OSHLSP Numeracy Treasure Chest

Numeracy Treasure Chest Checklist

The following resources can be either made or purchased at any local discount store, Reject Shop or Kmart.

- Playing cards (with Kings, Queens, Jacks removed)
- Dice- 6 sided/10 sided/12 sided
- Paddle pop sticks
- Rubber bands
- Dominoes
- Pegs
- Number line
- Play money
- Counters (can be anything- dinosaurs, beads, traditional flat round counters)
- Flat 2D shapes
- Mini mirrors
- Stop-watch
- Magnifying glass
- Transparent sheet/table cloth (and permanent marker to create a grid)
- Downloadable sheets- Hundred charts, dot paper, grid paper, tens frames, number think-boards, multiplication squares, place value charts
- Calculators
- Clock with batteries removed (or a toy clock)
- Marbles
- Measuring tape
- Beaded string (in groups of 10)

Suggested Activities

All games listed below require resources listed in the treasure chest checklist and can be modified to suit any ability level from Foundation – Year 6. It is essential to recognise that a child's age and grade level does not always correlate with the Victorian Curriculum standard they are working towards. It is important to *know* the children you work with and use and adjust activities to suit their ability level.
The use of oral language in mathematics is key to understanding and success-particularly when working with EAL learners. When working with students in homework clubs, encourage them to practice counting aloud and verbally explain their strategies.

Card Games

Snap
2 players. Split the entire pack of cards equally between 2 players. Take in turns to turn over a card and place on centre pile. If a matching pair appears (e.g a nine and a nine) the first player to place their hand on the pile and yell SNAP wins the centre pile. Play continues until one player has no cards left.

Variations: Play snap with a **target number,** call snap when two cards are turned that add to 10. E.g 7 and 3 or 6 and 4. Can pick any target number up to 20.

Play snap with a target, but use multiplication rather than addition. e.g target number might be 16, so they call SNAP if an 8 and 2 is turned over, 8 x 2 = 16

Seven Up

2 players or small group. Turn over seven cards. Students find total (or tutor provides total- this shifts focus from importance of the *answer* to importance of *strategy*). Each child must carefully explain strategy they used to support their working out. Each player takes in turn to explain how they found the total.

E.g: sevens cards turned over could be: 2, 4, 7, 3, 7, 9, 10. Total = **42**. Allow enough time for every child to work out the answer at their own pace. Students may work to find total in partners to support confidence and encourage conversation.

Example strategy: I found the doubles first- 7 + 7 = 14. Then I used my knowledge of bridging 10's- 10 +14 = 24. Then I used doubles again- 24 + 4 = 28. Then, I used the 'near 10' strategy with the 9: 28 + 10 = 38, so, 28 + 9 is one less, 37. I know friends of ten, 7 + 3 is 10, so 37 + 3 must equal 40. Then that just leaves the 2! 40 + 2 = 42.

How Close

Two players. Deal cards one at a time until each player has four cards. Turn two cards up from the remaining pile and place in order so that the first card is the tens and the second card is the units. This is the TARGET number. Each player arranges their four cards to form 2 two digit numbers that when added (or subtracted) are closest to the target.

The difference between a player's answer and the target is that player's score. Lower scores are better.

Extend: use three or four digit numbers.

Enable- instead of making a 2 digit number, choose one card for the target number, then students work together using a combination of their four cards to get as close as possible to the target using addition or subtraction.

Have students write down the equations. Alternatively, use calculators.

Odd or Even

Any number of students can play. Place deck of cards in the centre, face down. Students take it in turns, taking one card at a time. Before they flip it over and read the number, they guess whether or not it is odd or even. If the child guesses correctly, he/she keeps the card. If they guess

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incorrectly, the card is given to another player. Keep playing until all cards have been used. Student with the most cards wins the game.

High Card Multiplication

Two students place a deck of cards in front of them face down, having removed the Kings, Jacks and Jokers. Ace is 1 and Queen is 0. Children share out the cards equally between them, then place their pile facedown in front of them. Player A turns over the top two cards and multiplies them. Player B does the same. Whoever has the **highest** number takes all four cards. Winner is the player at the end with all cards, or with the most cards.

Variations:
- Play same rules, but whoever has the **lowest** number takes all four cards.
- Play same rules, but use addition or subtraction.

Less confident students may need a multiplication grid for support.

Ten in a row

2 – 5 players. Place 10 cards face up in a row. The remainder of the deck kept together face down. Students take in turn rolling a ten sided dice (can use a regular 6 sided dice). Using the number that is displayed on the dice as a target, students are challenged to use combinations of the ten available cards to equal the number. Any operation can be used. Cards used to make the answer are collected and kept by each student and then replaced from the deck. The game continues until all cards have been used.

Young children or less confident mathematicians will use addition/subtraction to make answers using two cards. Older or more able students can use any combination of operations, decimals, negative numbers, fractions etc. and use up to five cards. Students need to articulate how they make the answer, trying to gather more cards than their partner.

Variations: Roll two dice, making a two digit number as the total.

Making Tens

2 players. Students arrange 9 cards face up in three rows of three. The remainder of the deck are placed on top of the cards face up until all are gone leaving the nine piles of cards. Students take it in turns collecting two cards that when added together make 10. This continues until all cards are removed. Children need to say aloud the combinations as they collect the pairs.

Variations: Collect more than two cards to make ten. Use addition and subtraction. Choose a different target number instead of 10. Make 100 using the displayed cards as two numbers. Make ten using mixed numbers e.g 4.7 + 5.3

Highest or Lowest

2 players or more. Pack is dealt evenly among players until there are no cards left. Players place their cards in front of them in a pile. Player one turns over his/her top two cards and adds them ie. 7 and 10 = 17. Player two then turns over his/her top two cards hoping to get a higher score than player one. Whoever has the higher score takes all 4 cards and places them at the bottom of heir pack. Play continues until one child has no cards left or the tutor says stop. Player with most cards wins.

Variations: turn over three cards. Use subtraction to find the lowest score. Use multiplication. Make the largest 3 or 4 digit number.

Make my number

This game is best suited to students year 4 and above. Play in pairs or groups of 4.

Six cards are dealt face up between two or more students. The seventh card or the next card on the deck is the target number. Students are challenged to make as many equations as possible using combinations of the six cards displayed to equal the target number. They must write the equations down. Encourage students to begin using simple equations to make the target number and then extend to using more than one operation, brackets, order of operations, negative numbers, square root, decimal notation etc. A scoring system can be used earning extra points for using more cards in the equations or using operations other than addition and subtraction. Place a time limit of perhaps 3 or 4 minutes per game. Students tally their points to see how they went. Discard these cards and play again using the next seven numbers. It may be worth modelling this activity a few times first.

Domino Games

<u>Simple dominoes matching</u> (standard game rules)
This is a valuable task for Foundation – year 2 students. Recognising the number of dots at a glance- this skill is called 'subitising' and is important for development. Crucial to use lots of conversation and language when playing a standard game of dominoes.

<u>Domino Train</u>
Play in pairs- any number of students can be involved. Give students a target to create including a number of 'carriages' and a total amount.

E.g.- Target 45, using 6 carriages. They need to make the dots total 45, using 6 domino pieces. This can be played with multiple players, but students should work with a partner- students support one another to make the correct train, racing against the other pairs. Can be modified and adapted depending on ability. Younger students can make 15 with three carriages, for example. Older students have a larger target or can use multiplication.

<u>Domino Fractions</u>
Year 4 and above

Provide a fraction and ask students to find a domino which represents the fraction, or a simplified version of that fraction.

Student selects domino- simplify the fraction you see

Student selects two dominos- take steps to ensure they are 'like' fractions, then add them together- what is the total?

Dice Games

Paddocks

2 or 3 players. Use dot paper.

Take turns to roll two dice, add the two numbers together to make a total. If the total is 5, student draws 5 lines on the dot paper. Each mark between a pair of dots is counted as one line. The aim is to make as many complete squares as possible. E.g, if a 1 and a 2 is rolled, they can draw three lines- not quite a complete square. The next player then roles the two dice and can use one of their lines to complete the square. As squares are completed, student marks their initial inside square. Student with most initials marked is the winner.

Variations: Use multiplication. Use 10 or 12 sided dice to extend highly able students.
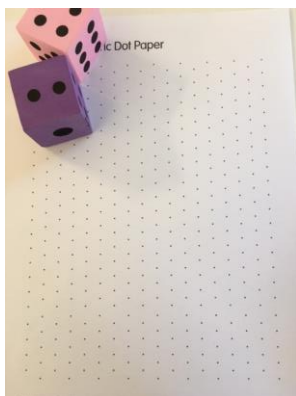
Race to 10
2 players. Also need: ten frame, counters.

Children take turns to roll dice and collect the number of counters, placing them on a ten frame. Encourage children to verbalise their progress. For example, one student rolls a 4 and collects 4 counters. He/she places the four counters on the frame and says "I have 4 and I need 6 more". Player two then does the same thing. The first to reach exactly ten wins.

Variations: By adding more than on ten frame, students can play race to 12, 15, 20, 30 etc. Children need to practice making tens first and then adding on when playing race to 12, 13 etc. For example instead of saying "I need 8" when a student has 4, they need to say "I need 6 and 2 more".

The game can also focus on subtraction where the first to get to exactly zero wins.

Multiplication Squares
2 or 3 players. Use multiplication squares sheet.

Students take turns to roll two dice, then multiply the two numbers rolled. Find the answer on the sheet and draw **one** line along the outside square of the answer. Aim to complete as many squares as possible. Game of strategy.

Variations: provide students with tables chart or calculators to check answers.

Place Value Roll/Bundles and Sticks

2 or 3 players. Also need: icy pole sticks, rubber bands and paper or whiteboard to create a place value chart (ones, tens, hundreds).

Draw a place value chart on a blank piece of paper or a whiteboard.

Players take it in turns to roll dice. Take the number of icy pole sticks rolled and place them in the ones column. Player 2 rolls, take number of icy pole sticks rolled and add to the existing total. If the new total is more than ten, take a rubber band and 'bundle' ten sticks and place in the tens column. Any left over ones remain in the ones column.

For example, if a 6 is rolled first, there should be 6 icy pole sticks in the ones column. If the next player rolled a 5, they would collect 5 sticks, then bundle ten. So there should be one bundle of ten in the tens column and one stick in the ones column- a total of 11. Continue playing, with the aim to reach more than 100. Children should be encouraged to articulate their number every single roll, for example "I have 3 bundles of ten in my tens column and 4 sticks in my ones column, so my number is thirty four".

Variations: use two dice and add total to make game faster and more challenging. Use a 110 or 12 sided dice. Challenge students to reach a larger total- 200 or 300.
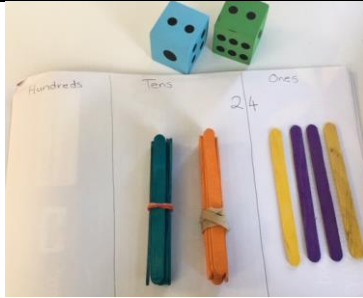
Calculator Games

Change it
2 players. Pairs take it in turns to enter a number into the calculator and change digits.

For example, one child creates a number and enters it. E.g. **342.** He/she then asks the other child to change a digit, for example, change the 4 into a 7. The partner then needs to +30 and the number becomes 372. Swap over and the activity continues. The students need to determine the value of the digit that is being changed. Place value materials such as MAB or bundles of icy pole sticks may need to be used to help students see the value of the digits in different places. If a mistake is made the game simply continues with a new number.

Variations: Simplify the activity by using a single digit number and giving each pair ten counters or cubes so they can make the numbers and then use the calculator to check.

Vary the range of numbers selected to cater for mixed abilities, e.g work with smaller or larger numbers.

Try to change all three digits at once to make a set number. 999

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Change more than one digit at a time with one move. For example, the entered number is **51 478.** Change both the digits 1 and 7 into 6's with one move.

Hit the Target
Provide several suitable target numbers, for example, 10, 20, 35, 50, 100, 101.1- depending on ability and confidence level.

Children work in pairs, selecting an appropriate target number. They take it in turn to enter a number that is smaller than the target number. The challenge is for the other student to enter the matching number to hit the target. For example, partners select the target number 20. Player one enters 12 into the calculator. Player two has the challenge of finding and adding the number to make 20. In this case, 8. Swap roles after each shot.

Variations: use target numbers such as 38, 101, 9.9, negative numbers etc.

Bead String

Counting Aid
Model to students how to use the bead string to assist calculations if completing a task from school. E.g addition/subtraction. Discuss how to use place value (tens/metric system) to assist with calculations.

Practise counting aloud using bead string- skip count by 2's, 3's, 4's 5's, 10's- backwards or forwards. Starting at various numbers.

Tug of War
You need: beaded string with 110 beads, prepared question cards or numbers. Play in partners OR groups.

First, talk about how to divide the beads equally between each team/player (halving). How can you do it without having to count by ones? What is the most efficient way?

Each player or team will have 55 beads to start with. Aim of the game is to 'steal' beads from the other team by pulling them along the string over to your own side.

Provide set of numbers/equations suitable for the ability of the children playing.

Player reaches into box/bag and pulls out a number or equation. If they pull out 3 +12, first, they have to work out what 3 +12 is (they may use the beads to help with this- encourage them to verbally discuss reasoning). Next, that player 'steals' fifteen (3 +12) beads from the other team. They must verbally explain how they will do this- e.g. one group of ten and five ones. Or a 2, a ten, then another 3- depending on how the beads are placed.

The game ends when one team steals all beads from the other team.

Marbles

Teach student to play a standard game of marbles- roll the large marble first and use as a target for the rest of the game.

Game can be modified and used to demonstrate a range of mathematical concepts. E.g measurement.

Variations: young or very inexperienced students will not yet be using standard units (mm, cm, m etc.) to measure. They could use match sticks or icy pole sticks to measure distance of each roll from the target.

Older students to measure and record the distance of each roll, in cm, from the target. Add total at end of game. Calculate average distance (total distance divided by number of rolls). Work out who wins the game based on lowest average.

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Transparent grid

Graph It!

In pairs, students come up with a topic they are interested in and survey all homework club members (e.g. favourite football team, hair colour, age etc.)

Use post it notes or counter and a whiteboard marker to represent findings as a bar graph on the grid.

Grid it!

Write random numbers between 0 – 99 on a post-it note and provide to student (one post-it per child).

Lay the blank transparent grid on the floor. Students must imagine the grid is a blank hundreds chart and work out where their number belongs. Students place post-it in correct square once they have worked out where it should sit.

Once each child has put down a post-it note, provide students with blank post-its and textas/pens. They must write down and correctly place one more, one less, ten more, ten less than the numbers already on the grid.

Variations: Have a few pre-prepared numbers already placed in the correct spot on the grid to assist students.

Make the task more challenging by using larger numbers and having the grid represent a hundreds chart from, for example, 440 - 539

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Magnifying Glass
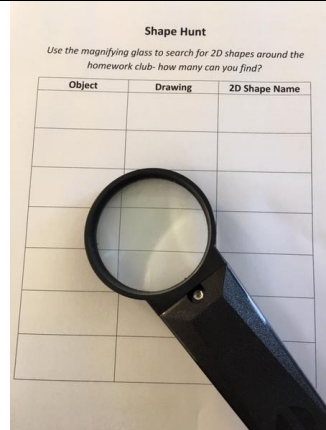
Detective Hunts
Use the magnifying glass as a novelty item to inspire detective hunts around the club room or garden to search for everyday items demonstrating a range of mathematical concepts. Have students draw up a table to display their findings.

- *Angles*- search for examples of right angles, obtuse angles, acute angles around the community centre/classroom. In a table, draw what you find, identify what type of angle it is and why.
- *Shapes*- search for particular shapes in the room. Draw and identify findings. E.g the top of the table, the bottom of a mug etc.is it a quadrilateral, triangle etc. why? What are the features?
- *Arrays*- when learning about multiplication or division. Have students *create* arrays with counters, sticks etc. record their arrays as an equation. Have students hunt for arrays around the room or centre- draw the arrays and record the corresponding equation. *E.g. an egg carton is an example of an array representing the equation 2 x 6 or 6 x 2.*

Mark the Spot
Print out an image from google maps of your local area (e.g. school/homework club and surrounding area).

Have students use the magnifying glass to search for and identify particular features. Provide them a list of things to find, e.g. the local park, their house, a familiar street etc.

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Hundreds Chart

There are many activities you can do with a hundreds chart. Refer to the vast list of activities for hundreds charts on google. The objectives of these activities are for students to learn to recognise numbers, understand numbers, and find different ways of working with numbers to improve their understanding.

Some example activities:

- Colour all the even numbers and establish a rule for recognising even numbers
- Find all the multiples of 3
- Find all the numbers who's digits add up to 11
- Find all the prime numbers

*if you have access to technology at your club, google 'hundreds chart splat' for an interactive hundreds chart students will enjoy manipulating.

Other Ideas

The potential for educational games and activities that the items in the treasure chest can be used for is endless. The above list is by no means exhaustive. Here are some other ideas:

- Have children look at various items in treasure box, ask them to identify how they could use resources (they might remember games from school or come up with their own ideas).
- Patterns- encourage children to use the various counters to create patterns using colours, numbers etc. Ask partner to identify and then continue the pattern.
- Symmetry- ask students to design a symmetrical pattern using the grid paper. Create a large line on the floor (using chalk or masking tape), students use 2D shape to create a perfectly symmetrical pattern- with the line of symmetry down the centre. Use mirrors to check accuracy.

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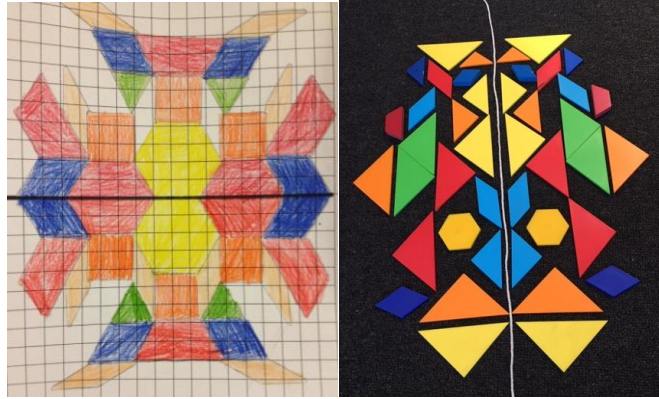
- Encourage children to make a board game demonstrating a particular mathematics skill.
- Help children write a song or rap to help them remember a particular mathematics concept, e.g doubles, set of times tables etc.
- Number line- use pegs to practise counting patterns on number line- skip counting by a particular number- allows children to see patterns visually- have them work it out themselves, then practise counting aloud.