB. Teams cannot score negative points

4. Counting from 0 by 2s, 5s and 10s

Can count from 0 by 2s, 5s and 10s to a given target

a. Ducks Legs

Materials: Storybook "Come On, Daisy" by Jane Simmons

Group size: Whole Class

Read the students the story of Daisy. There are many pictures of Daisy and Mamma Duck throughout the story. Use questioning to have students acknowledge that ducks each have two legs, and as you turn the pages have the students count the number of legs – by twos (seen or unseen) that there are in the story.

Variation: Use any other story book which has repeated pictures of animals with two legs.

b. 5s Walk

Materials: Long roll of paper, paint, (outside area!)

Group size: Whole class and small groups

Each child uses the paint to make their own footprints on the paper, recorded in a walking pattern. Teacher can number the feet (1,2, 3 etc) and then small groups can "do the 5s walk", counting toes in groups of five as they step on each foot.

Variation: Doing the "10s jump". Feet can be recorded side by side and then students jump from pair to pair, counting by 10s as they go.



c. Ice Cream Bundles

Materials: Icy pole sticks and rubber bands

Group size: Small groups

The group is given a collection of icy pole sticks (70+) which they are required to count into bundles of ten, contained by the rubber bands. These can then be used to count by tens and then count in left over sticks to find total. Small groups can be joined together to facilitate counting to larger numbers if desired.

d. Caterpillar Crawl (Worksheet 10)

Materials: Caterpillars either made by students using egg cartons and match sticks, or from template.

Group size: Whole Class

Discussion about how many caterpillars there are – each has ten legs, “I wonder how many legs that is altogether?” Whole class count by tens together to determine total number of legs.

e. Frog Hop

Materials: hula hoops, sets of cards with numerals counting by 2s, 5s and 10s

Group size: Small group

Lie the hoops in a random pattern on the floor, with a card face up inside each. Select a focus for the session i.e. counting by 2s, 5s or 10s; and place the cards in counting order with hoops adjacent to each other. The student becomes the frog who must leap from “lily pad” to “lily pad” in counting order. Other students check for accuracy.



5. Counting from x (where $x > 0$) by 2s, 5s and 10s

Given a non-zero starting point, can count by 2s, 5s and 10s to a given target.

a. Make Your Counters Count (Worksheet 11)

Materials: one gameboard per group (enlarge to A3 size or even bigger), one counter per student

Group size: Small groups

Students take turns to throw their counter onto the gameboard from a distance of about 1m. The area in which their counter lands will determine their score for that throw. Students keep their own running total of their score. The first student to reach 50 points wins. If the counter is touching any part of a line, it is a score of 1 point only.

b. Dice Count

Materials: Two dice marked +2, +2, +5, +5, +10, +10

Group size: Pairs or small group



Students roll the dice, total the score on both dice and add this to their running total. They may continue having turns until they decide to “bank” their score and pass their turn onto the next student. If, however, before they “bank” their score they roll a double (i.e. two 2s, two 5s or two 10s) they lose all of their points for this turn. The first student to reach 100 points wins.

c. Stand Up Sit Down

Refer to Peter Sullivan – Short Flexible Maths Games

Materials: None

Group size: Whole class

This activity is designed purely as an individual challenge for the students. It is important that it is not portrayed as a competitive activity. Students try to improve their previous performance by remaining standing for a greater number of rounds each time they play. The activity can be concluded when a small number of students are left, rather than just one.

To begin the activity all members of the class are standing. The teacher gives an oral addition sum such as $5+2$ which students must calculate in their heads and keep the total. The teacher then builds upon this with another questions such as $+10$, which the students must add to the previous total. The students remain standing for as long as they can keep track of the total. When they have “lost” the total they quietly sit in their seat and wait for the conclusion. It is useful to begin with easier questions and gradually increase the difficulty and speed of delivery.

It is important that the teacher keeps a record of the questions given, so that a whole class activity at the conclusion can be to check that the final total that the last students standing had was actually correct. As mentioned above, students are praised for improving their own number of rounds standing, rather than for being the last person standing.

The questions given can be selected to suit the focus of the class, at this time counting by 2s, 5s and 10s from x where $x > 0$.

d. How Does Your Garden Grow? (Worksheet 12)

Materials: Worksheets for the group, die marked +2, +2, +5, +5, +10, +10

Group size: Small Group

Students roll dice and number off (counting by 1s) the corresponding number of petals on a flower. When the next student rolls they continue numbering the petals on the same flower until it is complete, and then start on the next flower if necessary.

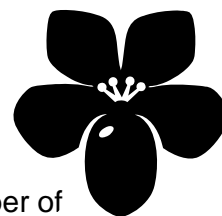
i.e. Flower 1 is numbered 1 – 10

Flower 2 is numbered 11 – 20

Flower 3 is numbered 21 – 30

The student who numbers the last petal on a flower writes their name in the centre.

Play for a set period of time (eg. ten minutes). The student who has their name in the greatest number of flowers at the end wins.



e. Choose Your Own Bingo (Worksheet 13)

Materials: Blank bingo template for each student, counters, two dice

Group size: Small group

Students select four numbers between 2 and 12 (they may have repeats, but the number must come up twice) and write these onto their bingo card. The students then take it in turns to roll the two dice and add them to find the total. If the total appears on their own bingo card they may cross it off. Play then passes to the next student. The first student to win is the one who crosses off all of their numbers.

6. Extending and applying counting skills

Can count from a non-zero starting point by any single digit number, and can apply counting skills in practical tasks.

a. Jigsaw Numbers (Worksheet 14)

Materials: Activity card

Group size: Whole class or small group

Cut the hundreds chart along the bold lines. Each student is given a piece on which they must complete the missing digits. Students then combine their pieces to reproduce the hundreds chart.



b. Counting Patterns (Worksheet 15)

Materials: Set of 9 worksheets per group

Group size: Small group

Students colour the numbers in a counting pattern eg. 2s on the hundreds chart.

Discuss the pattern that is made. Repeat for 3s, 4s, 5s, etc to 10s. Use a different colour for each pattern.

Extension: Using overhead projector, teacher to show a blank hundreds chart with a pattern shown using transparent counters. Students name counting pattern from pattern of counters, without the use of the numerals.

c. Hangman (Worksheet 16)

Materials: Worksheet per student, red die, blue die

Group size: Pairs

Students roll the two dice and add the digits. They record this total in the appropriate square on the worksheet. If the score has been rolled before (ie Red4 + Blue3 is different to Red3 + Blue4) the student misses a turn and begins to play hangman. The object of the game is to complete the table before reaching "hangman".

d. Times Ten You Win

Materials: Pack of playing cards with picture cards removed

Group size: Pairs

Place all of the cards face down in the centre. Students take turns in turning over a card and adding this onto the running total. If this total is a multiple of ten, the player keeps all of the cards. The winner is the player with the greatest number of cards.

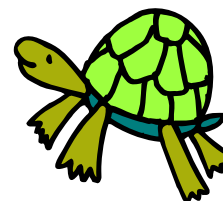
e. Whose Legs? (Worksheet 17)

Materials: Activity Card per group, set of numeral cards

Group size: Pairs or small group

Students familiarise themselves with the animals depicted on the activity card, paying particular attention to the number of legs each has. i.e. duck – 2 legs, turtle – 4 legs, ladybird – 6 legs, octopus – 8 legs. Students take turns to draw a numeral card from the pile, which states a given number of legs. Students determine a combination of the animals shown, that would have this number of legs.

eg. 14 legs could be– 7 ducks; 2 ladybirds and a duck; 1 octopus, 1 turtle and 1 duck. Students compare answers and check for accuracy. The openness of this task allows for much discussion and for differentiation of expected outcomes.



Counting - Not Apparent
Worksheet 1 - Farm Play

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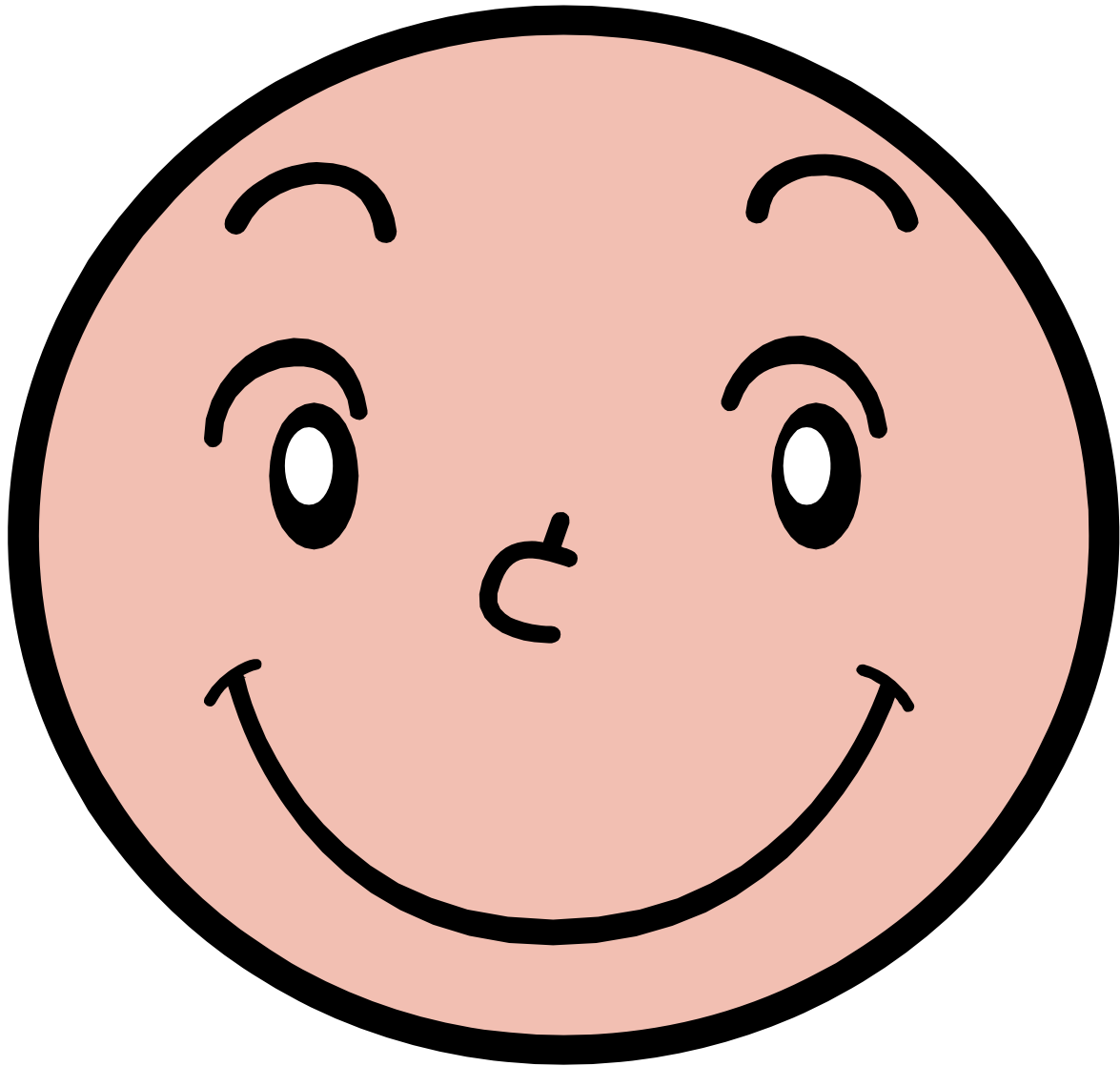
Counting - Rote Counting
Worksheet 2 - Numbers or Nonsense

| | | |
|---------------|----------|----------|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |
| 10 | 11 | 12 |
| 13 | 14 | 15 |
| 16 | 17 | 18 |
| 19 | 20 | ϕ |
| ε | π | ζ |
| χ | Ψ | ∞ |
| ε | Ω | μ |

Counting - Rote Counting
Worksheet 3 - Birthdates

| | | |
|------------------------|------------------------|------------------------|
| 1st | 2nd | 3rd |
| 4th | 5th | 6th |
| 7th | 8th | 9th |
| 10th | 11th | 12th |
| 13th | 14th | 15th |
| 16th | 17th | 18th |
| 19th | 20th | 21st |
| 22nd | 23rd | 24th |
| 25th | 26th | 27th |
| 28th | 29th | 30th |
| 31st | | |

Worksheet 4 - Freckleface



Counting - Counting Collections
Worksheet 5 - Count Your Own Bingo

| | | | |
|----|----|----|----|
| 16 | 21 | 37 | 18 |
|----|----|----|----|

| | | | |
|----|----|----|----|
| 25 | 19 | 38 | 33 |
|----|----|----|----|

| | | | |
|----|----|----|----|
| 27 | 39 | 15 | 31 |
|----|----|----|----|

| | | | |
|----|----|----|----|
| 34 | 29 | 24 | 17 |
|----|----|----|----|

| | | | |
|----|----|----|----|
| 23 | 18 | 32 | 28 |
|----|----|----|----|

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|----|----|----|----|
| 35 | 26 | 30 | 22 |
|----|----|----|----|

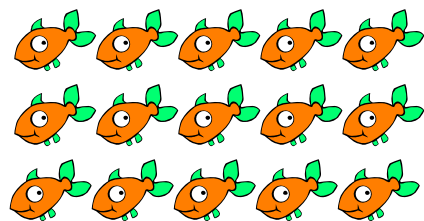
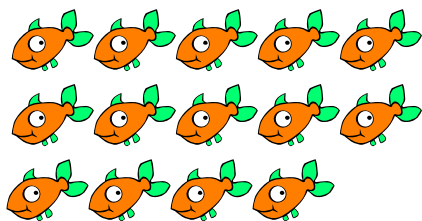
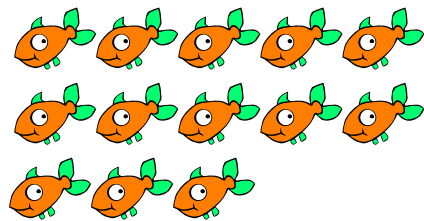
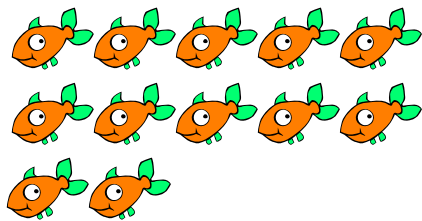
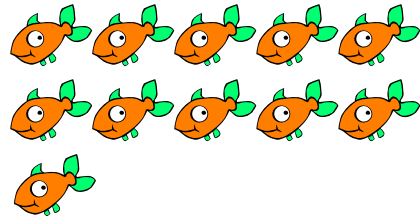
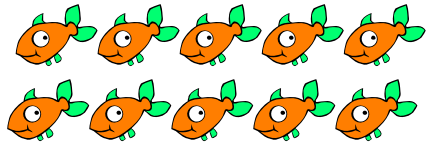
Counting - Counting Collections

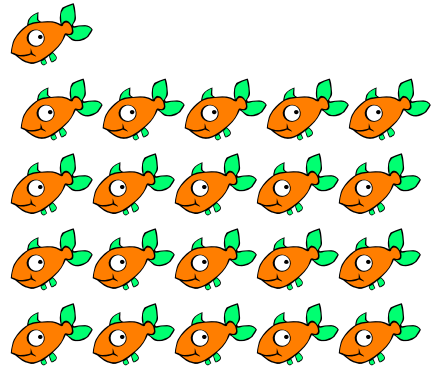
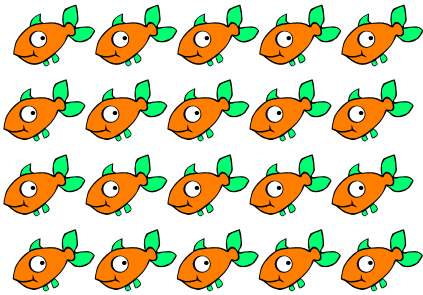
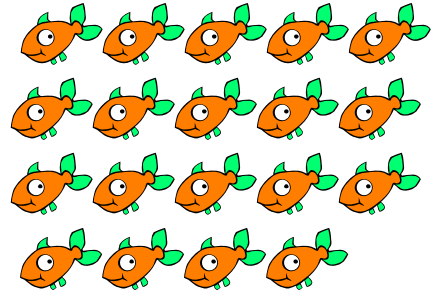
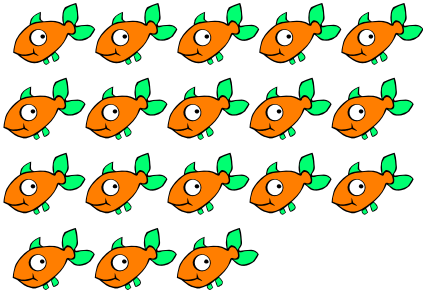
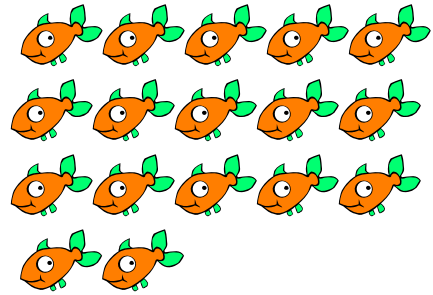
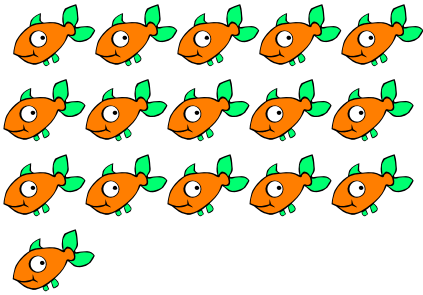
Worksheet 6 - Dog Wash

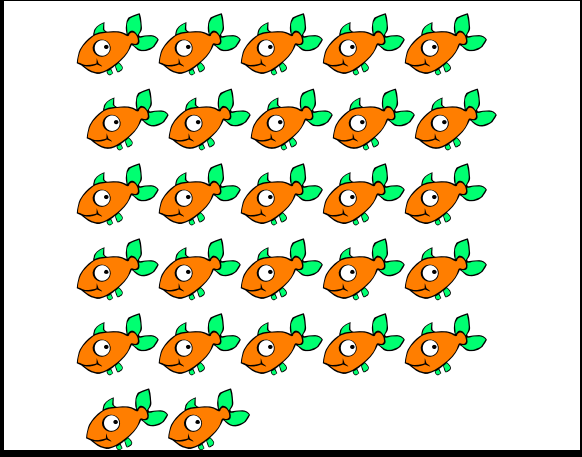
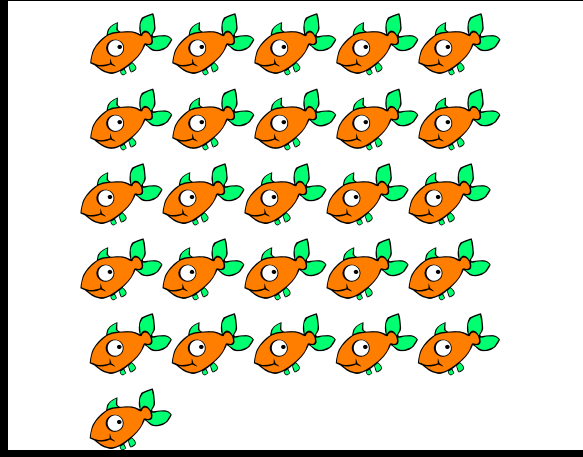
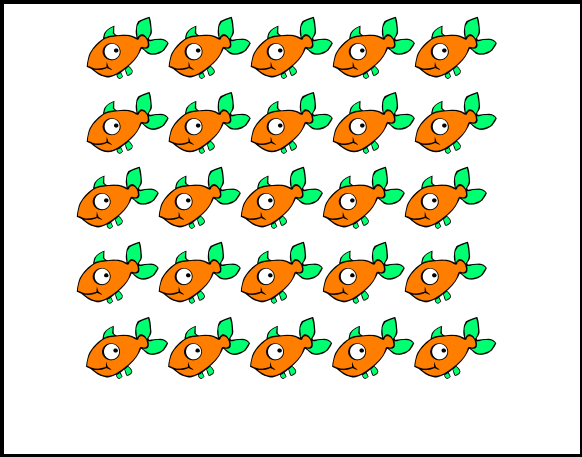
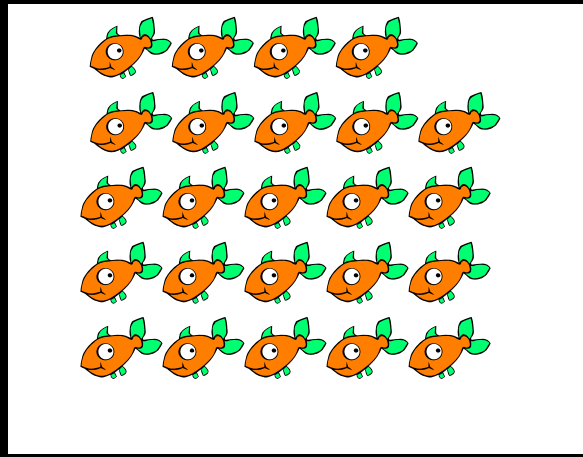
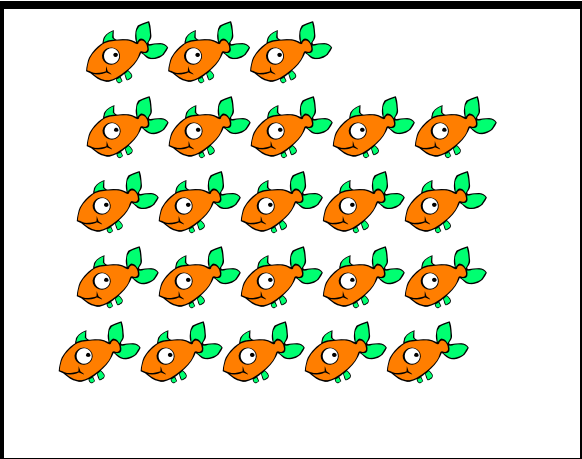
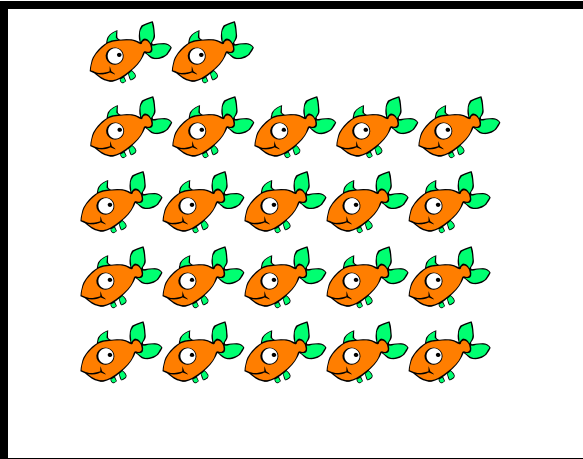


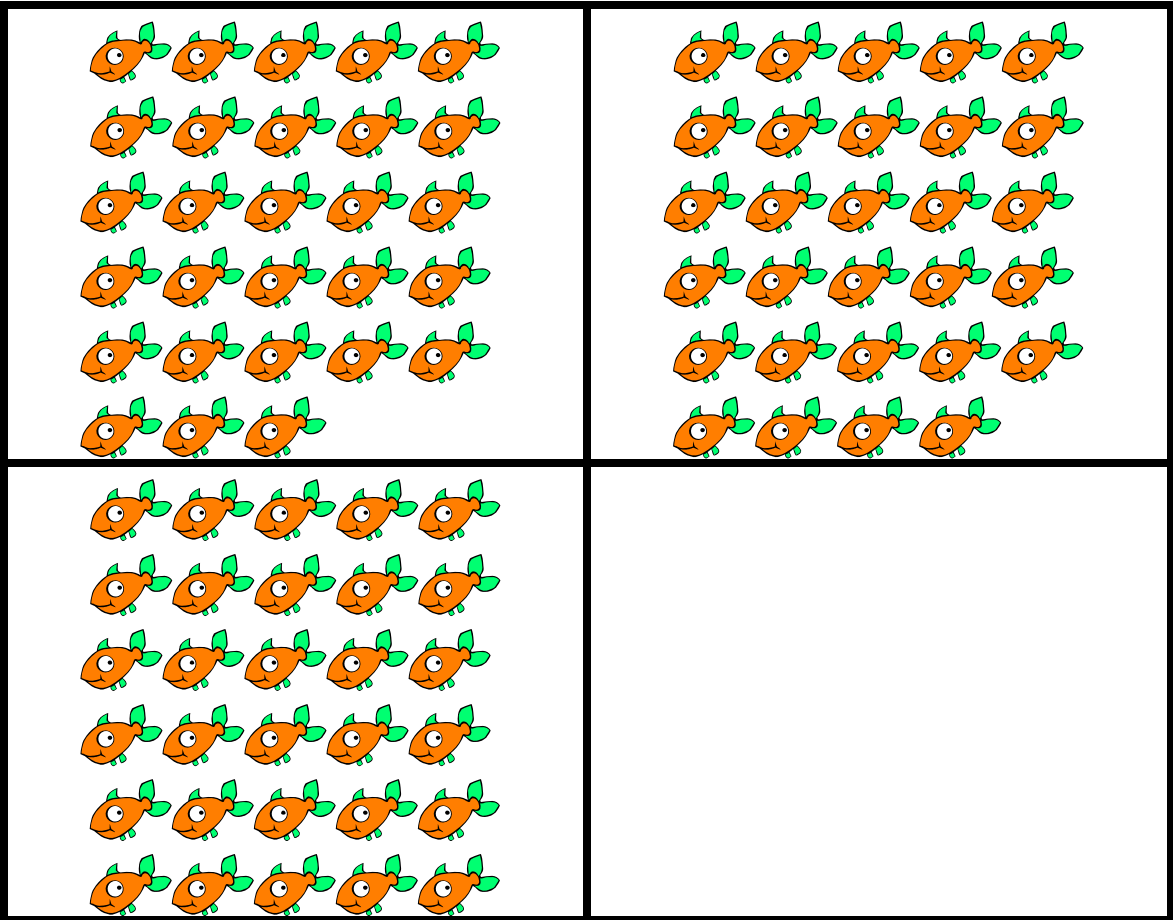
Counting – Counting Collections

Worksheet 7 – Schools of Fish









Counting - Counting by 1s

Worksheet 8 - Up and Down Ladder

| |
|----|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| 10 |
| 11 |
| 12 |
| 13 |
| 14 |
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| 16 |
| 17 |
| 18 |
| 19 |
| 20 |
| 21 |
| 22 |
| 23 |
| 24 |
| 25 |

START

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|----|
| 26 |
| 27 |
| 28 |
| 29 |
| 30 |
| 31 |
| 32 |
| 33 |
| 34 |
| 35 |
| 36 |
| 37 |
| 38 |
| 39 |
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| 45 |
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| 49 |
| 50 |

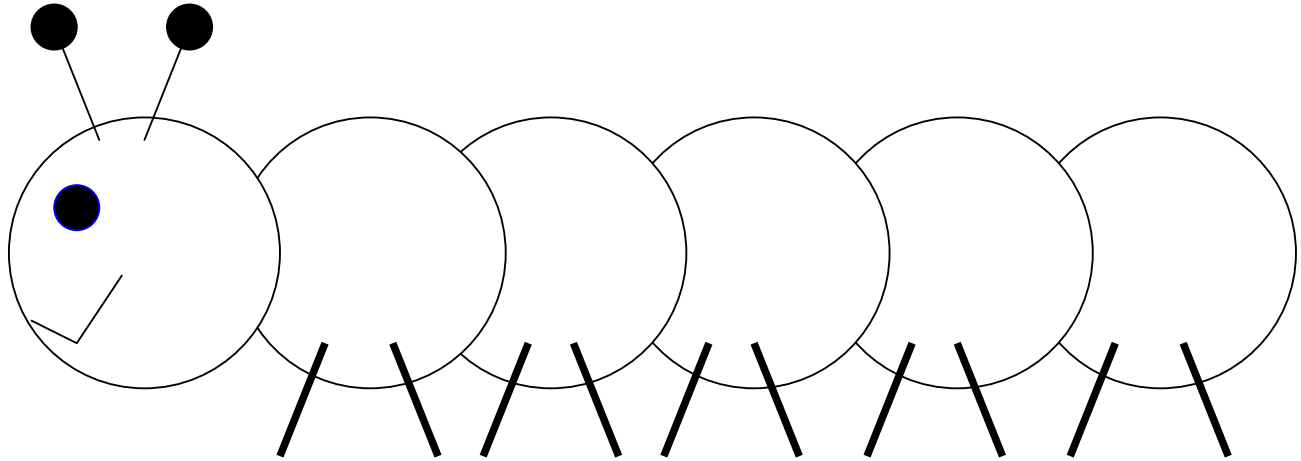
Counting - Counting by 1s

Worksheet 9 - Missing Numbers

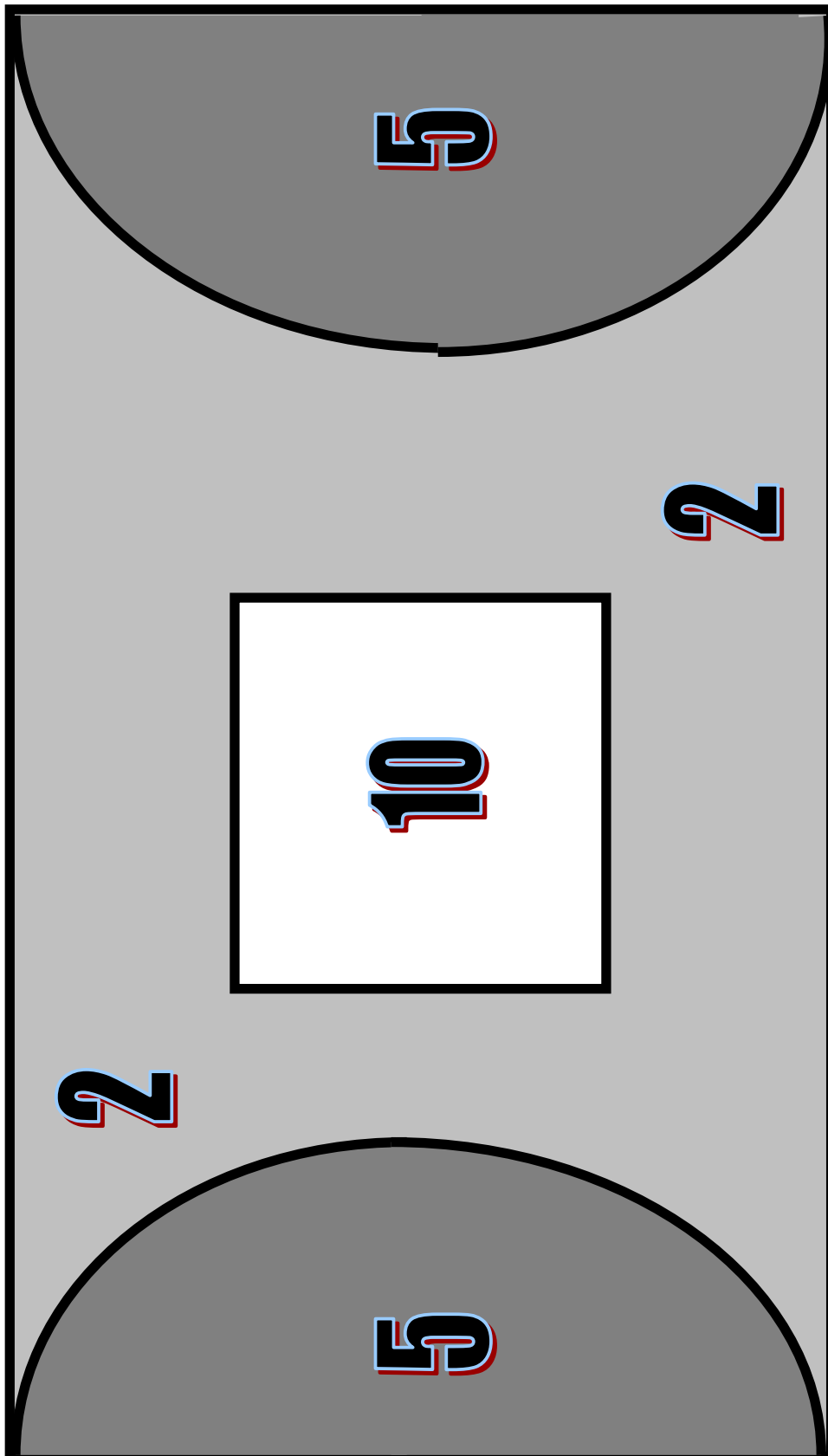
| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | | 5 | 6 | | 8 | 9 | 10 |
| 11 | 12 | | 14 | 15 | 16 | 17 | 18 | 19 | |
| | 22 | 23 | 24 | | | 27 | 28 | | 30 |
| 31 | 32 | | 34 | 35 | 36 | 37 | | 39 | 40 |
| 41 | | 43 | | 45 | 46 | 47 | | | 50 |
| 51 | 52 | 53 | 54 | | 56 | | 58 | 59 | |
| | 62 | | 64 | 65 | 66 | 67 | | | 70 |
| 71 | 72 | 73 | 74 | | 76 | | 78 | 79 | |
| | 82 | | 84 | 85 | 86 | 87 | | 89 | 90 |
| 91 | | 93 | | | 96 | | 98 | 99 | |

Counting - Counting from 0 by 10s

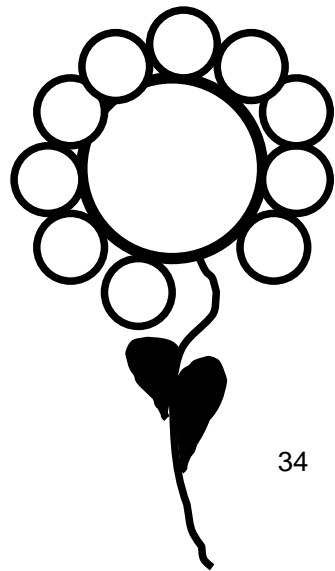
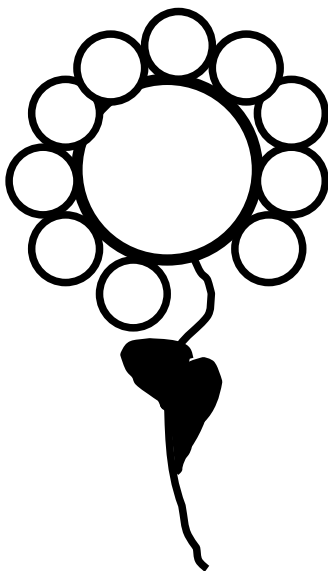
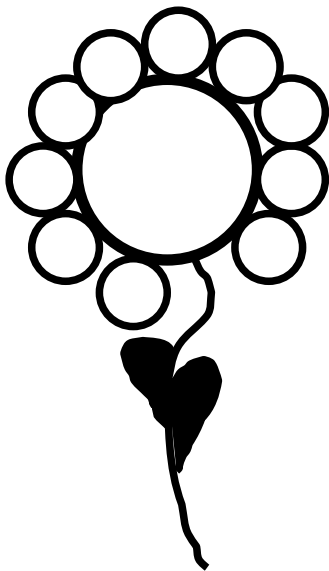
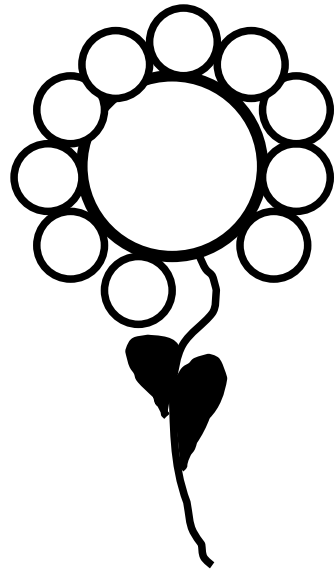
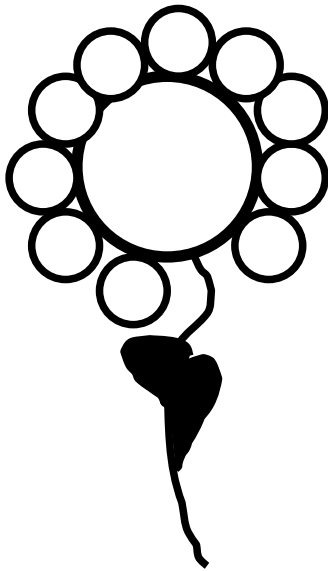
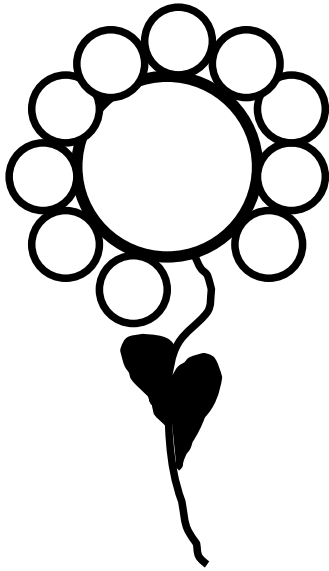
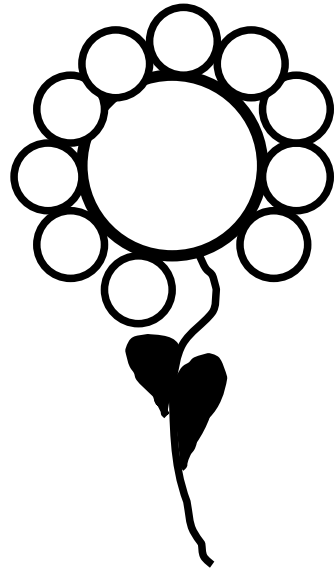
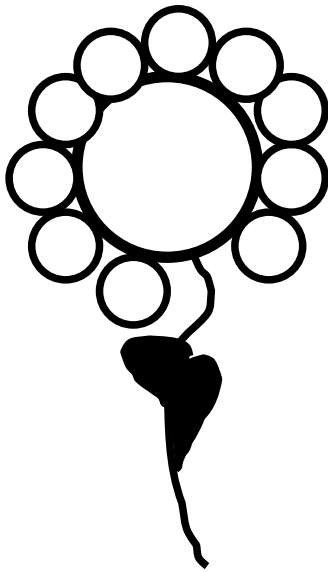
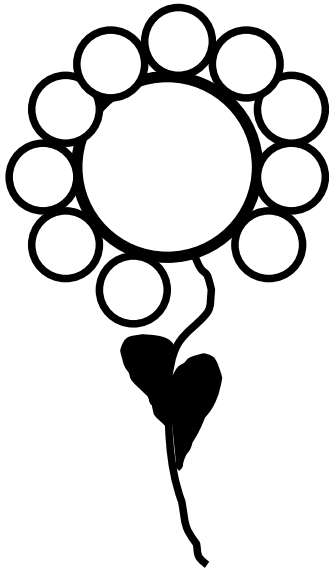
Worksheet 10 - Caterpillar Crawl



Counting - Counting from x by 2s, 5s and 10s
Worksheet 11 - Make Your Counters Count



Counting - Counting from x by 2s, 5s and 10s
Worksheet 12 - How Does Your Garden Grow?



Counting - Counting from x by 2s, 5s and 10s
Worksheet 13 - Choose Your Own
Bingo

| | | | |
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| | | | |
|--|--|--|--|

Counting - Extending and Applying Counting Skills
Worksheet 14 - Jigsaw Numbers

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | | 3 | | | | 7 | 8 | | |
| | | | 14 | 15 | | | | | |
| | 22 | | | | | | 28 | | 30 |
| 31 | | | | | | | | | |
| 41 | | 43 | | 45 | 46 | | | 49 | |
| | | | | | 56 | | | 59 | |
| | | | 64 | | | | | | 70 |
| 71 | | | 74 | | | | 78 | 79 | |
| | | | | 85 | | 87 | | | |
| | 92 | | 94 | | | | | | 100 |

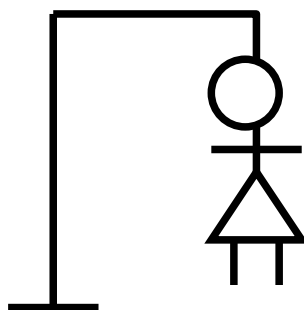
Counting - Extending and Applying Counting Skills
Worksheet 15 - Counting Patterns

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 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 |

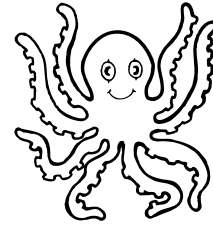
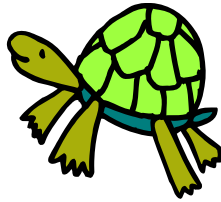
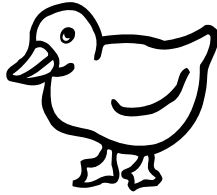
Counting - Extending and Applying Counting Skills

Worksheet 16 - Hangman

| + | Red 1 | Red 2 | Red 3 | Red 4 | Red 5 | Red 6 |
|--------|-------|-------|-------|-------|-------|-------|
| Blue 1 | | | | | | |
| Blue 2 | | | | | | |
| Blue 3 | | | | | | |
| Blue 4 | | | | | | |
| Blue 5 | | | | | | |
| Blue 6 | | | | | | |



Worksheet 17 – Whose Legs?



| | | |
|---------|---------|---------|
| 16 legs | 42 legs | 30 legs |
| 24 legs | 60 legs | 84 legs |
| 10 legs | 34 legs | 22 legs |
| 58 legs | 78 legs | 60 legs |
| 38 legs | 44 legs | 52 legs |



Growth Point Activities – PLACE VALUE

0. Not apparent

- | | |
|--|-------|
| a. Digit Jigsaw (Worksheet 18 pg 57) | pg 42 |
| b. Counting Strip (Worksheet 19 pg 58) | pg 42 |
| c. Before Bingo (Worksheet 20 pg 59) | pg 42 |
| d. Mystery Mail (Worksheet 21 pg 60) | pg 42 |
| e. Dominoes (Worksheet 22 pg 61) | pg 43 |
| f. Line Up (Worksheet 23 pg 62) | pg 43 |

1. Reading, writing, interpreting and ordering single digit numbers

- | | |
|--|-------|
| a. Tell Me Three | pg 44 |
| b. Biggest Stand Up | pg 44 |
| c. Ring Ring | pg 44 |
| d. Who Lives Where? (Worksheet 24 pg 63) | pg 45 |
| e. Colour In Sum (Worksheet 25 pg 64) | pg 45 |

2. Reading, writing, interpreting and ordering two- digit numbers

- | | |
|--|-------|
| a. Connect Four (Worksheet 26 pg 65) | pg 46 |
| b. Numbers Up | pg 46 |
| c. Odds and Evens (Worksheet 27 pg 66) | pg 46 |
| d. Chonks | pg 47 |
| e. Ice Cream Bundles Again | pg 48 |

3. Reading, writing, interpreting and ordering three-digit numbers

- | | |
|--|-------|
| a. Pass It On | pg 49 |
| b. Know My Number | pg 49 |
| c. What's My Number? | pg 50 |
| d. Three Card Numbers (Worksheet 28 pg 67) | pg 50 |
| e. Three Dice Numbers (Worksheet 29 pg 68) | pg 50 |

4. Reading, writing, interpreting and ordering numbers beyond 1000

- | | |
|--|------------|
| a. Telephone Maths | pg 52 |
| b. Find Me A Number (Worksheet 30 pg 69) | pg 52 |
| c. Dice Numbers | pg 52 |
| d. Calculate to Zero | pg 52 , 53 |
| e. Four Card Numbers | pg 54 |

5. Extending and applying place value knowledge

- | | |
|-------------------------|-------|
| a. How Far Can You Fly? | pg 55 |
| b. Lap-a-thon | pg 55 |
| c. Auction Action | pg 55 |
| d. Place Value Bingo | pg 56 |
| e. Telephone Order | pg 56 |

Growth Point Activities – PLACE VALUE

0. Not Apparent

Not yet able to read, write, interpret and order single digit numbers.

a. Digit Jigsaw (Worksheet 18)

Materials: Activity card

Group size: Pairs or individual

Teacher to cut the activity card into individual jigsaw pieces. Students then reassemble into counting order.



b. Counting Strip (Worksheet 19)

Materials: one worksheet per student, red and blue pencils

Group size: Individual

Students colour odd numbers red and even numbers blue. Compare with a partner.

Discussion to follow about zero as an odd or even number.

c. Before Bingo (Worksheet 20)

Materials: one bingo board per student, counters

Group size: Small group with teacher (or student) direction

Students choose four numbers between 0 and 10. Teacher (or other student) gives number clues such as

The number before 6

The number after 2 etc.

Students cover their numbers when called, until all numbers are covered and bingo is achieved.

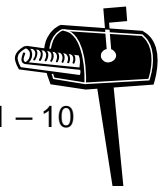
d. Mystery Mail (Worksheet 21)

Materials: ten envelopes with clue cards inside, ten shoeboxes numbered 1 – 10

(ref: Who Lives Here? – Place Value Growth Point 0)

Group size: Pairs

Students open each envelope and determine which house the mail belongs to, and “post” it into that house.



e. Dominoes (Worksheet 22)

Materials: domino cards

Group size: Pairs

Students match the domino cards end to end with equivalent values. Play moves from player to player until no more cards can be placed.

f. Line Up (Worksheet 23)

Materials: one worksheet per student

Group size: Individual

Students draw a line to connect the equal values on either side of the page.

1. Reading, writing, interpreting and ordering single digit numbers

Can read, write, interpret and order single digit numbers.

a. Tell Me Three

Materials: None

Group size: Whole Class

This activity could be explained using Edward de Bono's Six Thinking Hats if the children are familiar with them. Using the White Hat (Facts), state three facts about a given number.

eg. Number 10 It is one more than 9.
 It is an even number.
 It is the number before 11.



b. Biggest Stand Up

Materials: stickers numbered from 1 to number of students in class

Group size: Whole Class

Students find a partner in the room. The student with the largest number stands up, while the smaller number sits down. Share some pairs with class. Pairs then join with another pair to make four. Again order from smallest number sitting down to largest standing on toes. Share again with whole class – Discuss did students have to change their position when others joined in? Combine groups of four, and continue until whole class is one large group in order from smallest to largest.

Extension: Ask odd numbers to stand and even numbers to sit. Is there a pattern when this happens? What is it? What would happen to the teacher if they were zero? Should they stand or sit?

c. Ring Ring

Materials: pages from a telephone book

Group size: Pairs or individual

Students select a telephone number at random and record on a piece of paper. Rewrite the digits in counting order.

eg 9 8 7 3 6 7 2 2 becomes 2 2 3 6 7 7 8 9



Repeat with another telephone number. Ask students to tally the frequency with which numbers occur. Are there any numbers that occur more often than others? It may become obvious that 9 is in every telephone number. Do any of the students know why this is?

Extension: Could discuss use of tally with students and how grouping in fives makes it easier to total the numbers later. Will lead into later discussion on groups of ten. Investigation could also centre around the occurrence of odd v even numbers.

d. Who Lives Where? (Worksheet 24)

Materials: worksheet for each student

Group size: Whole Class or small group led by teacher

Discussion with students about the numbering of houses in streets and the fact that all of the odd numbers are on one side of the road, and the evens on the other. Label the houses from 1 to 10 using this knowledge. Questions such as

Who lives next door to #4?

Who lives opposite #7?

will all encourage discussion about odd and even numbers and their counting order.

Extension: Encourage students to discuss an extension of the street. Which side of the road would #31 be? How do you know this? Who would be next door to #24?

May lead to a class "road" with individuals each completing a section of the road. Encourage students to check the numbering of the houses in their own street.

e. Colour in Sum (Worksheet 25)

Materials: activity card for each student, two dice per group, coloured pencil

Group size: Pairs or small group

Students roll two dice and find the sum. Colour in the square with the total on the activity card. The student with all of their numbers covered first wins.

2. Reading, writing, interpreting and ordering two digit numbers

Can read, write, interpret and order two digit numbers.

a. Connect Four (Worksheet 26)

Materials: one activity card per student, two dice, counters

Group size: Pairs or small group

Students take turns to roll two dice. Students decide which two digit number the dice will make i.e. if a 3 and 4 are rolled, students decide if this is 34 or 43; and then cover the corresponding box on their card with a counter. The first student to cover four squares in a row (horizontally, vertically or diagonally) wins.

b. Numbers Up

Materials: pack of playing cards with only cards 1 – 9 included (Ace =1)

Group size: Pairs or small group

Each student is dealt two cards and uses these to make a two digit number. The person with the highest number collects all of the cards for that round. Continue playing until all of the cards in the pack are used. The student with the greatest number of cards wins.

Variation: Aim to make the lowest number using the two cards.



c. Odds and Evens (Worksheet 27)

Materials: students draw up own place value card (or use template)

Group size: Pairs or individual

Challenge students to use each of the digits from 0 – 9 once only, to make five 2 digit numbers that are odd. Repeat but making only even numbers this time. Are all of the answers the same? Compare with other class mates.

d. Chonks

Materials: playdough, plastic bowl, toothpicks, 2 dice both numbered 1, 1, 2, 2, 3, 3,
Group size: Small group

Chonks are small animals from the far planet of Chonk Rock. The Chonk population is under threat on its own planet and they have moved to Earth in search of new parents to help them rebuild their numbers. Chonks grow inside an egg (the plastic bowl) and are only hatched when they are completely formed with their ten legs. The students must accept the challenge of becoming a Chonk parent to complete this activity. Once a group of ten Chonks is formed, they become known as a Chonk Pod and they are able to safely travel back to live on Chonk Rock once again.

Begin with twenty playdough balls already formed inside a plastic bowl. In order to “hatch” the Chonks, students must roll the two dice and use the two digits to make the smallest number possible. i.e. rolling 1 and 2, make 12 not 21. They are then able to add this number of legs (toothpicks) onto a growing Chonk inside the egg. Once a Chonk has ten legs, it is able to hatch and the student becomes its parent. Once a student has responsibility for ten Chonks, or a Chonk Pod, that can travel back to Chonk Rock, the game is ended.

e. Ice Cream Bundles Again

Materials: icy pole sticks, rubber bands, two dice

Group size: Small group

Students take turns to roll both dice and calculate the total, and then collect that number of icy pole sticks from the centre pile. When they are able to, they combine ten sticks into a bundle with a rubber band and place to one side. After a set time (eg. ten minutes) students total their piles by counting by tens and find the greatest number. Individual totals may be combined to calculate a group total.



3. Reading, writing, interpreting and ordering three digit numbers

Can read, write, interpret and order three digit numbers.

a. Pass It On

Materials: pack of playing cards with only cards 1 – 9 included (Ace =1)

Group size: Small group



Shuffle cards and place face down in centre. One student deals four cards to each player. Students aim to make the highest three digit number possible. Each player chooses to discard one card into another centre pile, and pass one card on to the next player in a clockwise direction. Players then use their three cards to make the highest three digit number possible. The winner of each round collects all of the cards. Once all cards have been played, the overall winner, with the most cards, can be calculated.

Variation: Students aim to make the lowest three digit number possible.

b. Know My Number

Similar to MCTP Activity Bank, Volume 1, 'Find My Number', pg 285

Materials: whiteboard

Group size: Whole class

This game is played similarly to "Celebrity Head". Three students sit in front of the whiteboard, facing the class. Three other students are asked to select a three digit number and write it onto the whiteboard behind where the students are sitting so that they are not able to see it. The three "contestants" then proceed to ask questions to help them identify their number. These questions can only be answered with "yes" or "no". If the answer is "no", play then moves to the next student. The first student to determine their number, wins.

Encourage use of questions which focus upon place value, such as

Do I have a 4 in my hundreds column?

Do I have an even number in my tens column?

Discussion can also follow about "good questions" which omit possibilities very quickly, such as "Am I an even number?", as opposed to very narrow questions such as "Am I 542?", which only rules out one possibility.

This whole class activity is a very good modelling for the next activity.

c. What's My Number

Refer to MCTP Activity Bank, Volume 2, pg 532.

Materials: one sticker with a three digit number for each student

Group size: Whole class



Know My Number (see previous activity) is a good means of modelling this activity, in order to enhance the opportunities for all students experience success.

Each student has a sticker placed on their back so that they cannot see it. They must then proceed to move amongst class mates and ask questions to determine what their number is. Again, the responses can only be “yes” or “no”. If a “no” answer is given, students must find another person to question. When they have successfully determined their number, they must place their sticker on the front of their jumper and assist others by answering their questions.

d. Three Card Numbers (Worksheet 28)

Materials: pack of playing cards with only cards 1 – 9 included (Ace =1), one activity sheet per student

Group size: Pairs

Student selects three cards from the pile and tries to satisfy one of the five criteria on the worksheet using these three digits to make a three digit number. They record the number in the right hand column. Even if they are unable to make a number, play then passes to the next student. The first student to complete the worksheet by writing all five numbers, wins.

e. Three Dice Numbers (Worksheet 29)

Materials: one activity sheet per student, three different coloured dice, coin

Group size: Groups of three

Blue die – hundreds

Red die – tens

White die – ones

Student A rolls the three dice and selects one of the digits to place onto their own activity sheet in the place indicated by the dice. i.e. red 4 means 40, blue 2 means 200.

They then allocate the other two scores, one to each of the other players, who record these on their own activity sheet. Student B then rolls the three dice, selects which of the remaining two digits they want to “keep” and again allocates the others to the two



other players. NB. Digits can only be passed on to students who have not yet filled that column i.e. If Student B filled the hundreds column with the first roll, they must be given the score rolled on either the red(tens) or white(ones) dice on the next roll. Student C then has the final roll, to fill their own remaining column, and therefore those of the other two students also.

Student A then tosses the coin, if it lands Heads – the player with the Highest score wins one point, if it lands Tails – the player with the Lowest score wins one point.

The next round then begins with Student B rolling the dice first.

The first student to score 10 points wins.

4. Reading, writing, interpreting and ordering numbers beyond 1 000

Can read, write, interpret and order numbers beyond 1 000.

a. Telephone Maths

Materials: page of telephone directory, calculator

Group size: Pairs



Each student randomly selects a telephone number from the listed directory eg. 9842 6733. They then separate this telephone number into two four digit numbers. i.e. 9 842 and 6 733. Students decide which of their two numbers is the greatest and using the calculator, subtract the smaller number from this to find the difference.

$$9\ 842 - 6\ 733 = 3\ 109.$$

The student with the smallest difference scores one point, and the activity is repeated with another telephone number. The first student to score five points wins.

Variation: Student with the greatest difference wins.

b. Find Me A Number (Worksheet 30)

Materials: worksheet (optional)

Group size: Whole class

This activity can be completed on the worksheet given; it could be completed as an oral, whole class discussion; or with instructions simply written on the whiteboard.

Students use the “clues” given to find a four digit number which meets the set criteria.

The openness of this task allows for students to find many solutions.

Extension: Students could be asked to find the number of possible solutions that exist for each question.

c. Dice Numbers

Materials: four dice

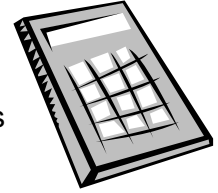
Group size: Individual or pairs

Students throw four dice and use the numbers to make as many different four digit numbers as they can. Students are asked to make

- an even number
- an odd number

- the largest possible number
- the smallest possible number

Students to order their numbers from largest to smallest. Partner to check for accuracy.



d. Calculate to Zero

Materials: One calculator per student, one die, paper to record subtractions

Group size: Pairs

This activity is played as a game with the aim being to get as close to zero as possible, without going into negative numbers.

Each student enters a four digit number into their calculator. Student One then rolls the dice. Once they have seen their roll, Student One must nominate whether they will subtract this from the ones, tens, hundreds or thousands column (only able to nominate each column once) on their calculator; remembering that they cannot subtract more than they already have in that column. If the rolled number is too large to subtract from any column, play passes to the other student, and the student tries again on the next roll.

eg. Enter number 8 469 on calculator. Roll 5 on dice. Unable to subtract 500 (because less than 5 in hundreds column), but could nominate to subtract 5 000, 50 or 5.

Opt to subtract 50, calculator now reads 8 419.

Play moves to Student Two.

On next turn, Student One rolls 2. Unable to subtract 20, because have already “used” subtraction in tens column, must subtract 2 000, 200 or 2. Opt to subtract 2, calculator now reads 8 417.

Play moves to Student Two.

On next two turns, Student One can only subtract from thousands or hundreds column, to come to final result.

Winner is the player closest to zero, after four rolls.

See worked example on next page.

Example for Calculate to Zero

Student One

Enters **8 469**

Student Two

Enters **4 735**

Rolls 5 Subtracts 50

Calculator reads **8 419**

Rolls 2 Subtracts 2

Calculator reads **8 417**

Rolls 6 Subtracts 6000

Calculator reads **2 417**

Rolls 4 Subtracts 400

Calculator reads **2 017**

2 017

Rolls 3 Subtracts 30

Calculator reads **4 705**

Rolls 5 Subtracts 500

Calculator reads **4 205**

Rolls 3 Subtracts 3000

Calculator reads **1 205**

Rolls 6 Unable to subtract 6

Calculator reads **1 205**

1 205

Student Two wins because closer to zero

e. Four Card Numbers

Materials: Set of ten cards, numbered 0 - 9

Group size: Pairs

The aim of this activity is to make the largest four digit number possible. Each student is dealt four cards face down, with the remaining two cards left face down in the centre. Without allowing your partner to see your own cards arrange them to make the largest four digit number possible, but keep them face down. Students **must** trade one of their own cards for one of the cards face down in the centre, and it must be used to replace the discarded number. After this initial trade, taking alternate turns in each round, one player must also “swap” one of their cards for the corresponding card of their partners. i.e. Student One may swap their hundreds card for the hundreds card of their partner. The cards are then turned over and compared, the student with the highest number scores one point for that round, cards are shuffled and play continues.

In the next round the other player must select which card is to be swapped with that of their partner.

Play continues for a set period of time, or until one player reaches a total score of 10.

Variation: Make the lowest number possible.

5. Extending and applying place value knowledge

Can extend and apply knowledge of place value in solving problems.

a. How Far Can You Fly?

Materials: paper aeroplane, measuring tape

Group size: Whole Class

As a prior activity, students make their own (or in pairs) paper aeroplane. They then take turns to fly these from a specified starting point and measure the distance travelled in centimetres. The distances can then be ordered from lowest to highest.

Variation: Measure the height of each student in centimetres, and then order these heights.



b. Lap-a-thon

Materials: 4 dice – 1 red, 3 blue

Group size: Pairs or small group

Students will simulate a group of students participating in a school lap-a-thon, with the dice rolls being used to determine the distance (in metres) walked by each student.

Roll the red dice, this digit will represent the “thousands” number. Roll the other three dice and use these in any order to represent the hundreds, tens and ones digits.

Each roll of the four dice will be used to determine another student's total distance walked.

Once six (or more) distances have been calculated, these should be ordered to determine the student who walked the furthest through to the student who walked the least distance.

Extension: If students raised 10c for each metre walked, how much money was raised by each student? In total?



c. Auction Action

Materials: part of Sunday paper which gives auction results

Group size: Small group

Students select a number of suburbs from the results page of the paper and record the prices that houses sold for. (Their own area may or may not be appropriate). These prices can then be ordered from highest to lowest.

d. Place Value Bingo

Materials: none

Group size: Whole class

Each student records four five digit numbers on a piece of paper. Played like bingo, the teacher gives clues to enable students to cross off their numbers. Clues such as

- an even number
- a number with a 7 in the hundreds column
- a number greater than 80 000

will all assess the students understanding of place value.

Variation: A student plays the role of caller in the larger or a smaller group.



e. Telephone Order

Materials: None

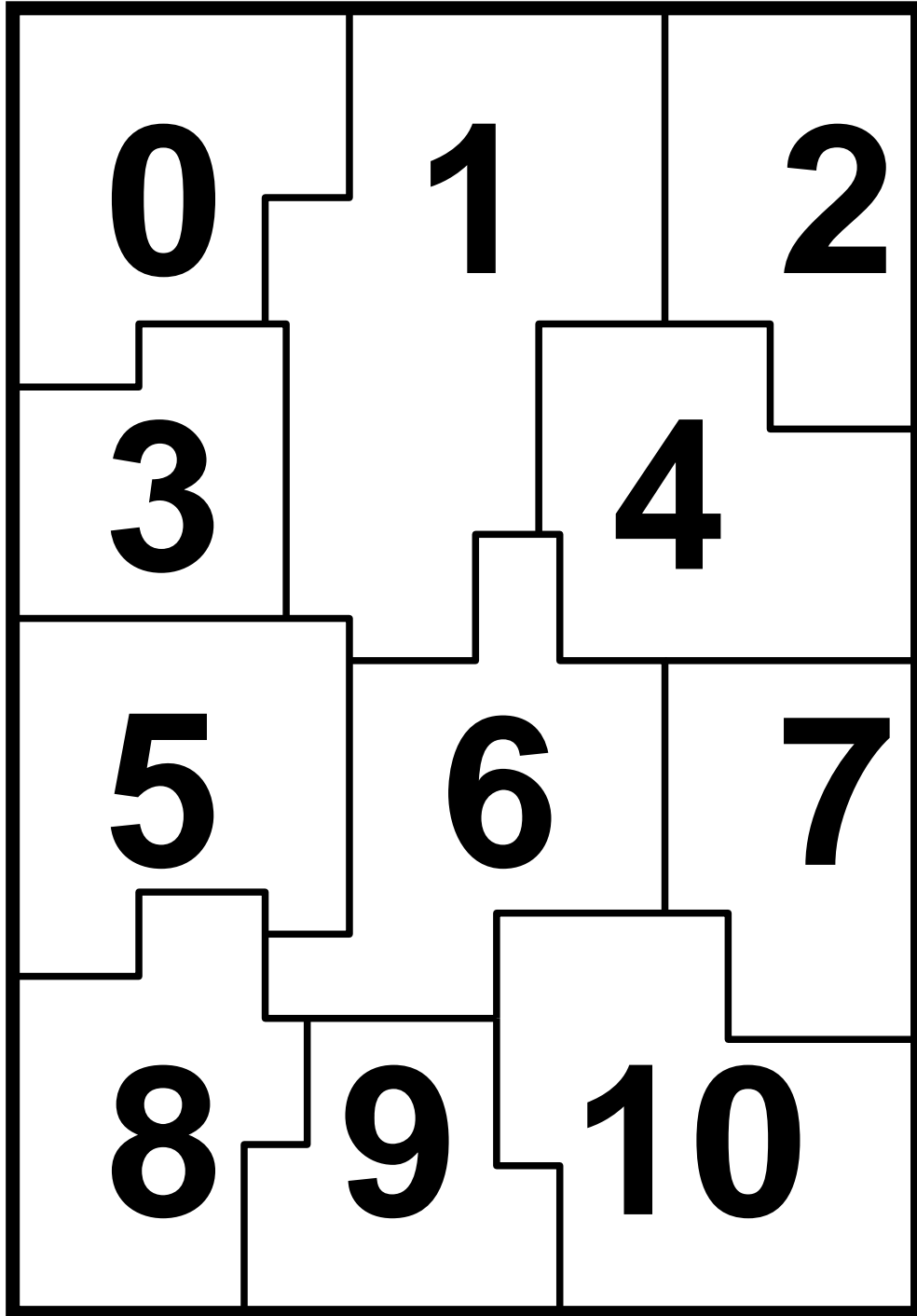
Group size: Whole Class

Teacher models with school telephone number. What is the highest number that can be made using these eight digits? How do we say it? What is the lowest number?

Approximate where the middle between these two digits is. Can you make any numbers that are near to this mid point?

Students record their own telephone number on paper. They then answer the same questions using their own number.

Place Value - Not Apparent
Worksheet 18 - Digit Jigsaw



Place Value - Not Apparent

Worksheet 19 - Counting Strip

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|----|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|

Place Value - Not Apparent
Worksheet 20 - Before Bingo

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

Place Value - Not Apparent
Worksheet 21 - Mystery Mail

An even number greater than 8.

The number two larger than 3.

The number before 7.

An odd number greater than 5 but less than 8.

The number after 2.

The first counting number after 0.

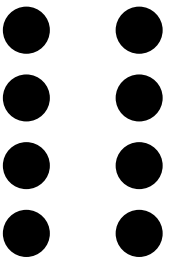
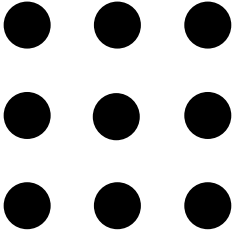

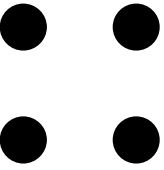
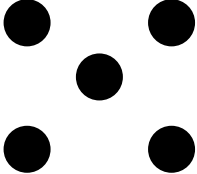

The number between 1 and 3.

The number before 10.

The number after 3.

The even number less than 9.

Worksheet 22 - Dominoes

| | | | |
|---|---|---|---|
| 1 | $3+1$ | $4-1$ |  |
| $6+1$ |  | $5+1$ | 10 |
|  | 5 |  | $8+1$ |
| $0+1$ | 6 | $7+1$ | $3-1$ |
|  | 7 | $9+1$ |  |

Cut along dotted lines only.

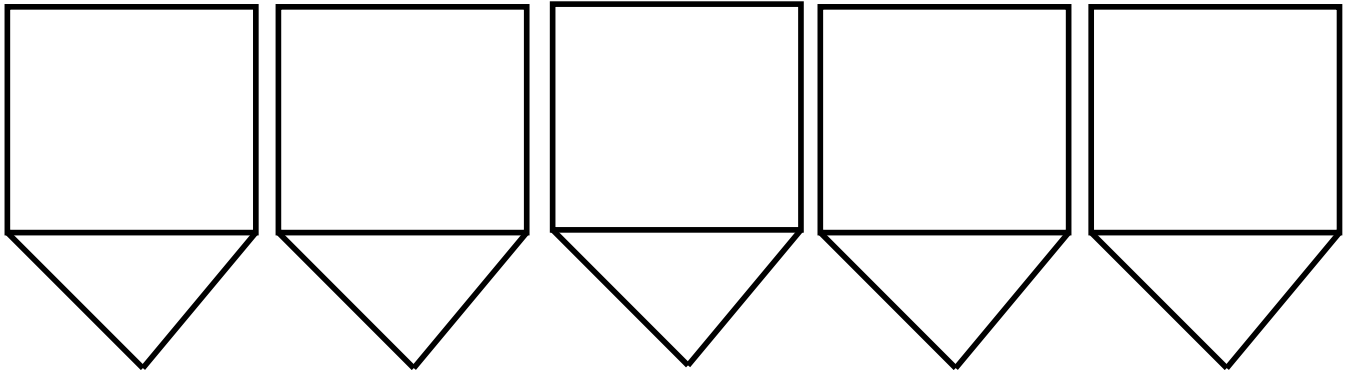
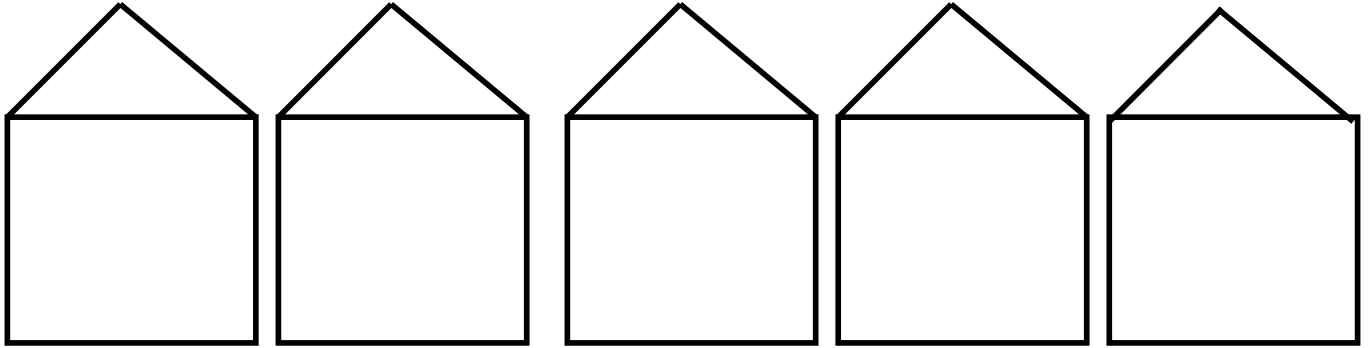
Place Value - Not Apparent
Worksheet 23 - Line Up

| |
|----------------------|
| $6 + 1$ |
| ● ● ● |
| 8 |
| $10 - 1$ |
| ● ● ● ● ● ● |
| $0 + 1$ |
| The number before 5. |
| ● ● ● ● ● |
| The number after 9. |
| $3 - 1$ |

| |
|-------------------------------|
| ● ● ● ● |
| The number between 6 and 8. |
| $8 + 1$ |
| 10 |
| ● |
| $6 - 1$ |
| The number after 5. |
| The next even number after 6. |
| ● ● |
| $2 + 1$ |

Place Value - Reading, writing, interpreting and ordering single digit numbers

Worksheet 24 - Who Lives Where?



Place Value - Reading, writing, interpreting and ordering single digit numbers

Worksheet 25 - Colour in Sum

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|----|----|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|----|----|----|

Place Value - Reading, writing, interpreting and ordering two digit numbers

Worksheet 26 - Connect Four

| | | | | | |
|----|----|----|----|----|----|
| 11 | 12 | 13 | 14 | 15 | 16 |
| 21 | 22 | 23 | 24 | 25 | 26 |
| 31 | 32 | 33 | 34 | 35 | 36 |
| 41 | 42 | 43 | 44 | 45 | 46 |
| 51 | 52 | 53 | 54 | 55 | 56 |
| 61 | 62 | 63 | 64 | 65 | 66 |

Place Value - Reading, writing, interpreting and ordering two digit numbers

Worksheet 27 - Odds and Evens

| Tens | Ones |
|------|------|
| | |

Place Value - Reading, writing, interpreting and ordering three digit numbers

Worksheet 28 - Three Card Numbers

| A three digit number which ... | Number |
|--------------------------------|--------|
| has a 3 in the hundreds column | |
| is even | |
| has a 6 in the tens column | |
| is greater than 500 | |
| has a 7 in the units column | |

Worksheet 30 - Find Me a Number

Write a four digit number which has:

a 3 in the 10s column

is odd

is greater than 4 000

has a 7 in the 100s column

is a multiple of 10

has a number greater than 5
in the 10s column

is less than 6 000

is even

has a 9 in the 1s column

has 2 zeros in it

| | | | |
|--|--|--|--|
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Growth Point Activities

ADDITION & SUBTRACTION STRATEGIES

0. Not apparent

- | | |
|--------------------------|-------|
| a. Student Groups | pg 72 |
| b. Smartie Maths | pg 72 |
| c. Count Around the Room | pg 73 |
| d. Fingers and Toes | pg 73 |
| e. Spinning Dots | pg 73 |

1. Count All (two collections)

- | | |
|------------------------------------|-------|
| a. Potato Stamping | pg 74 |
| b. Match Box Counting | pg 74 |
| c. Add Them Up | pg 74 |
| d. Dice Bingo (Worksheet 31 pg 88) | pg 75 |
| e. Dot Plate Match Up | pg 75 |

2. Count On

- | | |
|-------------------|-------|
| a. Counter Cards | pg 76 |
| b. Pair Up | pg 76 |
| c. Telephone High | pg 76 |
| d. Soccer Scores | pg 77 |
| e. Twenty Wins | pg 77 |
| f. Count On | pg 77 |

3. Count back/count down to/count up from

- | | |
|--|-------|
| a. Subtraction Triplets (Worksheet 32 pg 89) | pg 78 |
| b. Count Back Bingo (Worksheet 33 pg 90) | pg 78 |
| c. Connect Three (Worksheet 34 pg 91) | pg 78 |
| d. Mine Shaft Drop (Worksheet 35 pg 92) | pg 79 |
| e. Backwards Roll | pg 79 |

4. Basic Strategies (doubles, commutativity, adding ten, tens facts, other known facts)

- | | |
|---|-------|
| a. Butterflies (Worksheet 36 pg 93) | pg 80 |
| b. Tens Frame Match Up (Worksheet 37 pg 94) | pg 81 |
| c. Draw a Game Card (Worksheet 38 pg 95) | pg 81 |
| d. Add Them Up | pg 81 |
| e. Connect Four Again (Worksheet 39 pg 96,97) | pg 82 |

5. Derived strategies (near doubles, adding 9, build to next ten, fact families, intuitive strategies)

- a. Adding Nine pg 83
- b. Fact Families (Worksheet 40 pg 98) pg 83
- c. Chonks Visit Earth pg 84
- d. How will you solve it? (Worksheet 41 pg 99) pg 84
- e. Dice Throw pg 85

6. Extending and applying addition and subtraction using basic, derived and intuitive strategies

- a. Top Table pg 86
- b. Three Digit Throw pg 86
- c. I went shopping and I bought... pg 86
- d. Race to the Edge (Worksheet 42 pg 100) pg 87
- e. Heads High, Tails Low pg 87

Growth Point Activities

ADDITION & SUBTRACTION STRATEGIES

0. Not Apparent

Not yet able to combine and count two collections of objects.

a. Student Groups

Materials: None

Group size: Whole class

Teacher calls for groups of students to stand up

eg. all students with
jumpers on
pigtails
brown hair
glasses



Class then counts the number of students in each group. These could be recorded on the board and then a comparison made as to the largest, smallest group etc.

b. Smartie Maths

Materials: one small box of smarties for each student

Group size: Whole class

This activity is aimed, primarily, at simply providing lots of opportunities for counting.

Each student is given a small box of Smarties. Questioning could begin such as

How many smarties do you think will be in your box? More than one?

Less than one hundred? Ask for reasons as to answers given.

Students count numbers of Smarties in box. Then separate the Smarties into colour groups. How many brown Smarties? Stand up if you had 3 brown Smarties in your box. Then count number of students standing.

Extension: This activity could be revisited and include counting total number of brown (etc) Smarties in the class.

c. Count Around the Room

Materials: everyday classroom equipment

Group size: Whole class or small group

This activity is aimed, primarily, at simply providing lots of opportunities for counting.

Find objects/equipment around the classroom and school which can be used for counting. eg. windows, steps, cars in the carpark, trees.

Practise counting these as a group, begin to introduce the idea of “easier” ways to count, such as by 2s etc.

d. Fingers and Toes

Materials: None (but this is an activity that should be completed in the morning!)

Group size: Small group

Students remove shoes and socks, and count together the total number of fingers and toes in their group.

Ask for suggested strategies to make the counting easier such as counting by 2s, 5s or even 10s.



e. Spinning Dots

Materials: stick on dots, blank stickers

Group size: Whole class

Preparation: Make regular dot patterns on the back of half of the students in the class for numbers 1 to 15 (or 1 – 12 etc. depending upon the number of children in the class). Make a second random set of dot patterns on the back of the rest of the students for the same digits.

One by one the students stand at the front of the room and turn quickly to show the rest of the class the pattern on their back. With only a quick glimpse, the students call out the number of dots they see, and this numeral is then written onto a blank sticker and placed on the front of the student.

Extension: After all students have a numeral sticker to match their dots, they must then find the other student in the room who has the same number as them. They then transfer their dot patterns onto two halves of a blank sheet of paper, with the numeral written at the top of the page.

1. Count All (two collections)

Counts all to find the total of two collections

a. Potato Stamping

Materials: potato stamp (or similar), paint

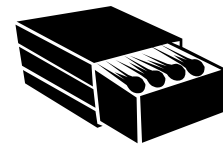
Group size: Individual

Student takes a piece of paper and folds it in half. On one half he stamps between one and five stamps. He then folds the paper in half to transfer the image onto the other half of the paper. Count the total number of stamps now across the page.

b. Match Box Counting

Materials: empty match boxes, counters

Group size: Pairs



Preparation: Fill empty match boxes with between 1 and 10 counters. Write the number of counters on the bottom of the box.

Working as a pair, each student chooses a matchbox and empties the counters onto the table. Combining the contents of two boxes, the students count the total number of counters. After checking their answer, they then redivide the counters back into the match boxes by counting out.

eg. matchbox #8 and matchbox #5 are selected.

Count total of 13 counters together. Then reparate into 8 and 5 in each box.

c. Add Them Up

Materials: pack of playing cards with picture cards removed (Ace =1), counters

Group size: Pairs

Each student is given ten counters. To begin a “round”, each student places one counter in front of them. Both students are then dealt two cards, they count the total of these two cards, and the student with the highest total collects both counters. In the event of the same total, each student places another counter out, and two more cards are dealt to each student. The highest total takes all four counters. The student who collects all of the partners counters, is the winner.

d. Dice Bingo (Worksheet 31)

Materials: activity sheet (optional), 2 dice

Group size: Small group

Each student selects four numbers between 2 and 12, and records these on the activity sheet (or on another piece of paper). The two dice are then rolled and the total counted. If students have this total on their sheet, they cross it off. Play continues until bingo is reached.

e. Dot Plate Match Up

Materials: dot plates

Group size: Whole class (assume thirty students)

Preparation: Make one set of coloured dot plates with the numbers 11 – 20.

Make a white set of dot plates with the numbers

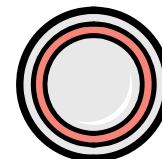
3, 4, 4, 5, 5, 5, 6, 6, 7, 7, 8, 8, 8, 9, 9, 10, 11, 12, 13 and 15.

Make different dot patterns for numbers which are repeated.

Give each student a dot plate. The students with the “total” or coloured dot plates must find two other students who combine to give their total.

eg.. Coloured Dot plate #14 may find #9 and #5.

It may happen that towards the end, the dot plates that are left may not combine to make the remaining totals. This allows for discussion about other possible combinations, and may require some rearrangement of groups already formed.



2. Count On

Counts on from one number to find the total of two collections.

a. Counter Cards

Materials: Set of playing cards with picture cards removed (Ace = 1),
counters



Group size: Pairs

Each student is dealt one card face up. They collect this number of counters and place them on the table. They are then each dealt another card. Again they collect this number of counters. Using the Count On strategy, they begin with the largest number and count on to find the total of the two sets of counters, and therefore the two sets of cards. The student with the highest total collects all four cards.

Play then repeats itself for either a timed period, or until the pack is all dealt.

b. Pair Up

Materials: None

Group size: Whole class

This is a useful activity whenever there is a need to pair students off.

Teacher numbers students from 1 to the number of students in the class. Students are then instructed to find the person with whom, their numbers added together makes one more than the highest number allocated.

i.e. If there are 26 students in the class, students must find their partner with whom their numbers added together make 27. eg. 1 and 26, 2 and 25 etc.

c. Telephone High

Materials: None

Group size: Whole class

The aim of this activity is to give students the opportunity to practise the count on strategy. Explain to students that you are going to see who has the highest scoring telephone number in the class. Teacher models with a telephone number, eg. 9834 4833 becomes $9 + 8 + 3 + 4 + 4 + 8 + 3 + 3$. Add only pairs of numbers at a time i.e. $9 + 8 = 17$, $17 + 3 = 20$ etc to reach a total of 42.

Students then add the eight digits of their own phone numbers together to find a total.

d. Soccer Scores

Materials: 10 of each number 0, 1, 2, and 3 cards and 3 number 4 cards



Group size: Whole class

Divide the class into halves. One is the Red Ravens soccer team, and the other the Blue Bods. Explain that you are going to simulate an entire soccer season, by finding the total number of goals that they scored each week.

Draw two columns on the blackboard and label one Red Ravens and the other Blue Bods. To simulate each round, have a student draw a card from the pack. This is their team's score for that round. Record it on the board, and as further rounds are scored, add a second column for each team with a cumulative total. Use the count on strategy from the previous score to find the new score. Encourage oral counting by each team to find their progressive total.

Play for ten rounds and the team with the highest score at the end of the season, will be the premiers.

e. Twenty Wins

Materials: one die

Group size: Pairs



Students take turns to roll the dice. They count on from the previous turn. The student who counts the number "20" wins the rounds and takes a counter. They then begin the next round by rolling the dice and starting from zero again. The first student to collect five counters wins.

f. Count On

Materials: Set of cards numbered 0 –15

Group size: Pairs

Soccer scores is a good activity to complete as a whole class before breaking into pairs to play this game.

The first student turns over two cards. They determine how many it is to count on from the lowest number to the highest and record this number on paper. Play then passes to Student Two. On Student One's second turn, add the "counting on" amount to the previous score and count on again to find a cumulative total. Play returns to Student Two.

The first student to score 100 wins.

3. Count back/count down to/count up from

Given a subtraction situation, chooses appropriately from strategies including count back, count down and count up from.

a. Subtraction Triplets (Worksheet 32)

Materials: One worksheet per student (or pair)

Group size: Individual or Pairs

Cut along the dotted lines to make three piles of number cards. Leave the subtraction signs and equal signs in columns. Students choose one card from each column to make true subtraction equations.

eg. $19 - 10 = 9$ or $16 - 7 = 9$

Students should be encouraged to use the count back, count down to and count up from strategies to select the numbers from columns two and three.

NB. Depending upon the combinations chosen, there may be some cards left over – this could be used as the basis for a discussion of the various strategies which can be used.

b. Count Back Bingo (Worksheet 33)

Materials: One game card per student, one dice

Group size: Small group

Each student is given one game card. The number in bold above the grid is their target number. The teacher (or one student) rolls the dice. Students count back from their target number by the amount shown on the dice. If this number appears on their game card they cover it with a counter. The first to cover all four numbers on their grid is the winner.

c. Connect Three (Worksheet 34)

Similar to activity in ‘Dice Dilemmas’, by Paul Swan

Materials: Two sets of cards 0 – 20, counters

Group size: Pairs

Each student has one grid card. Students take turns to draw two cards from the pile. They then find the difference between these two cards by using either the count back, count down to or count up from strategies. They cover this difference with a

counter on their grid card. The first student to cover three numbers in either a vertical, horizontal or diagonal row, is the winner.

d. Mine Shaft Drop (Worksheet 35)

Materials: One activity card per pair, one dice, one coin

Group size: Pairs



The aim of this game is to be the first to get to the diamonds at zero. Begin at ground level (40). Student One tosses the coin. If the coin lands as

Heads – move up

Tails – move down

the mine shaft. Once the direction is known, the student then rolls the dice to find the number of moves to be made. Play moves from student to student until one reaches the diamonds at the bottom of the mine shaft. An exact roll is not needed in order to win.

If a student reaches 50, they stay there until they toss a tails in order to move down.

e. Backwards Roll

Materials: one dice, calculator (optional)

Group size: Pairs

Each student begins with the number 100. Each student rolls the dice and counts back by the number shown. The first student to reach zero is the winner. Encourage students to record their running total.

Variation: Students use the calculator to keep track of their total.

4. Basic Strategies (doubles, commutativity, adding 10, tens facts, other known facts)

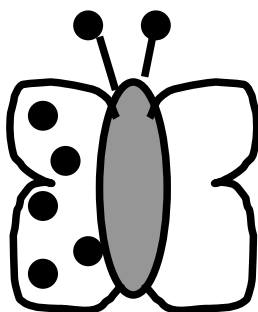
Given an addition or subtraction problem, strategies such as doubles, commutativity, adding 10, tens facts and other known facts are evident.

a. Butterflies (Worksheet 36)

Materials: templates of butterflies for each student

Group size: Small group

Explain to the students that these are the lay out for a new type of chocolate biscuit. There has, however, been a fault at the factory and they have not been properly completed. The biscuits are supposed to have the same number of smarties on both wings of the butterflies, but they have been produced with smarties only on one wing.



Model the above diagram for students. Ask students, how many smarties are there on this biscuit? How many smarties should there be on this biscuit? Have students use the template and counters or pencil to make their own biscuits to determine the correct answer.

Discuss the concept of doubling with the students. Model with other numbers between 1 and 10.

b. Tens Frame Match Up (Worksheet 37)

Materials: templates of tens frames

Group size: Individual or Pairs

The aim of this activity is to reinforce the concept of commutativity. Cut the worksheet into each separate tens frame. Students must match the pairs which show this rule. i.e. $6 + 4$ and $4 + 6$. NB. Match only frames with the same symbols.

Extension: Use the blank tens frames to have students develop their own pairs to show commutativity.

c. Draw a Game Card (Worksheet 38)

Materials: game cards, calculator, three sets of cards numbered 1 -10

Group size: Pairs or small group

Shuffle the number cards and place face down. Students take turns to draw one number card from the pile. They then also draw one of the game cards. They must then give the correct answer to the game card question for their selected number. eg. draw number 3 and game card "make to 10". The answer required is "7".

Partner checks correct response, with calculator if necessary. For each correct response the student scores one point. The first student to score ten points is the winner.

Variation: Use number cards 10 – 20, with second set of game cards.

(i.e. "half", "subtract 10", "add to 20" and "subtract to 10")

d. Add Them up

Materials: none

Group size: Whole Class

The aim of this activity is to give students strategies to use when adding together groups of numbers. (Telephone High could be revisited after having completed this activity in order to provide students with further opportunities to add strings of numbers). Give students strings of numbers to add (See below) and encourage them to visit a range of strategies before they begin, to find the most appropriate. i.e. look for tens facts first, then doubles, use the commutativity rule etc.

Add 4, 3, 6, 5, 8, 7, 2, 9 Pair up 4 and 6, 3 and 7, 8 and 2. Three pairs of tens facts equals 30. Then use the plus $5 + 10 = 15$, but only have $5 + 9$ therefore $= 14$.
 $30 + 14 = 44$.

Use sets of numbers below as practice:

5, 3, 6, 4, 5, 8, 2, 1

4, 7, 6, 9, 2, 5, 7, 1

5, 8, 4, 2, 5, 9, 5, 3

8, 6, 3, 9, 4, 0, 2, 6

7, 1, 5, 3, 7, 8, 4, 6

e. Connect Four Again (Worksheet 39)

Materials: activity card, cards numbered 41 – 90, coin

Group size: Pairs or small group

Students take turns to draw a card. They then roll the dice, if

Heads – add ten

Tails – subtract ten

Students colour the appropriate square on the grid, the first to colour four squares in a row, vertically, horizontally or diagonally is the winner.

5. Derived Strategies (near doubles, adding 9, build to next ten, fact families, intuitive strategies)

Given an addition or subtraction problem, strategies such as near doubles, adding 9, build to next ten, fact families and intuitive strategies are evident.

a. Adding Nine

Materials: None

Group size: Whole class

Students use the rhyme to learn the adding nine rule. If appropriate, they may be able to add another verse.

Rhyme to the tune of “I’m a Little Teapot”

I love to add the number nine

There is a rule which works all the time

Take one off the units, add it to the tens

You can do it again and again

Sixty five plus nine makes seventy four

“Oh” you shout, “Let’s do some more”

Thirteen plus nine is twenty two

Now you know the rule you should use it too



b. Fact Families (Worksheet 40)

Materials: worksheet for each individual or pair (optional)

Group size: Individuals or pairs

Students use their knowledge of fact families to ten to complete the following statements. (This can be done on the whiteboard or as a worksheet).

I know that $2 + 8 = 10$, therefore I also know $8 + 2 = 10$

$$10 - 8 = 2$$

$$10 - 2 = 8$$

Extension: This practise can be used with fact families to 20 also.

c. Chonks Visit Earth

Materials: none

Group size: Small group

This task is a useful means of assessing what the students know about different strategies to use when adding and subtracting numbers.

Explain to the students that they have just had a new girl arrive at their school from Chonk Rock. (Refer Place Value Growth Point 2 Activity d) This is a planet far away in the solar system. Chonks know nothing about the way we work at school, so your teacher has asked you to help teach the new Chonk girl, some of the things you know about Maths. Each group is asked to put on a short play to dramatise one of the addition or subtraction strategies that can be used.

The strategies to be presented are

- doubles
- commutativity
- adding ten
- tens facts
- near doubles
- adding nine
- build to next ten
- fact families

Use your play to show these strategies might be useful in everyday life on Earth.

d. How will you solve it? (Worksheet 41)

Materials: one algorithm card for each pair

Group size: Pairs

Each pair is given an algorithm on a card. They must decide together what they think is the most appropriate strategy (there may be more than one in some cases) to use to solve this algorithm and use it to find the solution. Each pair then finds another pair to whom they must then explain which strategy they used to solve their problem and why. The partners then use the strategy to determine the answer and check for accuracy.

Extension: Pairs can write another algorithm to give to their partners which would be most suitably solved using the same strategy.

e. Dice Throw

Materials: two red dice and two blue dice, and one calculator (optional) for each pair

Group size: Pairs

One student rolls the blue dice and adds the two numbers together to find the total.

i.e. Rolls 4 and 3 and has total of 7.

The other student then rolls the two red dice and uses the numbers to make a two digit number. i.e. Rolls 5 and 3, can make either 35 or 53.

Working together, the students then add the number from the blue dice together with the number from the red dice, using an appropriate strategy. Record the answer on paper, and can be checked with a calculator if desired.

On the next turn students swap tasks.

Whole class discussion about the highest number calculated by a group, and the strategies used.

Variation: Students subtract the total found on the blue dice from the two digit number created by the red dice.

Extension: What is the highest total that could be scored? What is the lowest total that could be scored? How do you know this?

6. Extending and applying addition and subtraction using basic, derived and intuitive strategies

Given a range of tasks (including multi digit numbers), can solve them mentally, using the appropriate strategies and a clear understanding of key concepts.

a. Top Table

Materials: None

Group size: Whole class

This activity assumes that the students sit in table groups.

Appoint (or ask the students to appoint) a recorder for each table. This person then records the street number of the home of each student. Working as a team, each table group sums the street numbers, using an appropriate strategy. Class discussion can follow about the highest table total in the class. Is there a highest possible total? Is there a lowest possible total? How can they be sure?

Variation: Students find the average street number for their table.

b. Three Digit Throw

Adapted from Race to 1000 – Shuffling into Maths pg 3 -7

Materials: three dice for each pair

Group size: Pairs

Students draw a table with a hundreds, tens and ones column. They then take turns to roll the three dice. Make and record the highest possible number, and the lowest possible number using the three dice. Find the difference between these two numbers.

Students keep a running total of their differences and progressively add these together. The first student to reach a total score of 1 000, wins.

c. I Went Shopping and I Bought ...

Materials: cards made from junk mail brochures with priced items

Group size: Small Group

Place the cards face down in the centre of the table. Students take turns to turn one card face up and see what they bought when they went shopping. Students need to

keep an exact total of what they spent, until they reach their “limit”.

Once their “limit” is reached, students continue to turn the top card over, and they may trade one (or more) already purchased item for the new one, provided they remain under their limit. After each purchase, or trade, they must re-establish their total spending.

NB. The students’ “limit” will depend upon the type of junk mail brochures used. eg. Supermarket items may produce a limit of \$25, whereas Hi-Fi equipment may need to have a \$5000 limit.

d. Race to the Edge (Worksheet 42)

Materials: one game card per pair, one dice labelled +8, -8, +12, -12, +16, -16, coloured pencil for each student

Group size: Pairs

Each student begins the game in the centre of the board, on the square marked 50. Students take turns to roll the dice, and calculate their new total. i.e. Start at 50, roll + 8, student can move to square marked 58. However, students can only move to this total if it is adjacent (in any direction) to the square that they are currently in. If there is not an adjacent square with this total, play passes to the partner.

Students track their progress across the game card by colouring the squares they land in. The aim of the game is to be the first student to reach an edge of the square.

Variation: Students can move from an edge back into the centre 50 square.

e. Heads High, Tails Low

Materials: 2 dice, 1 coin, paper to record scores

Group size: Small Group

Each student commences this game with a score of 250. Students then take turns to roll the two dice, and use the numbers to make a two digit number. i.e. If roll 2 and 5, can opt to make 25 or 52. Once this two digit number is determined, students then toss the coin. If it lands Heads – they add this two digit number to their total, if it lands Tails – they must subtract it.

The aim of this game is to be the first to reach either 0 or 500.

Addition & Subtraction - Count All

Worksheet 31 - Dice Bingo

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Addition & Subtraction - Count back/count down to/count up from
Worksheet 32 - Subtraction Triplets

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|----|---|----|---|----|
| 19 | - | 12 | = | 7 |
| 14 | - | 8 | = | 3 |
| 20 | - | 6 | = | 8 |
| 11 | - | 3 | = | 4 |
| 16 | - | 13 | = | 14 |
| 15 | - | 7 | = | 9 |
| 13 | - | 9 | = | 8 |
| 17 | - | 10 | = | 8 |

Addition & Subtraction Strategies - Count back/count down to/
count up from

Worksheet 33 - Count Back Bingo

20

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|----|----|
| 15 | 19 |
| 14 | 18 |

16

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| 14 | 15 |
| 11 | 12 |

11

| | |
|---|----|
| 8 | 10 |
| 7 | 6 |

14

| | |
|----|----|
| 8 | 12 |
| 10 | 9 |

12

| | |
|----|----|
| 10 | 9 |
| 8 | 11 |

8

| | |
|---|---|
| 6 | 3 |
| 2 | 5 |

Addition & Subtraction - Count back/count down to/
count up from

Worksheet 34 - Connect Three

| | | | | |
|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 |

| | | | | |
|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 |

Addition & Subtraction - Count back/count down to
Worksheet 35 - Mine Shaft Drop

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41
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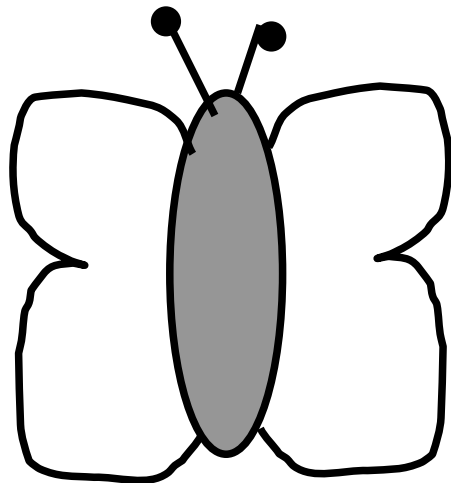
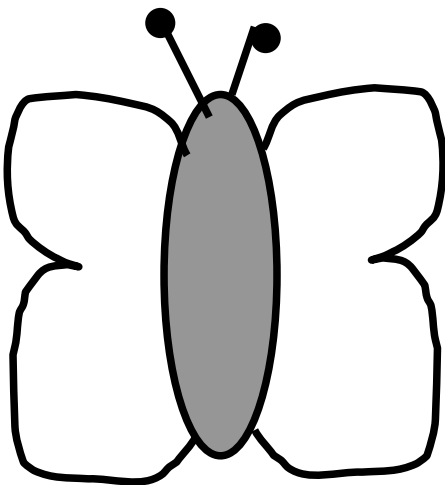
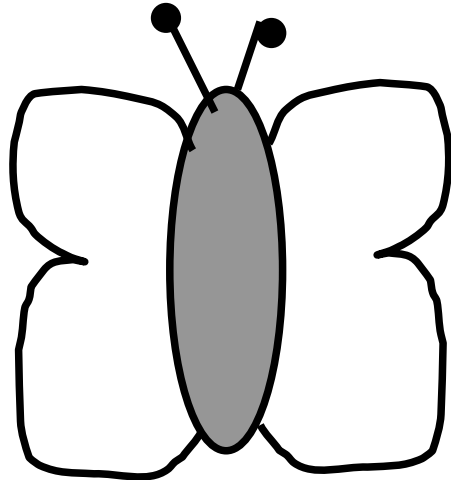
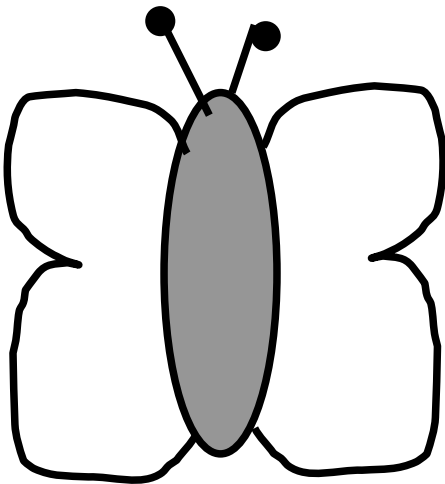
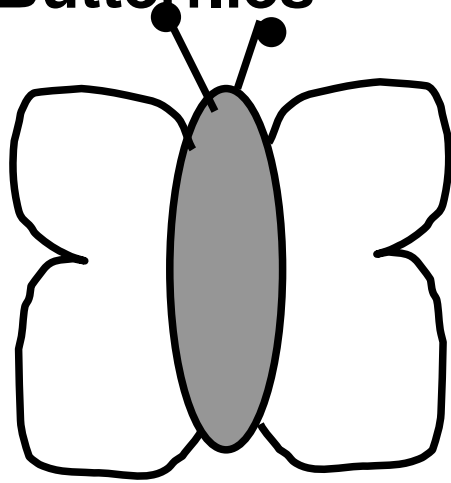
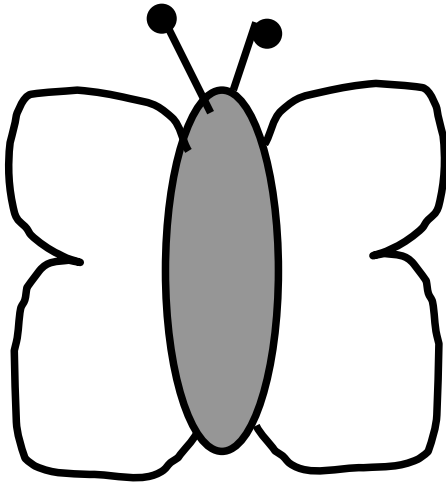
Ground Level



Diamonds



Addition & Subtraction - Basic Strategies
Worksheet 36 - Butterflies



Addition & Subtraction - Basic Strategies
Worksheet 37 - Tens Frame Match Up

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Worksheet 38 - Draw a Game Card

double

add ten

make to ten

plus ten

half

subtract ten

add to twenty

subtract to ten

Worksheet 39 - Connect Four Again

Grid

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 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 |

Addition & Subtraction - Basic Strategies

Worksheet 39 - Connect Four Again

Cut to make cards

| | | | | |
|----|----|----|----|----|
| 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 |

Addition & Subtraction - Derived Strategies

Worksheet 40 - Fact Families

I know that $2 + 8 = 10$, therefore I also know that $8 + 2 = 10$
 $10 - 8 = 2$
 $10 - 2 = 8$

I know that $7 + 3 = 10$, therefore I also know that

I know that $4 + 6 = 10$, therefore I also know that

I know that $9 + 1 = 10$, therefore I also know that

I know that $5 + 5 = 10$, therefore I also know that

Addition & Subtraction - Derived Strategies

Worksheet 41 - How Will You Solve it?

Cut into cards

$6 + 7$

$42 - 9$

$36 + 8$

$12 + 14$

$34 + 10$

$17 - 5$

$21 - 11$

$8 + 25$

$9 + 16$

$13 + 12$

$17 - 8$

$18 + 4$

$6 + 24$

$7 + 17$

$27 - 12$

Addition & Subtraction - Extending and Applying Strategies

Worksheet 42 - Race to the Edge

| | | | | | | | | |
|-----|-----|----|-----|----|----|----|----|----|
| 62 | 58 | 94 | 106 | 50 | 62 | 26 | 2 | 62 |
| 78 | 74 | 86 | 90 | 58 | 46 | 14 | 34 | 46 |
| 114 | 66 | 78 | 82 | 74 | 54 | 30 | 42 | 50 |
| 90 | 102 | 86 | 70 | 66 | 42 | 72 | 64 | 40 |
| 26 | 34 | 42 | 58 | 50 | 64 | 56 | 48 | 60 |
| 66 | 58 | 46 | 34 | 38 | 62 | 74 | 90 | 98 |
| 50 | 38 | 22 | 26 | 54 | 70 | 46 | 34 | 42 |
| 34 | 18 | 30 | 34 | 42 | 62 | 58 | 66 | 50 |
| 10 | 2 | 14 | 36 | 30 | 78 | 74 | 54 | 58 |



Growth Point Activities

MULTIPLICATION & DIVISION STRATEGIES

0. Not apparent

- | | |
|--------------------------------------|--------|
| a. Rabbit Ears (Worksheet 43 pg 118) | pg 103 |
| b. Feet facts (Worksheet 44 pg 119) | pg 103 |
| c. Unifix Sharing | pg 103 |
| d. Groups of Students | pg 104 |
| e. Mathematical Necklaces | pg 104 |

1. Counting group items as ones

- | | |
|---|--------|
| a. Group Matching (Worksheet 45 pg 120) | pg 105 |
| b. Street Smart (Worksheet 46 pg 121) | pg 105 |
| c. Lots of | pg 105 |
| d. Counter Groups | pg 106 |
| e. Grouped by ... | pg 106 |

2. Modelling multiplication and division (all objects perceived)

- | | |
|---|--------|
| a. More Group Matching (Worksheet 47 pg 122) | pg 107 |
| b. Modelling Multiplication | pg 107 |
| c. Multiplication Bingo (Worksheet 48 pg 123 - 127) | pg 107 |
| d. Party Time | pg 107 |
| e. Line Them Up (Worksheet 49 pg 128) | pg 108 |

3. Abstracting multiplication and division

- | | |
|---|--------|
| a. Colour To Win (Worksheet 50 pg 129) | pg 109 |
| b. Connect Three in the Grid (Worksheet 51 pg 130, 131) | pg 109 |
| c. Fill in the Blanks (Worksheet 52 pg 132) | pg 109 |
| d. Fact Trees (Worksheet 53 pg 133) | pg 111 |
| e. CoinToss | pg 111 |

4. Basic, derived and intuitive strategies for multiplication

- | | |
|---|--------|
| a. Modelling Multiplication Again | pg 111 |
| b. Multiplication Rules that you know | pg 111 |
| c. Multiplication Snap (Worksheet 54 pg 134, 135) | pg 112 |
| d. Choose Five (Worksheet 55 pg 136) | pg 112 |
| e. Vowels and Consonants in your name | pg 112 |

5. Basic, derived and intuitive strategies for division

- a. Connect 3 in the Grid Again (W'sheet 56 pg137-138) pg 113
- b. Even Stevens pg 113
- c. Calculator Quiz pg 113
- d. Remainders pg 114
- e. Draw Cards pg 114

6. Basic, derived and intuitive strategies for division

- a. Let's Go Shopping pg 115
- b. Clumps pg 115
- c. Telephone Maths Again pg 116
- d. Nappy Maths pg 116
- e. What's in a name? pg 116

Growth Point Activities

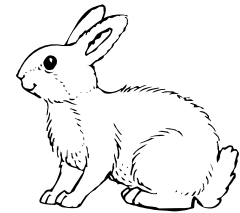
MULTIPLICATION & DIVISION STRATEGIES

0. Not Apparent

Not yet able to create and count the total of several small groups.

a. Rabbit Ears (Worksheet 43)

Similar to activity in 'Count Me In Too', Dep't of Education & Training, NSW, 1999



Materials: one worksheet per student (recommend enlarge to A3), scissors, glue

Group size: Individual or pairs

Students complete worksheet by cutting and pasting 2 ears on each rabbit. The ears can be cut from the bottom of the page. Concluding discussion can centre around number of ears and number of rabbits. I.e. 1 rabbit = 2 ears, 2 rabbits = 4 ears etc.

b. Feet Facts (Worksheet 44)

Materials: one worksheet per student

Group size: Individual or pairs

Students complete worksheet by adding five toes to each foot. Can then follow with discussion, one foot equals five toes, two feet equals ten toes etc.

c. Unifix Sharing

Materials: unifix blocks or similar

Group size: Small group lead by teacher

Each student is given a collection of twenty blocks (or items). Students are asked to share them into groups of 4. How many groups can you make? Compare answers. Combine groups to make twenty again. This time ask students to make groups of seven. How many groups can you make? Are there any left over? How many more blocks would we need to make another group of seven?

Repeat with groups of any number less than twenty. Students may be able to predict the likelihood of "left overs". It may be appropriate at this stage to introduce the term "remainder".

d. Groups of Students

Materials: None

Group size: Whole Class

Use the students themselves to model groups. Ask six students to organise themselves into “three groups of 2”, and record this in words on the board. Have the class determine whether or not they have been successful in their attempt.

At this time it may be appropriate to introduce the multiplication symbol (\times), and record underneath the above “ 3×2 ”.

Write onto the board another statement such as “4 groups of 5”. A student may be able to use the previous example to also record it as 4×5 . Again, have a different set of students organise themselves into this configuration.

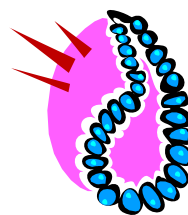
Repeat with various combinations, that total less than the number of students in the class.

Variation: Have a student determine the algorithm to be represented.

e. Mathematical Necklaces

Materials: various types of macaroni, string

Group size: Small group



Students thread the macaroni onto the string to make a necklace, they must however, thread the macaroni on in groups. eg. Thread six of one type of macaroni, then six of another type to make a repeating pattern. Discuss with the students the total number of macaroni pieces used, and how this could be recorded as an algorithm.

Eg. Eight groups of six macaroni equals 48 pieces, or 8 lots of $6 = 48$

It is recommended that the students be asked to complete this activity a couple of times, by rethreading their necklace with different “groups of” before being allowed to tie it off and wear it.

1. Counting group items as ones

To find the total in a multiple group situation, refers to individual items only.

a. Group Matching (Worksheet 45)

Materials: one worksheet per student

Group size: Individual or pairs

Students complete worksheet by matching grouped items on the left with the numerical value on the right.

b. Street Smart (Worksheet 46)

Materials: one activity card (enlarged to A3), selection of cut out people

Group size: Small group lead by teacher

Teacher leads activity by asking various students to place the correct number of people into (or beside) each house. Eg. Place all of the people who live in Green Street, into their homes. Discussion can then centre around the number of people who live in the street. "Is there an easy way to work this out?" i.e. Six houses with two people living in each $6 \times 2 = 12$ people live in Smith Street. Model the written algorithm for the students.



c. Lots of

Materials: 1 die, 1 set of cards numbered 1-5 per group, MAB, unifix or other items to be used as counters

Group size: Small group

Student rolls the die to determine how many "lots of" need to be made, and then draws a card to determine the group size. Eg. Roll 2 and draw 5, means make 2 groups of five. The student must then physically model these groups using the MAB or other items. This is checked by others in the group who then take a turn.

d. Counter Groups

Materials: 2 dice, 100 counters per student

Group size: Small group

Each student is given exactly one hundred counters. They then take turns to roll the two dice and use the two numbers to collect counters. eg. roll 3 and 4, collect three lots of four counters (or four lots of three counters). The next student then has a turn to roll the two dice. Play continues until one student has no remaining counters, or a set time has elapsed.

Variation: Students must also be able to state the total number of counters they have collected.

e. Grouped by ...

Materials: none

Group size: Whole class

This is a whole class discussion based activity. Ask students to identify items in the room that come in groups of

ones eg. students, lights, books etc

twos eg. arms, legs, eyes, ears etc

threes eg. stool legs, triangle sides

fours eg. chair legs, table legs,

fives eg, fingers, toes



Use these items to model groups of i.e. “if we have three chairs, that make 3 groups of 4 legs so that equals 12 legs all together”

Ask students to model similar algorithms.

2. Modelling multiplication and division (all objects perceived)

Models all objects to solve multiplicative and sharing situations

a. More Group Matching (Worksheet 47)

Materials: one worksheet per student

Group size: Individual or pairs

This is a very similar activity to “Group Matching”, but with a third column which requires students to also match the corresponding multiplication algorithm, with the visual representation and the numeral. Cards may be cut up individually to allow for easier manipulation.

b. Modelling Multiplication

Materials: 24 counters per student, set of flashcards numbered 6, 8, 9, 12, 16, 18, 20, and 24

Group size: Small group with teacher

Teacher shows students one of the flashcards. Each student then uses that number of counters to model a multiplication algorithm with that answer.

i.e. 12 could be represented as 6×2 , 3×4 or 12×1 .

Students then share and compare responses, teacher to lead discussion with questions such as “are there any other possibilities which we didn’t think of?”

c. Multiplication Bingo (Worksheet 48)

Materials: counters, six bingo cards - one per student, individual cards

Group size: Small group with teacher

Each child is given one bingo card and a selection of counters. The teacher randomly draws an individual card and shows it to the students. If they have an equivalent answer on their bingo card, the student then covers their square with a counter. The first to cover all six squares is the winner.

d. Party Time

Materials: selection of different objects to be used as counters eg. buttons, unifix, paper clips etc.

Group size: Small group with teacher



Teacher leads discussion about a birthday party, where you are going to have five friends to play. Use the different counters to represent different party foods. If there were

- 12 cup cakes (unifix blocks), how many would each person get?
- 24 jelly babies, how many would each person get?
- 6 dim sims, how many would each person get?
- 18 snakes, how many would each person get?
- 30 sour worms, how many would each person get?

Finally, if each person had two slices of pizza, how many pieces of pizza would be needed altogether?

e. Line Them Up (Worksheet 49)

Materials: one worksheet per student or pair, scissors

Group size: Individual or pairs

Students cut the worksheet into individual cards, and match one from each column to form an appropriate number sentence with a matching diagram.

3. Abstracting multiplication and division

Solves multiplication and division problems where objects are not all modelled or perceived.

a. Colour to Win (Worksheet 50)

Materials: one grid sheet per student, 2 dice per pair, coloured pencils

Group size: Pairs

This activity will introduce the idea of commutativity to students.

Each student takes turns to roll the two dice, and they then colour a regular shape as shown by the numbers on the dice. eg. roll 3 and 5, can shade a 5×3 rectangle or a 3×5 rectangle. Play then passes to the other student. Students aim to use the regular shapes to fill their grid sheet, If unable to colour a regular shape, play passes back to the other student. Play continues until one student completes grid sheet or time limit has expired.



b. Connect Three in the Grid (Worksheet 51)

Similar to activity in 'Dice Dilemmas', by Paul Swan

Materials: one game board per student, two sets of cards per pair, counters

Group size: Pairs

Each student has a game board and some counters. Shuffle all cards and place face down in a pile. Students take turns to turn up a card, and cover the answer to this algorithm with a counter on their board. The first student to cover three squares in a row in any direction is the winner.

c. Fill in the Blanks (Worksheet 52)

Materials: one work sheet per student

Group size: Pairs or individual

Students use the \times or \div , and the $=$ symbol to make the statements true.



d. Fact Trees (Worksheet 53)

Materials: one “tree” per number

Group size: Whole class

Make a fact tree for significant numbers that you may have been using in your maths work. Eg. a fact tree for 28, write the number 28 in large numerals on the trunk, and on each of the branches write a different algorithm that relates to 28. i.e. $4 \times 7 = 28$, $14 \times 2 = 28$, $28 \times 1 = 28$, (and their reverse), $28 \div 7 = 4$, $28 \div 4 = 7$, $28 \div 14 = 2$ etc.

Place these trees around the classroom that students can refer to.

Other numbers for trees may include 12, 16, 18, 20, 24, 30, 36, 40 etc

e. Coin Toss

Materials: cards numbered 1 – 9, one coin, calculator

Group size: Pairs

One student draws two cards eg. 6 and 8. They then toss the coin, if it lands

tails – division question heads – multiplication question.

The students must use the numbers drawn to make an appropriate algorithm.

eg. draw 6 and 8, toss heads algorithm could be either $6 \times 8 = 48$ or $8 \times 6 = 48$

draw 6 and 8, toss tails algorithm could be either $48 \div 6 = 8$ or $48 \div 8 = 6$

Partner checks with the calculator and student scores one point.

Play then passes to the other student.

The first student to score ten points is the winner.

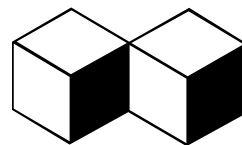
4. Basic, derived and intuitive strategies for multiplication

Can solve a range of multiplication problems using strategies such as commutativity, skip counting and building up from known facts.

a. Modelling Multiplication Again

Materials: overhead projector, unifix

Group size: Whole class



This activity will reinforce the idea of commutativity with students.

Use a grid (similar to that in Colour to Win, Appendix 50) on the overhead projector to model a shape that represents 3×4 . Then ask a student to model on the same grid sheet 4×3 . Discuss with the class the similarities and differences between these two shapes. i.e. both cover a total of 15, both are rectangles, different numbers of columns and rows etc.

Model the same process again with different values eg. 5×2 and 2×5 .

Give pairs of students unifix blocks and ask them to explore other combinations, and then to record these on paper.

Follow up with a share time of the student's findings.

b. Multiplication Rules That You Know

Materials: white board

Group size: Whole class

This activity would be used as whole class discussion once some explicit teaching of multiplication rules had been completed. This activity is aimed at students developing confidence in their own ability to multiply larger numbers using mental computation. Brainstorm with the students the multiplication "rules" that they are familiar with and the times that they might use these.

eg. $\times 10$: results in an extra zero on the end of the number being multiplied,

Therefore to $\times 5$, could be considered to be half of $\times 10$.

$\times 2$: is the same as doubling,

Therefore $\times 4$ could be doubling the double.

Ask students to spend some time discussing in pairs what other ways they could use this information to make their multiplications "easier".

Introduce the idea that $\times 12$ could be considered to be $\times 10$ plus $\times 2$.

How does this help to make the multiplication process easier?

Similarly $\times 18$ could be $\times 10$ plus $\times 8$, or two lots of $\times 10$ minus $\times 2$.

Encourage the students to talk about their maths in this way.

Ask students to determine strategies which would be most useful to

solve $\times 24$ $\times 14$ $\times 7$ $\times 31$ $\times 16$ $\times 11$

c. Multiplication Snap (Worksheet 54)

Materials: one set of cards per pair

Group size: Pairs

Students play “Snap” with the cards.

This reinforces the concept of $3 \times 4 = 4 + 4 + 4$.



d. Choose Five (Worksheet 55)

Materials: one set of cards numbered 1 – 10, per pair

Group size: Pairs

Each student chooses five numbers from the list on the appendix. They each take turns to draw two cards. These two cards are multiplied together, if either student has chosen this number they may cross it off their list. The first student to cross off all five of their numbers, is the winner.

e. Vowels and Consonants in your name

Materials: one red die, one blue die

Group size: Small groups

Each student records on a piece of paper, their first and last names, their street name, their suburb and their age in years (in words).

eg. Maria Flores, Lowther St, Westmeadows, Eleven

Each student then takes turn to roll the two dice. The red dice is used to score vowels, and the blue dice consonants.

If Maria rolled a red 4 and a blue 2, she could calculate the value of her name only as:

5 vowels (a, i, a, o, e) \times 4 points = 20 points

6 consonants (m, r, f, l, r, s) \times 2 points = 12 points Name total = 32 points

Play would then pass to the next student to calculate the value of their name.

Students then go on to calculate the value of their street name, suburb and age (in words). These are all tallied for a final total score.

5. Basic, derived and intuitive strategies for division

Can solve a range of division problems using strategies such as fact families, and building up from known facts.

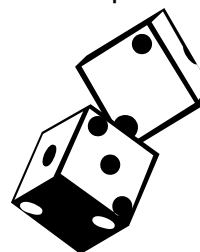
a. Connect Three in the Grid Again (Worksheet 56)

Similar to activity in 'Dice Dilemmas', by Paul Swan

Materials: one game board per student, two sets of cards per pair, counters

Group size: Pairs

Each student has a game board and some counters. Shuffle all cards and place face down in a pile. Students take turns to turn up a card, and cover the answer to this algorithm with a counter on their board. The first student to cover three squares in a row in any direction is the winner.



b. Even Stevens

Materials: two dice and one set of cards numbered 1 - 5

Group size: Pairs

Students take turns to roll the dice and make a two digit number. They then turn over a card and determine whether or not the number on the card will divide evenly into their two digit number. If not, they are permitted to alter the order of their digits eg. if they rolled 3 and 5 and made 53, they can change this to be 35 if this will assist them in.

If their number will divide evenly, they score one point, if not, play passes to the next person with no score.

The first student to score five points is the winner.



c. Calculator Quiz

Adapted from 'The Constant Operator', Teaching Mathematics K - 6

Materials: one calculator per pair

Group size: Pairs

Students are only permitted to use the following buttons on their calculator:

\div , \times , $+$, $-$, $=$, $+$, $=$, $=$ and the digit 2.

Using only these operations, what number would need to be entered in the first instance, so that the answer the calculator produces after the four division computations is 2?

Variation: Repeat the activity using any variation of numerals, can students find a pattern?

d. Remainders

Materials: one deck of cards with A = 1 – 9, one die

Group size: Pairs or small group

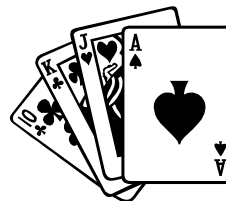
The aim of this game is to end up with as few counters as possible.

Students take turns to draw two cards from the pack and make a two digit number.

They then roll the dice, and divide this number into their two digit number. (At this point they are able to reverse the order of the digits if it suits them eg. rolled a 2 and had made 21, and would now prefer to make it 12)

If the number does not divide in evenly, the student must collect the remainder number of counters and play then moves to the next student.

After a set time period, the student with the least total number of remainder counters is the winner.



e. Draw Cards

Materials: one deck of cards with 1 – 9

Group size: Pairs

Each student draws four cards from the pile. The aim is to be the first to be able to use the four cards to make a correct division algorithm.

eg $32 \div 4 = 8$ with the cards 3, 2, 4 and 8. Play passes from student to student, if unable to make an algorithm, students opt to return one card to the central discard pile and collect another from the left over cards face down in the centre. When a student is able to make a correct algorithm, he/she scores one point and all cards are returned to the centre and shuffled, ready to play again.

The first student to score five points is the winner.

NB. A 10 card with a 4 could be read as 104.

6. Extending and applying multiplication and division

Can solve a range of multiplication and division problems (including multi digit numbers) in practical contexts



a. Let's Go Shopping

Materials: supermarket catalogues

Group size: Individual or pairs

Students choose five items from a recent supermarket catalogue and round these to the nearest dollar. They are then assigned \$100 for shopping with the task of having the least amount of money left over as possible. What is the combination of quantities of these five items that gives a total closest to \$100? Share ideas and results.

Variation: Increase total from \$100; include more than five items; make limitations such as students must choose at least two of each item etc.

b. Clumps

Materials: none

Group size: Individual or pairs

Familiarise students with the game of "clumps". Ask students to imagine that they are leading a game of clumps with some junior school students. They need to determine what size to make the groups for each round to ensure that only one person is left out each time.

Eg. Begin with 10 students

Round 1

Group of ten students – Instruction: "Make clumps of 3", would make 3 groups of 3, using 9 students, 1 student left out.

Round 2

Group of nine students – Instruction : "Make clumps of 4", would make 2 groups of 4, using 8 students, 1 student left out.

Continue Round 3 with group of seven students ...

Extension: Is it possible to go through the above process, having only one student left out each round, with a starting group of 26 students? What would the clump sizes be?

c. Telephone Maths Again

Materials: none

Group size: Whole class

Students record their own telephone numbers on a piece of paper. They then multiply the eight digits together, one by one i.e. $9 \times 3 = 27 \times 4 = 108$ etc. to find the student who has the telephone number with the greatest total.

Discussion: Is there any number that you do not want to have in your telephone number when completing this activity (i.e. 0) Why? Does it matter where in the telephone number that it appears?

Substitute all 0's with 10. Does this make a difference to the person in the room who had the greatest total?



d. Nappy Maths

Materials: none

Group size: Individual or pairs

Assume that a baby/toddler wears nappies every day of its life until its third birthday. On average, it wears eight nappies a day in its first year, six nappies a day in its second year and five nappies a day in its third year.

How many nappies would this child wear by the time it turns three?

Imagine that in this family there were twin five year old boys, a six year old girl and a four year old girl. How many nappies has that family worn in total?

If an average nappy cost 40c, how much money has this family spent on nappies in the last six years?

e. What's in a name?

Materials: none

Group size: Whole class

Each student writes their first and last name on a piece of paper.

eg Kenneth Chau – they then total the number of vowels and the number of consonants in their name

Kenneth Chau: vowels = 4, consonants = 7

Each student starts with a total of 1000 points. They must then divide this by the number of vowels in their name (ignore remainders). They then divide this number by the number of consonants in their name. Compare with the rest of the class to find

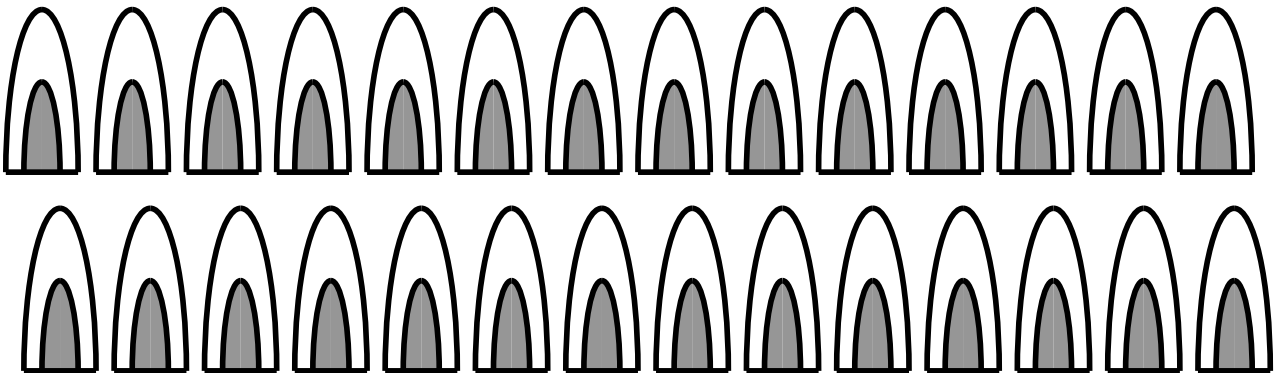
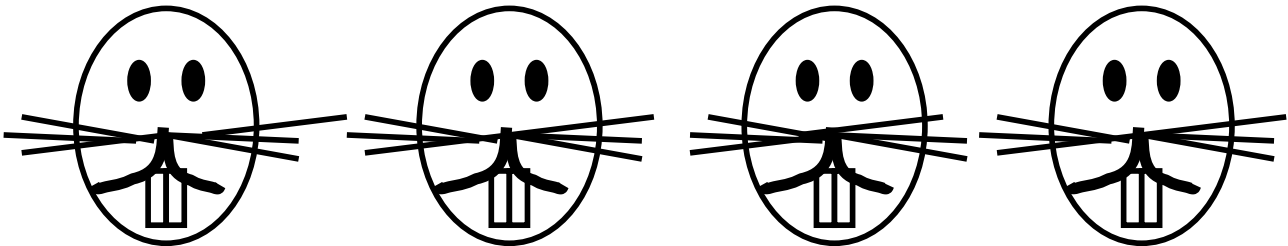
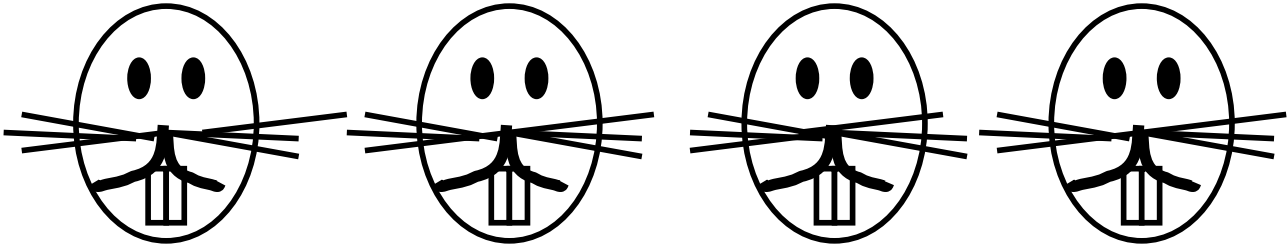
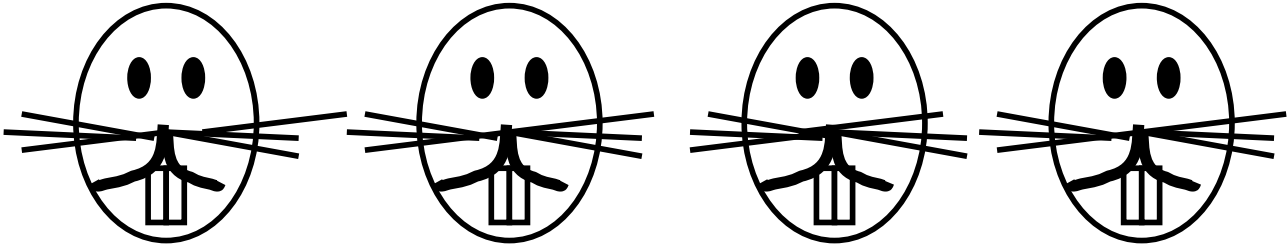
who has the greatest and lowest total.

Challenge: Does it make any difference to your total if you divide first by the number of consonants in your name and then by the number of vowels?

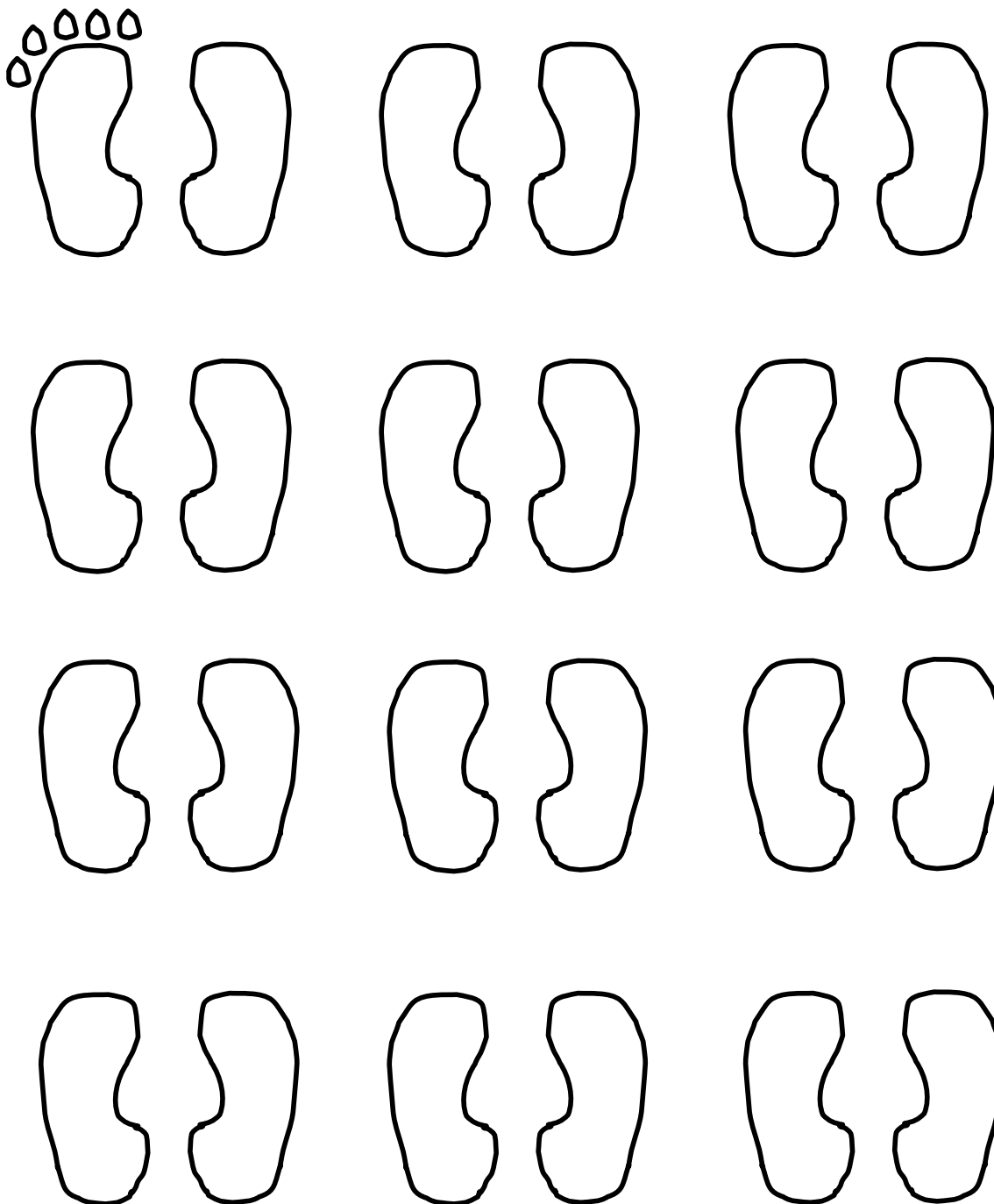
Why/why not?

Variation: Repeat activity with street name, parents names etc.

Multiplication & Division - Not Apparent
Worksheet 43 - Rabbit Ears



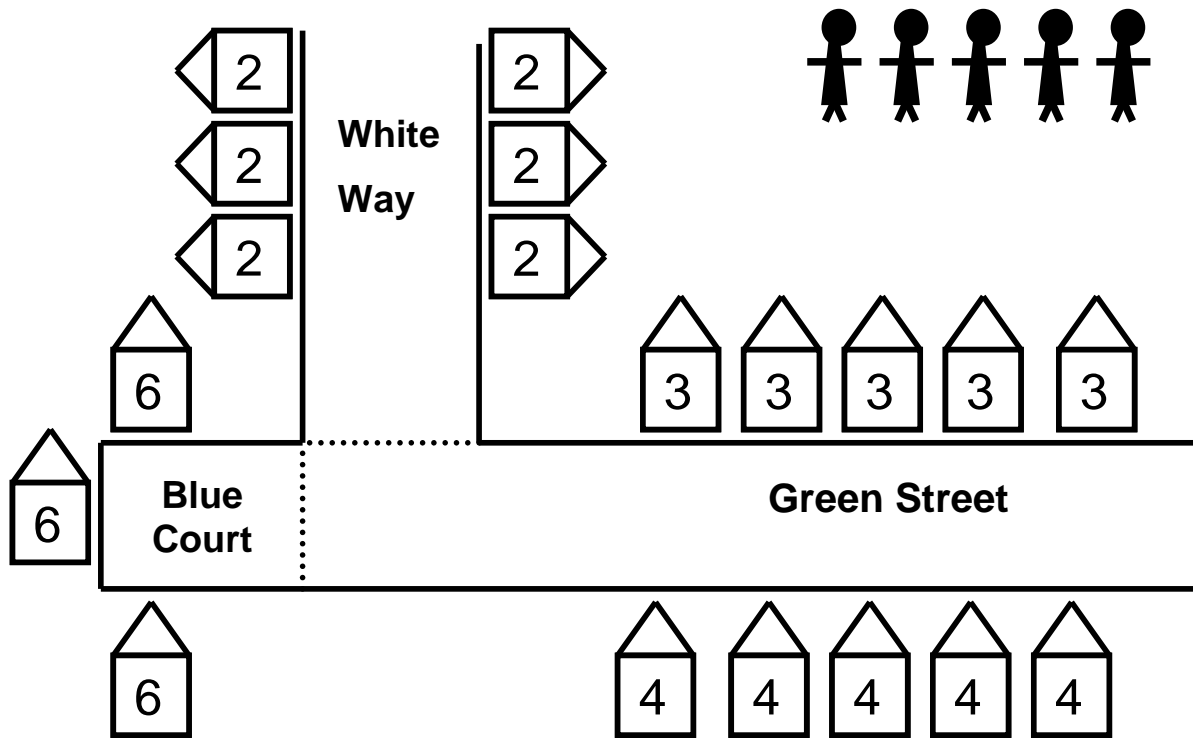
Multiplication & Division - Not Apparent
Worksheet 44 - Feet Facts



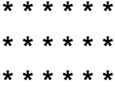

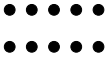

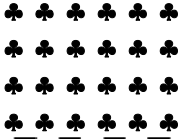





Multiplication & Division - Counting group items as ones
Worksheet 45 - Group Matching

| | |
|--|----|
| <p>* * * * *</p> <p>* * * * *</p> | 15 |
| <p>^ ^ ^</p> <p>^ ^ ^</p> <p>^ ^ ^</p> | 10 |
| <p>• • • • •</p> <p>• • • • •</p> <p>• • • • •</p> | 18 |
| <p># #</p> <p># #</p> <p># #</p> <p># #</p> | 20 |
| <p>♣ ♣ ♣ ♣ ♣ ♣</p> <p>♣ ♣ ♣ ♣ ♣ ♣</p> <p>♣ ♣ ♣ ♣ ♣ ♣</p> | 12 |
| <p>♦ ♦ ♦</p> <p>♦ ♦ ♦</p> <p>♦ ♦ ♦</p> <p>♦ ♦ ♦</p> <p>♦ ♦ ♦</p> <p>♦ ♦ ♦</p> <p>♦ ♦ ♦</p> | 4 |
| <p>♥ ♥ ♥ ♥ ♥</p> <p>♥ ♥ ♥ ♥ ♥</p> | 8 |
| <p>♠ ♠ ♠ ♠ ♠</p> <p>♠ ♠ ♠ ♠ ♠</p> <p>♠ ♠ ♠ ♠ ♠</p> <p>♠ ♠ ♠ ♠ ♠</p> | 9 |
| <p>Ω Ω</p> <p>Ω Ω</p> | 16 |
| <p>▽ ▽ ▽ ▽</p> <p>▽ ▽ ▽ ▽</p> <p>▽ ▽ ▽ ▽</p> <p>▽ ▽ ▽ ▽</p> | 21 |

Multiplication & Division - Counting Group items as ones
Worksheet 46 - Street Smart

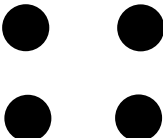
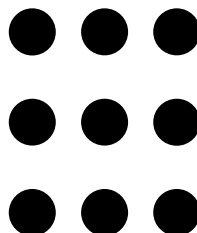


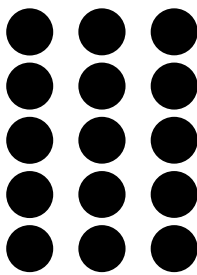
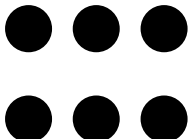
Worksheet 47 - More Group Matching

| | | |
|---|----|--------------|
|  | 24 | 2×5 |
|  | 8 | 1×6 |
|  | 20 | 4×3 |
|  | 18 | 5×4 |
|  | 4 | 2×7 |
|  | 12 | 2×4 |
|  | 9 | 2×2 |
|  | 14 | 3×6 |
|  | 10 | 4×6 |
|  | 6 | 3×3 |

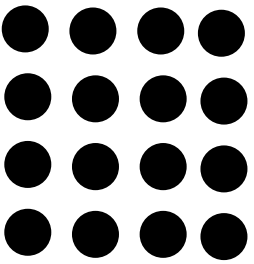

Multiplication & Division - Modelling multiplication and division
Worksheet 48 - Multiplication Bingo


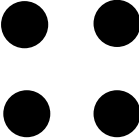
Bingo Cards

| | |
|--------------------|--|
| 6 |  |
| five groups of two |  |
| 12 | 3×5 |

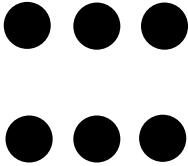
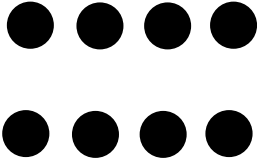
| | |
|---|---|
| three groups of two | 8 |
|  | 10 |
| 9×1 |  |


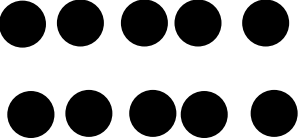
Bingo Cards

| | |
|--|----------------------|
|  | 3 |
|  | 4 |
| 2×4 | three groups of four |

| | |
|--|--|
| two groups of five | 9 |
| 16 |  |
|  | 4×2 |

Bingo Cards

| | |
|--|---|
| 3×4 |  |
|  | 10 |
| 9 | one group of four |

| | |
|--|--|
|  | three groups of three |
| 4×4 |  |
| 15 | 12 |

Individual Cards

six

two groups of two

$$2 \times 2$$

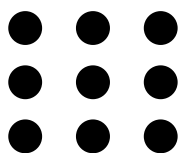
three groups of two

five groups of two

10

three groups of four

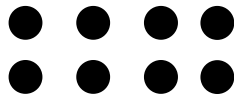
$$12 \times 1$$



three groups of three

15

$$3 \times 5$$



8

four groups of 4

$$4 \times 4$$



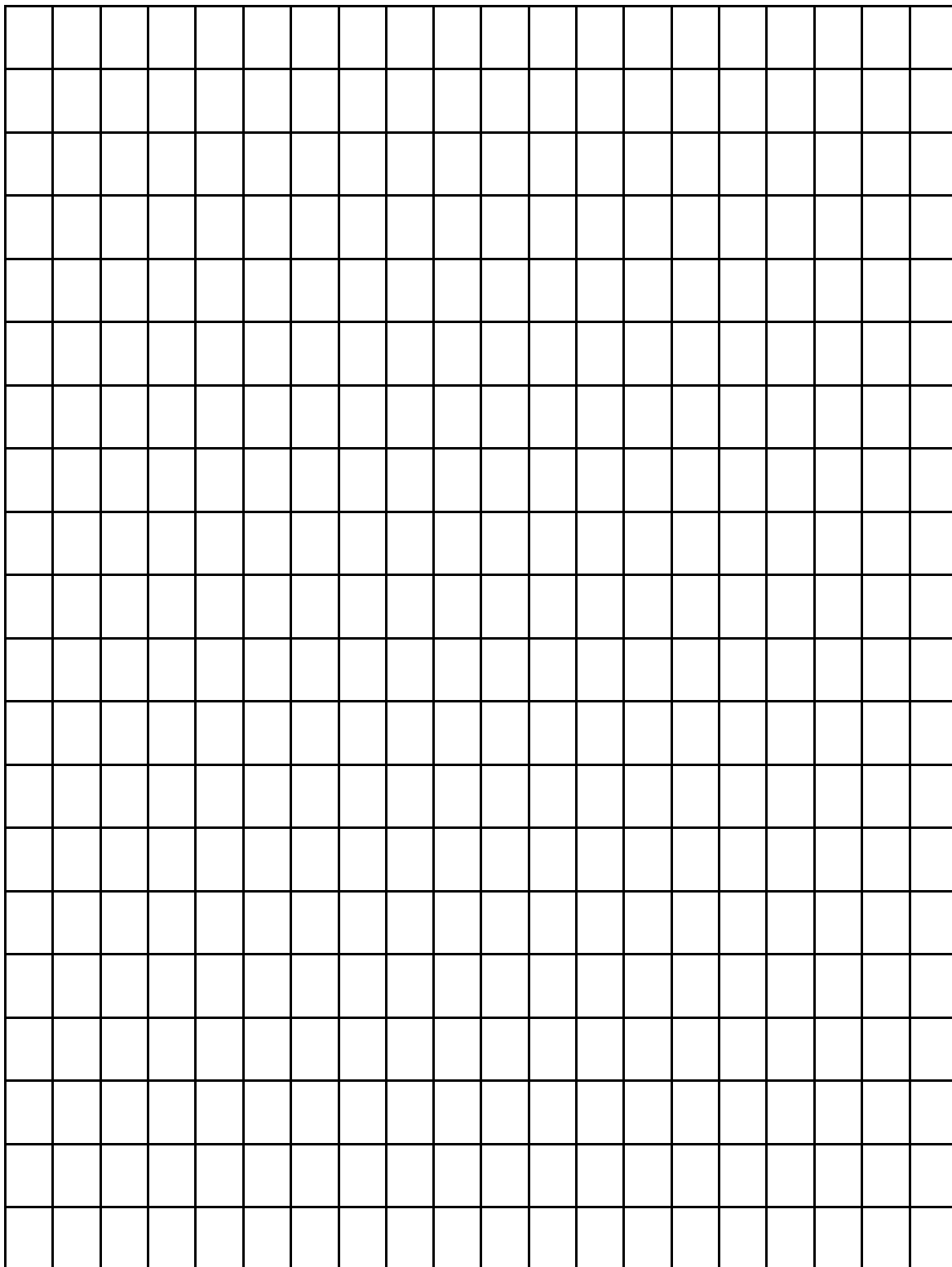
one group of 3

Worksheet 49 - Line Them Up

| | | | |
|----|-------------|---|---|
| 3 | lots of | 4 | * * * * * * * * |
| 5 | lot of | 2 | ■ ■ ■ ■ ■ ■ |
| 18 | lots of | 8 | ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ |
| 2 | lots of | 4 | ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ ♣ |
| 1 | shared into | 5 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● |
| 12 | shared into | 2 | Ω Ω Ω Ω Ω Ω Ω Ω |
| 15 | shared into | 6 | ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ |
| 8 | shared into | 3 | ♠ ♠ ♠ ♠ ♠ ♠ ♠ ♠ ♠ ♠ |

Multiplication & Division - Abstracting multiplication and division

Worksheet 50 - Colour to Win



Multiplication & Division - Abstracting multiplication and division

Worksheet 51 - Connect Three in the Grid

| | | | | |
|----|----|----|----|----|
| 4 | 6 | 8 | 10 | 12 |
| 16 | 18 | 20 | 24 | 28 |
| 30 | 32 | 36 | 40 | 42 |
| 44 | 45 | 48 | 50 | 52 |
| 54 | 60 | 64 | 66 | 70 |

Worksheet 51

Cut into cards

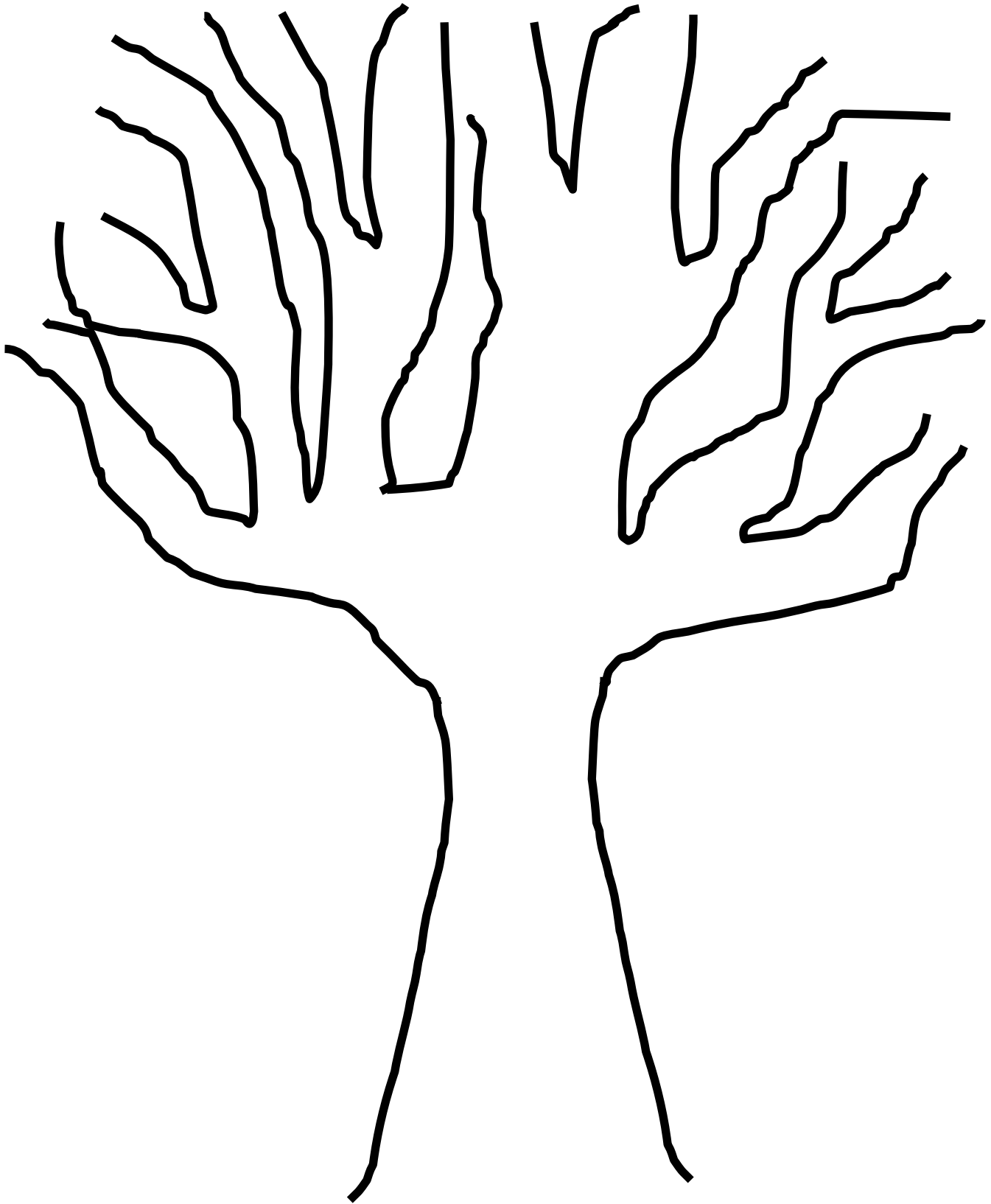
| | | |
|---------------|---------------|---------------|
| 2×2 | 4×1 | 3×2 |
| 2×4 | 5×2 | 6×2 |
| 3×4 | 4×4 | 8×2 |
| 3×6 | 2×9 | 5×4 |
| 1×20 | 6×4 | 3×8 |
| 7×4 | 3×10 | 6×5 |
| 4×8 | 7×5 | 8×5 |
| 10×4 | 6×7 | 11×4 |
| 22×2 | 9×5 | 4×12 |
| 10×5 | 26×2 | 9×6 |
| 6×8 | 12×5 | 8×8 |
| 11×6 | 10×7 | 2×35 |

Worksheet 52 - Fill in the blanks

| | | | | |
|----|--|---|--|----|
| 3 | | 7 | | 21 |
| 14 | | 7 | | 2 |
| 18 | | 3 | | 6 |
| 4 | | 5 | | 20 |
| 9 | | 3 | | 27 |
| 24 | | 8 | | 3 |
| 4 | | 4 | | 16 |
| 5 | | 7 | | 35 |
| 18 | | 2 | | 9 |
| 42 | | 7 | | 6 |

Multiplication & Division - Abstracting multiplication and division

Worksheet 53 - Fact Trees



Mult'n & Division - Basic, derived & intuitive strategies for multiplication

Worksheet 54 - Multiplication Snap

| | | |
|------------------------------|---|--------------|
| $4 + 4 + 4$ | 3×4 | $5 + 5$ |
| 2×5 | $8 + 8 + 8 + 8$ | 4×8 |
| 9×2 | $2 + 2 + 2$ $+ 2 + 2 + 2$ $+ 2 + 2 + 2$ | 4×5 |
| $5 + 5 + 5 + 5$ | 3×3 | $3 + 3 + 3$ |
| 4×1 | $1 + 1 + 1 + 1$ | 6×5 |
| $5 + 5 + 5 +$ $5 + 5 + 5$ | 1×12 | 12 |
| 2×2 | $2 + 2$ | 7×6 |

Worksheet 54 - Multiplication Snap

| | | |
|---|------------------------------|-----------------|
| $6 + 6 + 6$ $+ 6 + 6 + 6$ $+ 6$ | 4×4 | $4 + 4 + 4 + 4$ |
| 2×10 | $10 + 10$ | 5×5 |
| $5 + 5 + 5 +$ $5 + 5$ | 3×11 | $11 + 11 + 11$ |
| 6×6 | $6 + 6 + 6 +$ $6 + 6 + 6$ | 8×1 |
| $1 + 1 + 1 + 1$ $+ 1 + 1 + 1$ $+ 1$ | 3×9 | $9 + 9 + 9$ |

Mult'n & Division - Basic, derived and intuitive strategies for multiplication

Worksheet 55 - Choose Five

Each student chooses five numbers from the following list:

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

Mult'n & Division - Basic, derived & intuitive strategies for division

Worksheet 56 - Connect Three in the Grid Again

Game Board

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

Worksheet 56 - Connect Three in the Grid Again

Cut into cards

| | | |
|--------------|-------------|---------------|
| $18 \div 18$ | $6 \div 6$ | $20 \div 10$ |
| $16 \div 8$ | $15 \div 5$ | $24 \div 8$ |
| $28 \div 7$ | $32 \div 8$ | $50 \div 10$ |
| $48 \div 6$ | $16 \div 2$ | $108 \div 12$ |
| $72 \div 8$ | $40 \div 4$ | $60 \div 6$ |
| $55 \div 5$ | $33 \div 3$ | $36 \div 3$ |
| $60 \div 5$ | $9 \div 9$ | $24 \div 2$ |
| $27 \div 9$ | $36 \div 9$ | $45 \div 9$ |
| $72 \div 12$ | $49 \div 7$ | $40 \div 5$ |
| $63 \div 7$ | $20 \div 2$ | $88 \div 8$ |

Appendices

Set of Flashcards

| | | | | |
|----|----|----|----|----|
| 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 | 38 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 |
| 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 |
| 46 | 47 | 48 | 49 | 50 |