



YUMI DEADLY CENTRE
School of Curriculum

Enquiries: +61 7 3138 0035

Email: ydc@qut.edu.au

<http://ydc.qut.edu.au>

Professional Learning 3

Addition and Subtraction

Booklet 3.3: Strategies for Using Ten



Queensland University of Technology



Australian Catholic University



Queensland
Government
Education Queensland

Sustainable mathematics education capacity building: Empowering Indigenous teacher aides to enhance rural and remote Indigenous students' numeracy outcomes

This project is funded by an Australian Research Council Linkage Project grant with support from Education Queensland (EQ)

DEADLY MATH TUTORS PROGRAM
Professional Learning 3: Addition and Subtraction
TRIAL PACKAGE 3
STRATEGIES FOR USING TEN
(Addition and subtraction, basic facts and 2-digit algorithms)

This booklet prepared by
Professor Tom Cooper and Dr Annette Baturu

for

Deadly Maths Tutors Research Team:

Dr Annette Baturu
Prof Tom Cooper
Mr Warwick Collins
QUT

Assoc Prof Elizabeth Warren
Ms Denise Peck
ACU

and

Contributing EQ Organisations

Mount Isa EQ Regional Office
Boulia State School
Burketown State School
Dajarra State School
Doomadgee State School

Mornington Island State School
Sunset State School
Urundjiti State School
Indigenous Education and
Training Alliance (IETA)

YuMi Deadly Maths
Past Project Resource

Acknowledgement

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

YuMi Deadly Centre

The YuMi Deadly Centre is a Research Centre within the Faculty of Education at Queensland University of Technology which aims to improve the mathematics learning, employment and life chances of Aboriginal and Torres Strait Islander and low socio-economic status students at early childhood, primary and secondary levels, in vocational education and training courses, and through a focus on community within schools and neighbourhoods. It grew out of a group that, at the time of this booklet, was called “Deadly Maths”.

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

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

More information about the YuMi Deadly Centre can be found at <http://ydc.qut.edu.au> and staff can be contacted at ydc@qut.edu.au.

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School of Curriculum
QUT Faculty of Education
S Block, Room S404, Victoria Park Road
Kelvin Grove Qld 4059
Phone: +61 7 3138 0035
Fax: + 61 7 3138 3985
Email: ydc@qut.edu.au
Website: <http://ydc.qut.edu.au>

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Queensland University of Technology,
Australian Catholic University &
Education Queensland

Deadly Maths Tutor Program

**PROFESSIONAL LEARNING 3:
ADDITION & SUBTRACTION**

**BOOKLET 3.3
STRATEGIES FOR USING 10
2008**

Research Team:
Prof Tom Cooper
Dr Annette Baturo
Mr Warwick Collins
Assoc Prof Elizabeth Warren
Ms Denise Peck

Contributing EQ Organisations:

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Boulia State School	Sunset State School
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Doomadgee State School	(IETA)

YuMi Deadly Centre
School of Mathematics, Science and Technology Education,
Faculty of Education, QUT

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OVERVIEW

PURPOSE

These materials were designed to be used in conjunction with a Professional Learning program for teacher aides. The objective of this Professional Learning was to empower teacher aides to enhance rural and remote Indigenous students' numeracy outcomes. This document contains the materials of the third of five different booklets on addition and subtraction.

If your school would like to receive a YuMi Deadly Maths Professional Learning program please contact the YuMi Deadly Centre (YDC) on: 07 3138 0035 or ydc@qut.edu.au.

DIRECTIONS

(1) Interviewing the students:

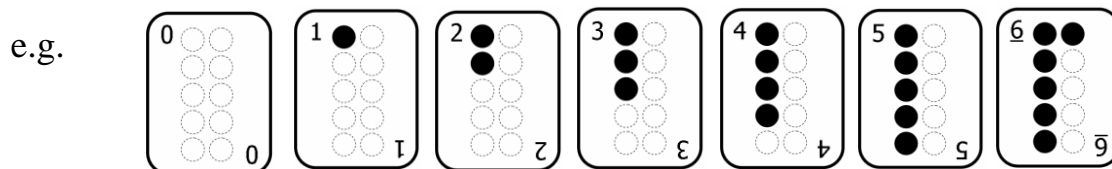
Pick one or more students who appear to be having trouble understanding addition. Interview these students using the interview schedule and the materials. Mark what they do and put their results on the Student Recording Sheet.

(2) Trialling the student activities:

Use the Recording Sheet to work out the activities the students need to do and trial these activities with the students (with each student one at a time or with a group of students). Keep a record of what happens and collect the students' work.

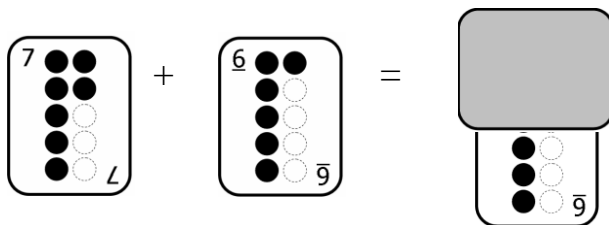
The activities UT1 to UT4 are based on using the ten for addition and subtraction, basic number facts and addition and subtraction of two digit numbers. This is done by

- (1) Using a card deck based on representing numbers using a 5 x 2 representation of numbers 0-10



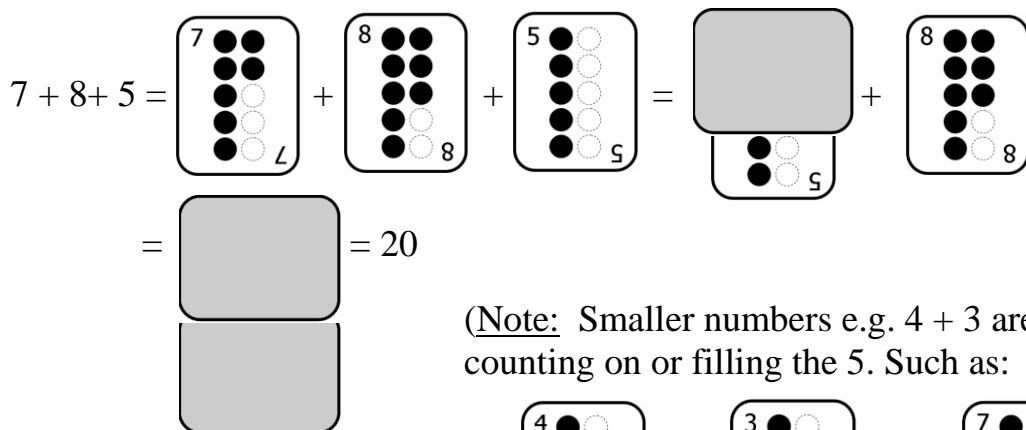
and so on, and

- (2) Using a system based on card games around Mount Isa where a ten is a card upside down and ones are the dots remaining

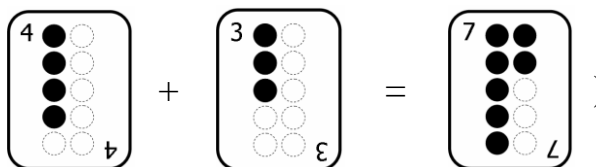
e.g. $7 + 6 =$ 

(the 7 has 3 to get to 10 so the 7 is turned over and covers 3 of the 6 leaving the upside down card and 3 dots or 13)

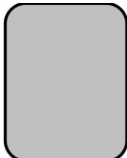
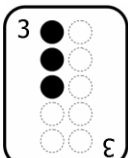
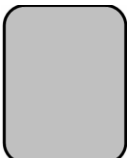
Addition: This is done by the method in (2) above. Another example is:

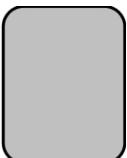
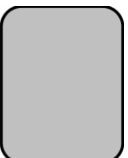
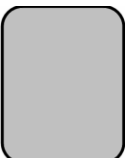
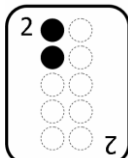


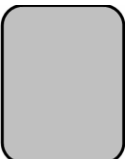



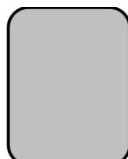
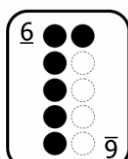
(Note: Smaller numbers e.g. $4 + 3$ are done by counting on or filling the 5. Such as:



Subtraction: This is done by going down to the 10 then removing the remainder from a 10. For example:

a) $13 - 8 =$   $- 8 =$  $- 5 = 5$

b) $32 - 6 =$     $- 6$

$=$    $- 4 =$    $= 26$

INTERVIEW

INTERVIEW SCHEDULE

MATERIALS

Unifix cubes, deck of playing cards, washable felt pen, pen, paper

Materials with this interview: interview cards, card deck 1

Student recording sheet

DIRECTIONS

1. Photocopy and laminate attached interview cards and card deck 1 pages.
2. Gather other material.
3. Place material in front of students. Give students pen and paper to write with.
4. Tell the students you are trying to find out what they know. Say they are not expected to know it and you will teach what is not known.
5. Give the student directions slowly – read problems. Do not give hints. If student cannot do a question, pass on to the next question.
6. Allow students to use material and make drawings but only after they say they do not know how to do it with symbols alone.

Building to 10

C1

Show Card 7.

- Say: *Read the number.*
- Say: *How many more to the next 10?*

Ask the same question for Card 8.

C2

Show and read Card 9.*Say: Calculate the answer by making 10s.***Ask the same question for Card 10.****If incorrect**, replace numbers with playing cards and say: *Calculate your score as if it was a card game.*

C3

Show and read Card 11.*Say: Calculate the answer by adding tens and then adding ones!***Ask the same question for Card 12.**

C4

Show and read Card 13.*Ask the student: If you subtract this number from 10 how much do you have left?***Ask the same question for Card 14.**

C5

Show and read Card 15.*Say: Calculate the answer by reducing to previous 10 and then subtracting the extra left over.***Repeat for Card 16.**

C6

Show and read Card 17.*Say: Calculate the answer by subtracting the tens and then subtracting the ones!***Ask the same question for Card 18.**

INTERVIEW MATERIAL**Interview Cards**

<p>CARD 7</p> <p>8</p>	<p>CARD 8</p> <p>3</p>
<p>CARD 9</p> <p>6 7 4 + 5</p>	<p>CARD 10</p> <p>3 5 8 + 7</p>
<p>CARD 11</p> <p>37 + 25</p>	<p>CARD 12</p> <p>58 + 27</p>

CARD 13

7

CARD 14

4

CARD 15

$$\begin{array}{r} 21 \\ - 5 \\ \hline \end{array}$$

CARD 16

$$\begin{array}{r} 36 \\ - 8 \\ \hline \end{array}$$

CARD 17

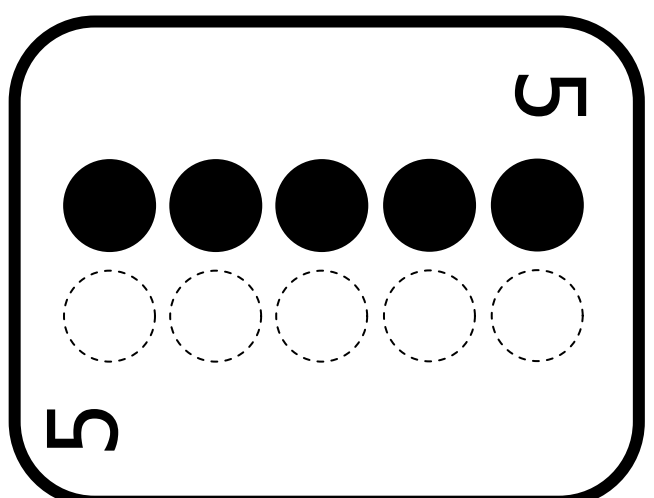
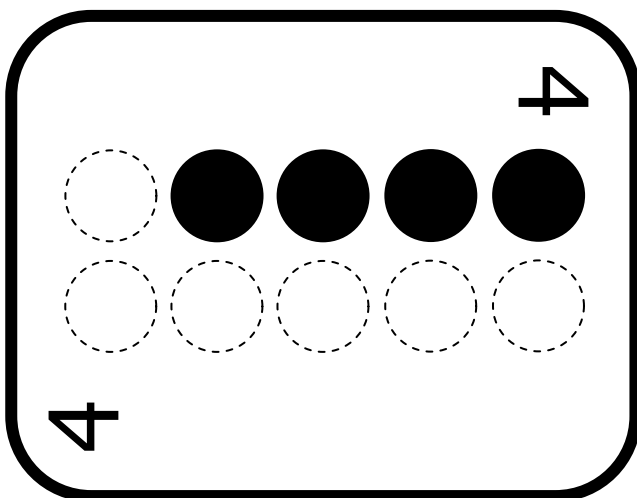
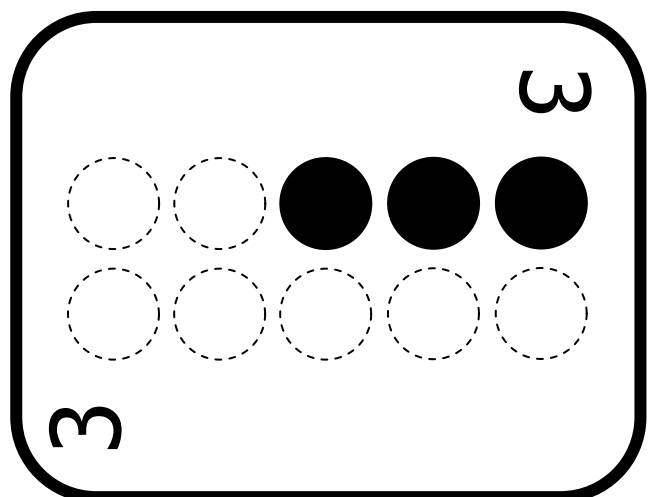
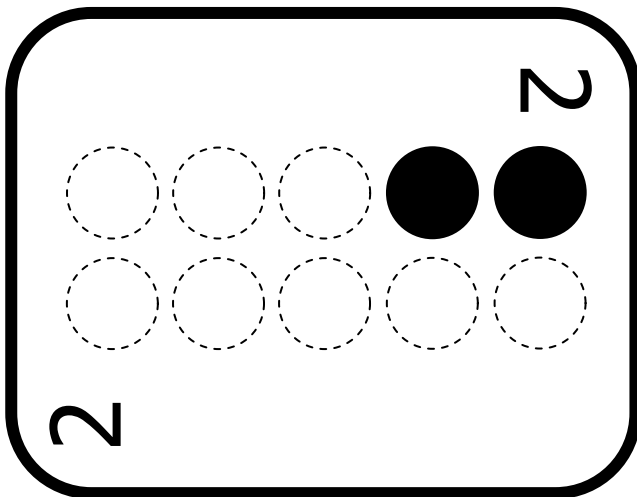
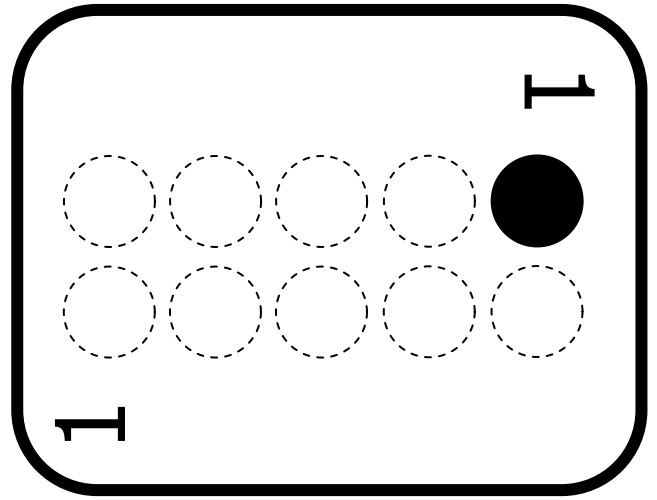
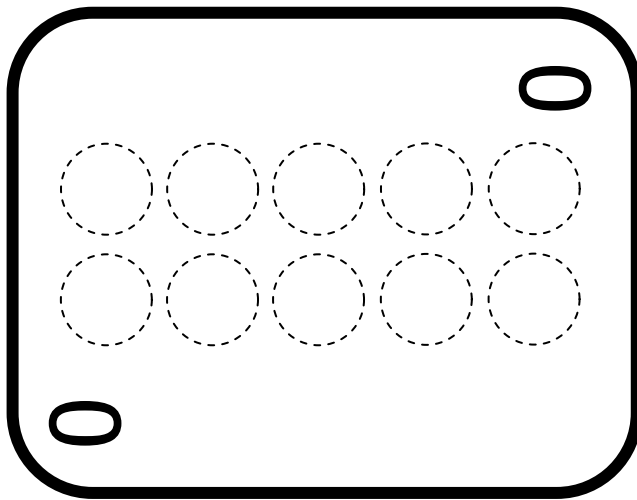
$$\begin{array}{r} 82 \\ - 34 \\ \hline \end{array}$$

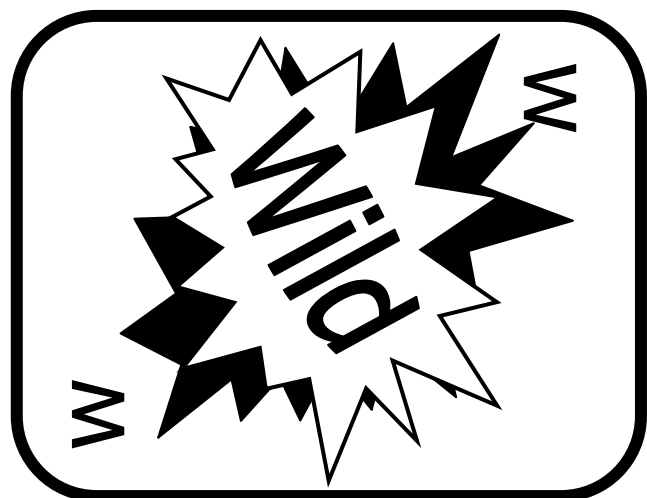
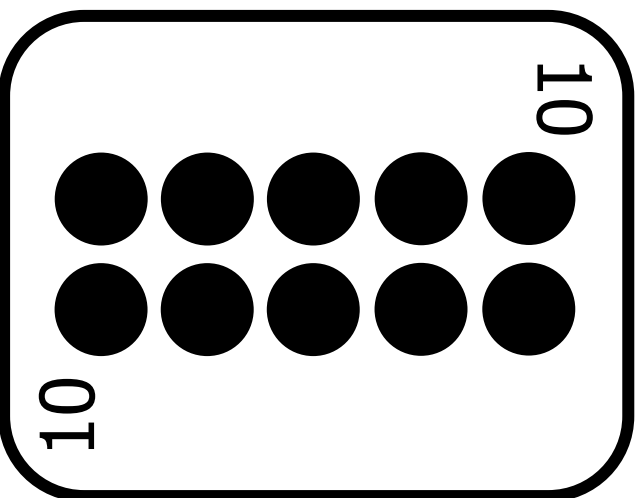
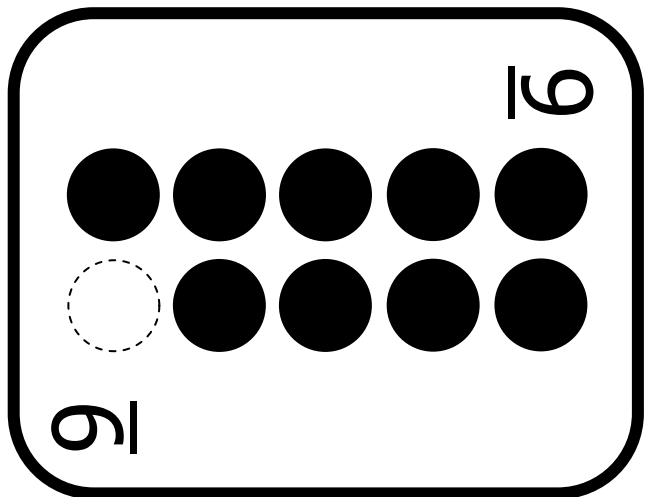
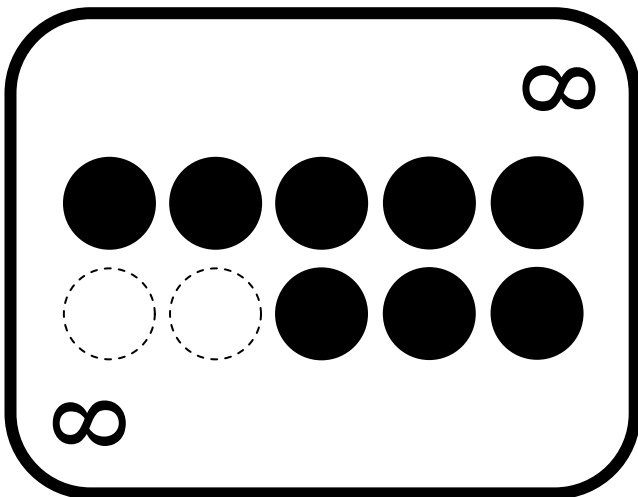
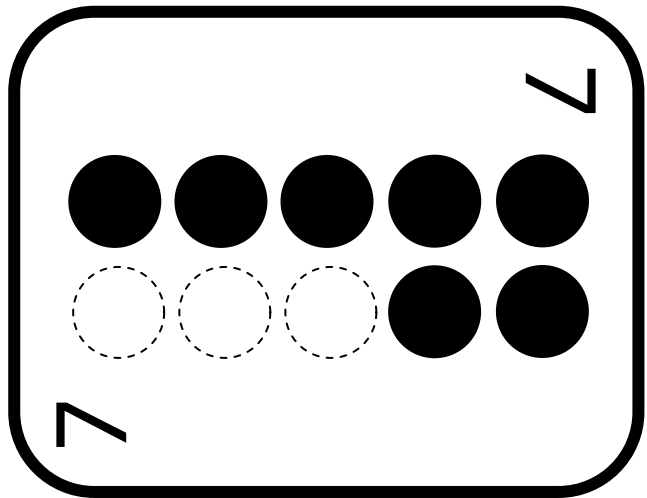
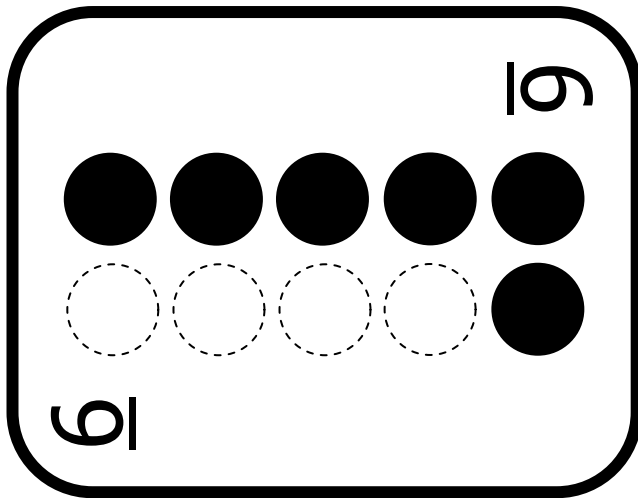
CARD 18

$$\begin{array}{r} 77 \\ - 28 \\ \hline \end{array}$$

Card Deck 1 (dots to 10 shown)

(Photocopy two pages 4 times on different coloured paper to make 48 cards in total – 4 “suits” of 12 cards each)





STUDENT RECORDING SHEET

Name: _____ Date: _____

School/Class: _____

Interview item	Result (✓, ✗)	Comments	Activities to be completed if incorrect
C1: building to ten			UT1
C2: making tens			UT1
C3: adding tens and ones			UT2
C4: subtracting from ten			UT3
C5: counting down from ten			UT3
C6 subtracting tens and ones			UT4

ACTIVITIES

ACTIVITY UT1

[Building to ten and making tens]

Materials: Hands, 5 x 2 Card Deck 1, Card Deck 2, Gameboards, Worksheet

Directions:

1. Say: *Hold both hands up. Count the fingers* [10]. Say: *Put up 6 fingers. Say: How many fingers are turned down?* [4]. Ask: *What does 6 and 4 give you?* [10]. Ask: *How many from 6 to 10?* [4]

Repeat for 9 fingers, 2 fingers and 5 fingers.

2. Hand out card deck 1. Ask: *Pick card 3. How many filled in circles and dotted circles does the card have?* [3, 7]. Ask: *Do these add to 10?* [Yes].

3. Play card games:
 - A. Build to 10 racetrack.
 - B. Build to 10 noughts and crosses.
 - C. Instant build to 10

4. Write $7 + 5$ on the board. Ask: *Put out the card numbers 5 and 7. How many to make the 7 a 10?* [3]. Direct students to turn over the 7 and cover 3 dots on the 5. Ask: *How many dots are under the overturned card?* [7 on bottom of overturned card, 3 underneath card]. *What is the total under the card?* [10]. *If an overturned card is a 10, what is the number shown by the cards?* [12].

If some problems, ask: *What is the 7 covering?* [3 dots]. Ask: *How much with the 7 turned over does this make?* [10]. *What do you see when you look at the cards?* [Overturned 7 card and 2 dots]

Repeat for a) $6 + 5$ b) $8 + 7$. Reinforce how ten is shown by an overturned card and how extra ones are left uncovered.

Repeat for c) $7 + 4 + 6$ d) $8 + 3 + 4 + 7$

5. Complete worksheet

6. Think cards. Ask: *Look at these examples:* (Write on board)

$$\begin{array}{r} \text{(a)} \quad 5 \\ 7 \\ + 8 \\ \hline \end{array}$$

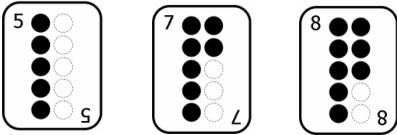
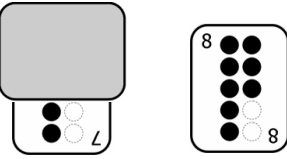
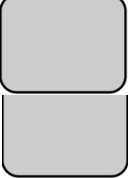
$$\begin{array}{r} \text{(b)} \quad 6 \\ 7 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(c)} \quad 8 \\ 7 \\ 5 \\ + 4 \\ \hline \end{array}$$

Say: *Imagine they are cards from a card deck. State: Think about forming tens with dots leftover.*

Look at example (a). Say: *What about this one? What does 5 need to make 10?*
 [5] Ask: *So what can we do with the 5 & 7 cards? Is there 5 in the 7 that a turned over 5 can cover to make a 10?* Do this. Say: *Now how many ones are leftover? And so on.*

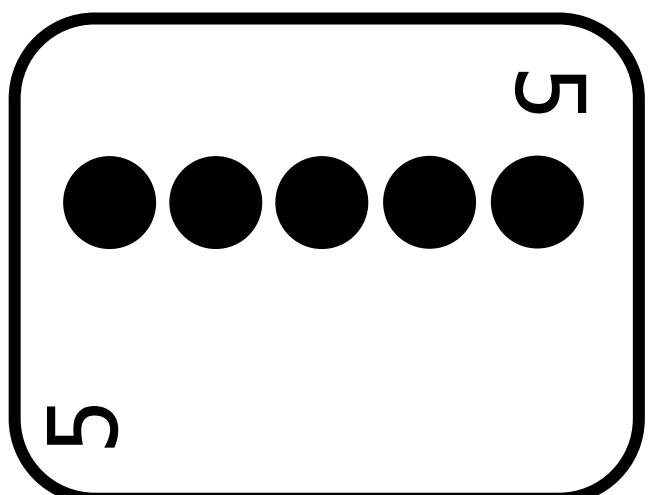
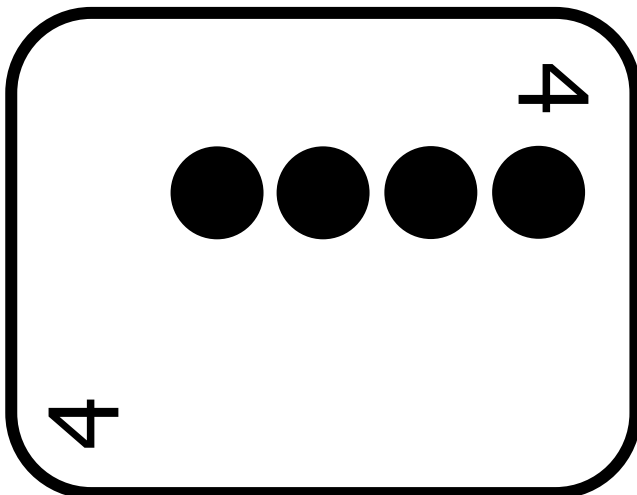
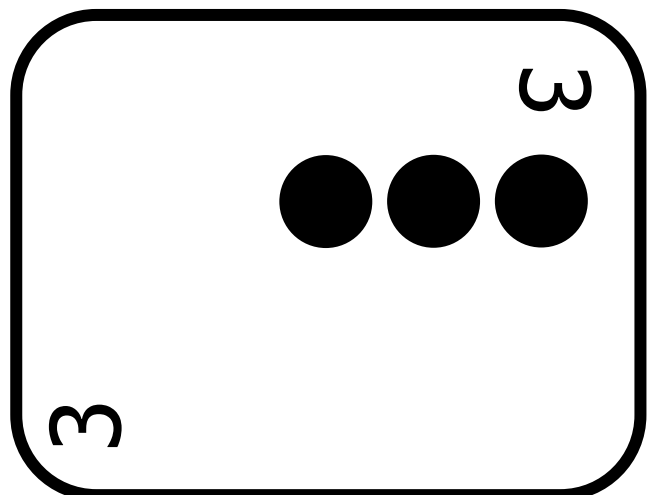
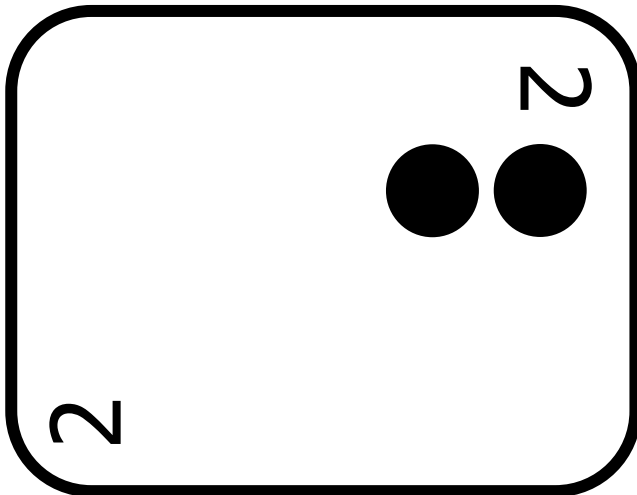
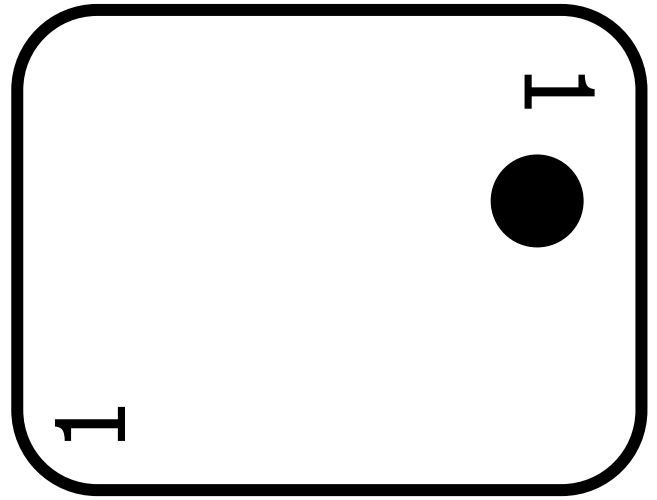
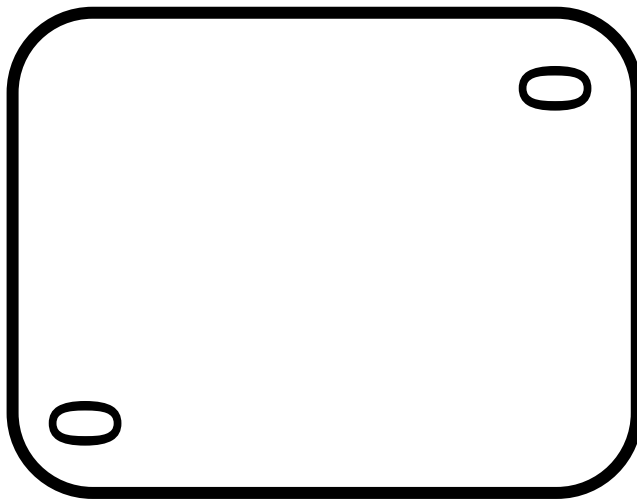
As an example:

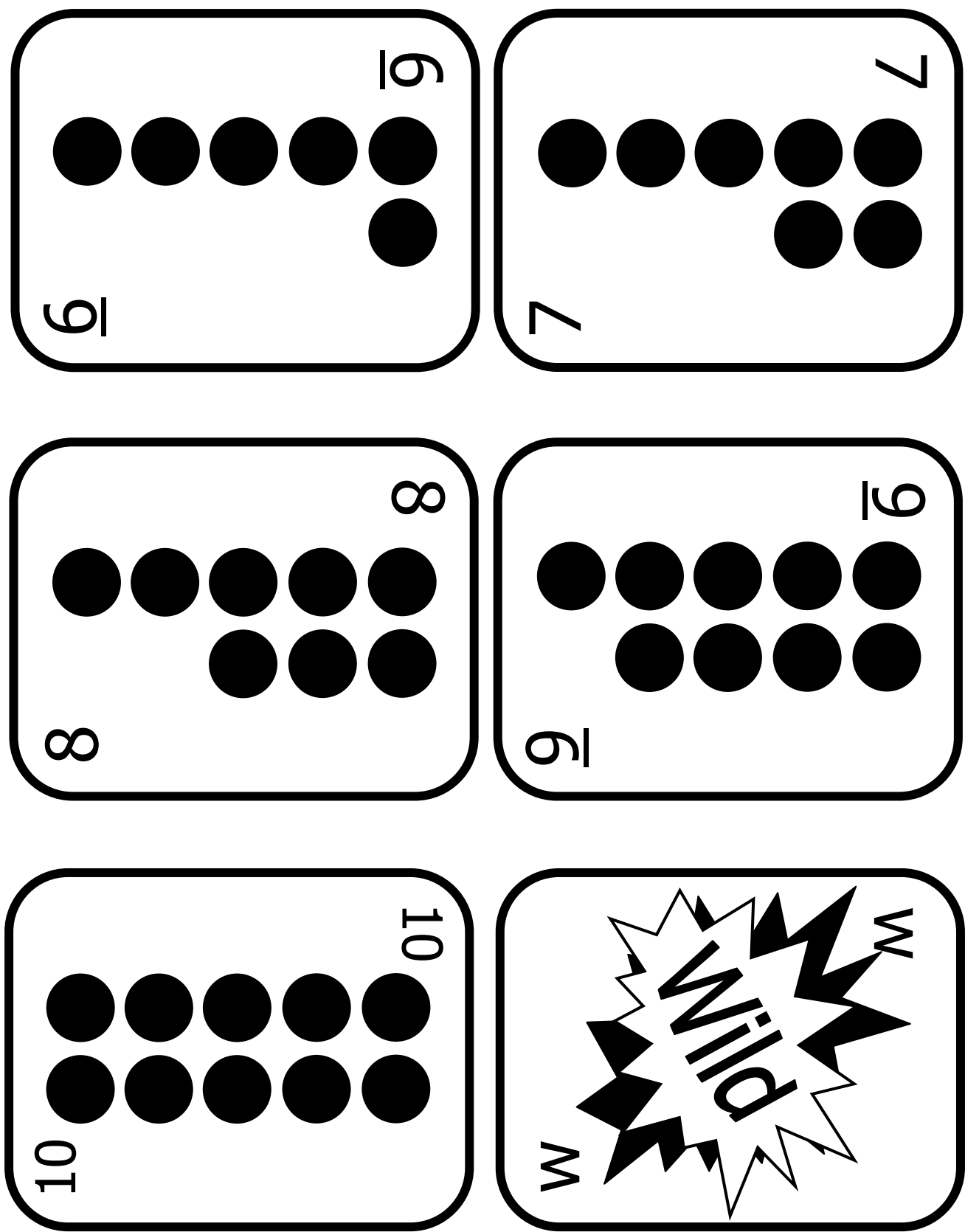
Questions	Action
Put out cards for: $5 + 7 + 8$	
How much for 5 to build to 10? Is there enough in 7 to do this? Do so! This is 1 ten and 2 ones. So 12.	
Think about the 8. How much to reach 10? Do we have this left over? Do this! The answer is 20.	

7. Play card games D. Instant make 10
 E. Cooney make 10

Card Deck 2 (dots to 10 not shown)

(Photocopy two pages 4 times on different coloured paper to make 48 cards in total – 4 “suits” of 12 cards each)





UT1 – Game A: Build to 10 race track

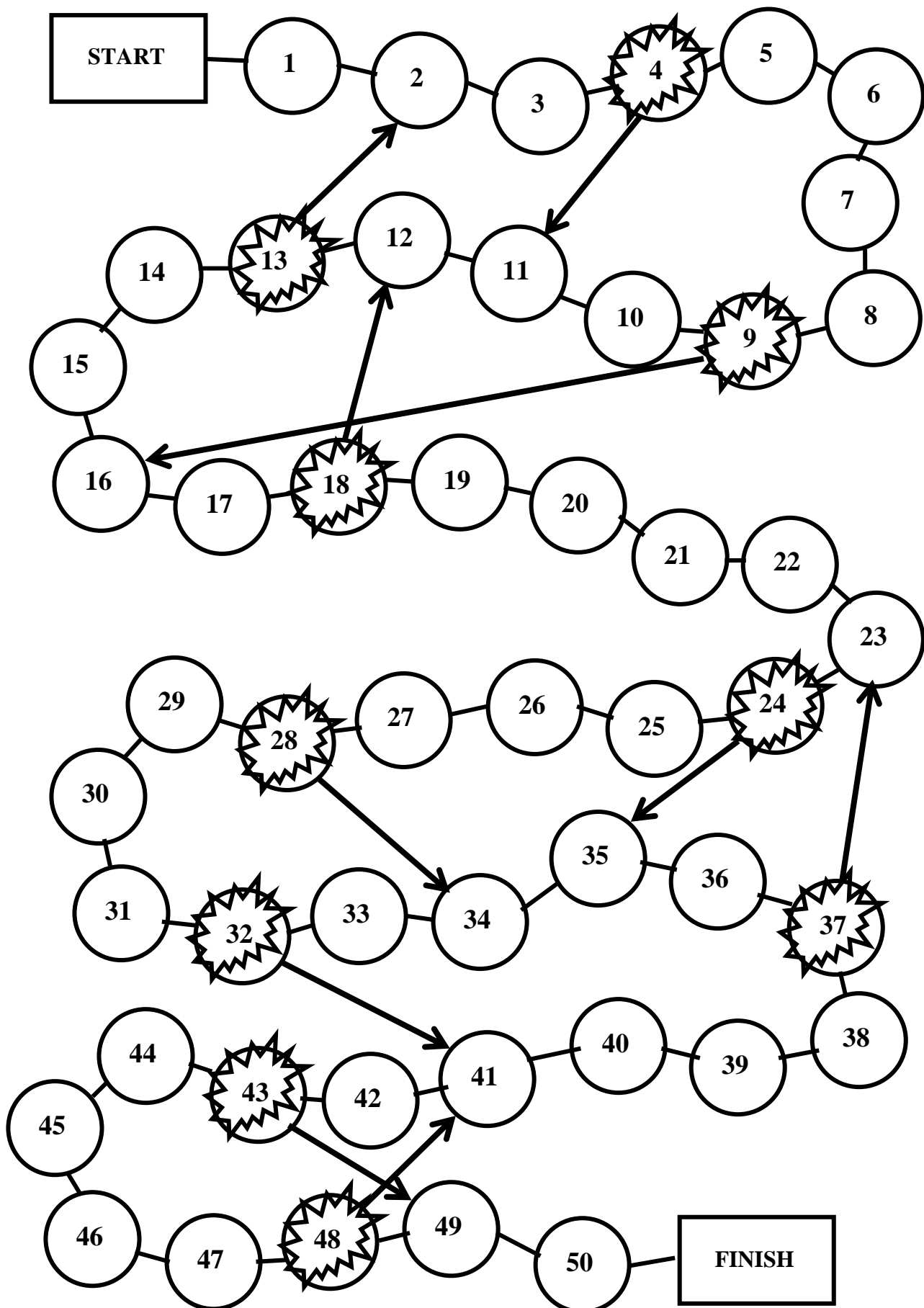
Materials: 1 Unifix per player (different colours), card deck 2 (without 0 & 10) and build to 10 racetrack board.

Number of players: 2-4

Directions:

- 1) Players begin at START (place counters there).
- 2) In turn, each player selects a card and moves forward the amount that would build that card to 10. (e.g., if the player selected 4 they would be required to move 6 places).
- 3) First to END wins.
- 4) If a player at any stage of the game lands on a star they are to continue to where that star's arrow leads.

UT1 – Build to 10 Racetrack Board



UT1 – Game B: Build to 10 noughts and crosses

Materials: 1 set Unifix per player (same colour for individual), card deck 2 (without 0 & 10), and Build to 10 noughts and crosses board.

Number of players: 2

Directions:

- 1) Players each have a set of Unifix – all one colour for each player.
- 2) Players, in turn, select a card from deck 2 and cover the number that builds the card to 10. (If already covered by opposition, replace the opposition counter.)
(NOTE: either number in space is OK).
- 3) First to get 3 in a row, column, or diagonal, wins.

UT1 – Build to 10 Noughts and Crosses Board

5	2	9
7	1	3
8	4	6

UT1 – Game C: Instant build to 10

Materials: Card deck 2 (all cards)

Number of players: 2-6

Directions:

- 1) Shuffle cards and deal 2 cards to each player. Players check if their 2 cards add to 10.
- 2) If no player has two cards adding to 10, a third card is given to each player. They check to see if any 2 cards in the 3 add to 10. If again no 2 cards adding to 10, a fourth, fifth, and so on card is given to each player until someone has 2 cards adding to 10.
- 3) The first player with the two cards adding to 10 wins and scores 1 point, and that round of the game ends.
- 4) If more than one player achieves two cards adding to 10 in the same round, all players score a point.
- 5) Game is played until someone reaches 5 (overall winner).

UT1 – Worksheet

Add the following with the cards:

$$\begin{array}{r} (a) \quad 6 \\ 4 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 7 \\ 8 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} (c) \quad 5 \\ 9 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} (d) \quad 8 \\ 5 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} (e) \quad 7 \\ 8 \\ 5 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} (f) \quad 5 \\ 3 \\ 7 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} (g) \quad 8 \\ 3 \\ 9 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} (h) \quad 8 \\ 7 \\ 9 \\ + 6 \\ \hline \end{array}$$

Add the following by thinking cards:

$$\begin{array}{r} (i) \quad 7 \\ 5 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} (j) \quad 8 \\ 6 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} (k) \quad 5 \\ 7 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} (l) \quad 8 \\ 4 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} (m) \quad 6 \\ 3 \\ 5 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} (n) \quad 9 \\ 8 \\ 3 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} (o) \quad 5 \\ 9 \\ 3 \\ + 7 \\ \hline \end{array}$$

$$\begin{array}{r} (p) \quad 8 \\ 8 \\ 8 \\ + 3 \\ \hline \end{array}$$



Colour the answers - Get across the river!

17	11	33	23	19
26	18	21	29	24
14	19	25	22	15
12	28	16	20	27
33	30	14	32	13



Home

UT1 – Game D: Instant make 10

Materials: Card deck 2 (all cards)

Number of players: 2-6

Directions:

- 1) Shuffle cards and deal 3 cards to each player.
- 2) Each player adds cards (can use “overturning card” method).
- 3) Score is cards leftover after removing 10s. However, 0 is best score, followed in decreasing order by 9, 8, 7 and so on.
- 4) If two or more players have the same score, they are given a 4th, 5th etc. card until someone has 3 cards that score 0. If this happens to 2 or more players together, both win.
- 5) First player to 5 wins is the overall winner.

UT1 – Game E: Cooney make 10

Materials: Card deck 2 (all cards)

Number of players: 2-6

Directions:

- 1) Players opposite each other are partners.
- 2) Cards are shuffled and 5 cards dealt to each player.
- 3) Each player adds cards. Highest sum means that partnership wins.
- 4) First partnership to 5 wins is overall winner.
- 5) Extension: Partners add their sums to get the winner.

ACTIVITY UT2

[Adding tens and ones]

Materials: Card decks 1 and 2, tens-ones chart, pen and paper, attached games and gameboards, worksheets A & B.

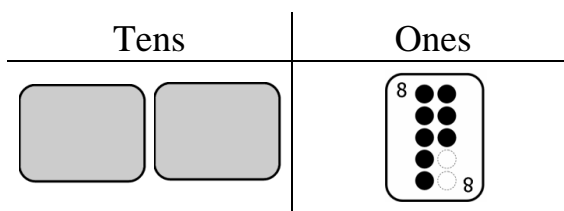
Directions:

1. Provide students with a problem: “There were 28 people at the party. 36 more came. How many at the party now?” Ask students: *How would we write this problem in symbols?* Elicit that normally the problem would be written vertically as follows. (Do not say students are wrong if pose horizontal setting out – just ask for another way.)

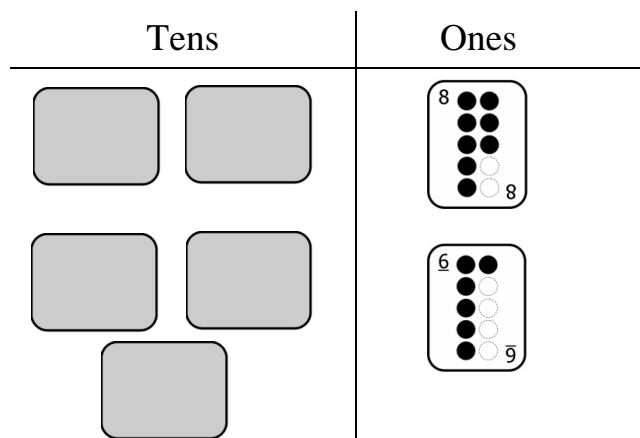
$$\begin{array}{r} 28 \\ + 36 \\ \hline \end{array}$$

Write this on the board.

2. Direct students to get out Card deck 1 and the tens-ones chart. Ask: *How many tens and ones in 28?* [2 tens, 8 ones]. Direct students to put 2 cards upside down to make tens in the tens position and an 8 card in the ones position:

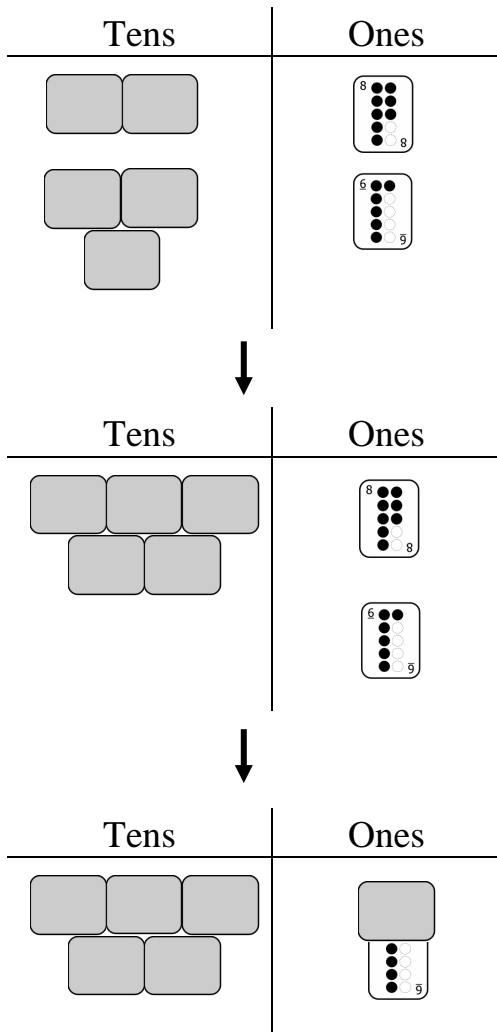


Ask: *How many tens and ones in 36?* [3 tens, 6 ones]. Direct students to put 3 cards upside down in the tens position and a 6 card in the ones position under the 28:

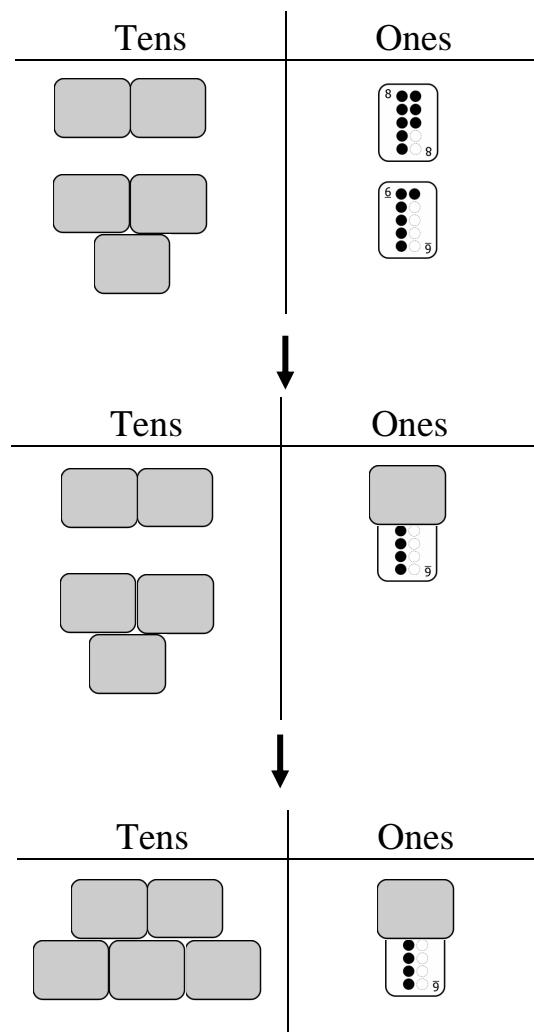


3. Ask students how these numbers could be added? Elicit that the ones and tens could be added separately and then results combined. Do not be concerned about order, tens first or ones first are equally good. Direct students to do the addition – using the technique of UT1.

Tens First

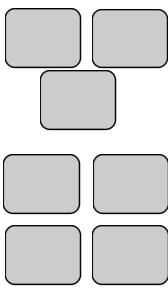
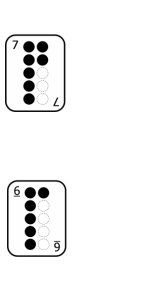
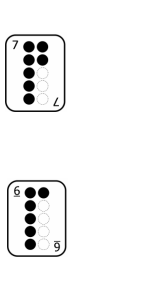
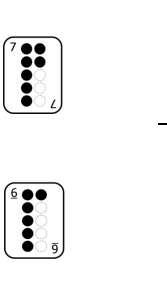
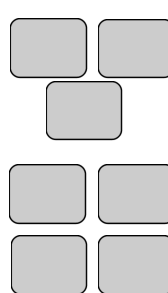
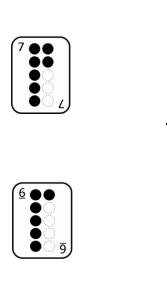
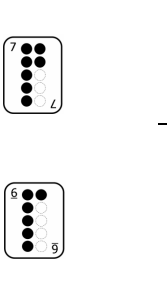
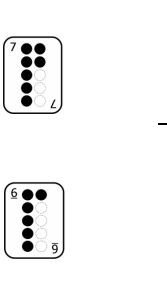
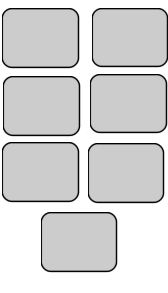
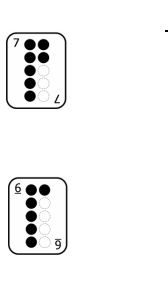
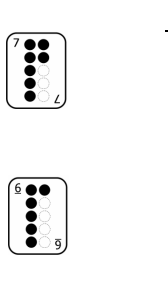
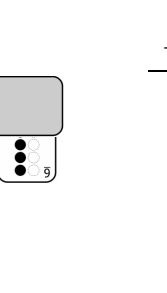
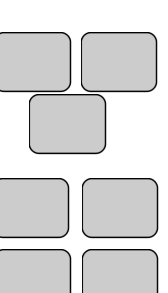
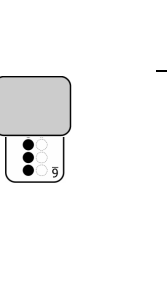
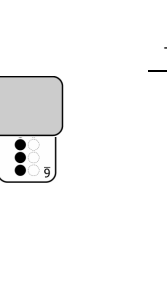
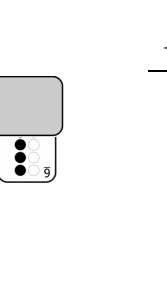
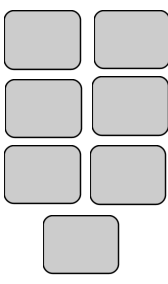
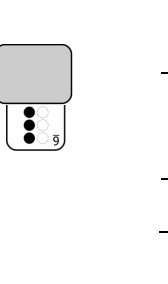
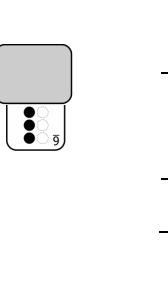
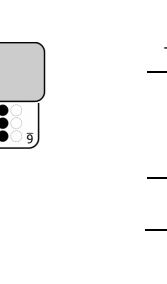
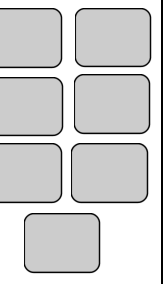
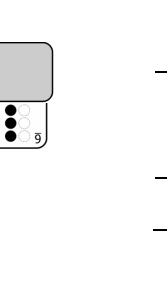
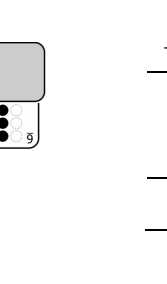
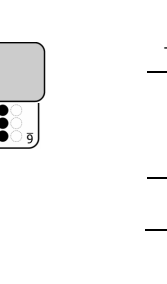


Ones First



Get students to see that there are now 6 tens and 4 ones. Ask: *What number is this?* [64]

4. Repeat this for problem: “I had \$37. My Mum gave me \$46. How much do I have now?” As you work with cards on chart, show students how to write it as an algorithm.

<u>Tens First</u>			<u>Ones First</u>		
<u>Materials</u>	<u>Symbols</u>		<u>Materials</u>	<u>Symbols</u>	
<div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	<div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	$\begin{array}{r} 37 \\ + 46 \\ \hline \end{array}$	<div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	<div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	$\begin{array}{r} 37 \\ + 46 \\ \hline \end{array}$
<div style="text-align: center; margin-bottom: 10px;">↓</div> <div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	<div style="text-align: center; margin-bottom: 10px;">↓</div> <div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	$\begin{array}{r} 37 \\ + 46 \\ \hline 70 \end{array}$	<div style="text-align: center; margin-bottom: 10px;">↓</div> <div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	<div style="text-align: center; margin-bottom: 10px;">↓</div> <div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	$\begin{array}{r} 37 \\ + 46 \\ \hline 13 \end{array}$
<div style="text-align: center; margin-bottom: 10px;">↓</div> <div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	<div style="text-align: center; margin-bottom: 10px;">↓</div> <div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	$\begin{array}{r} 37 \\ + 46 \\ \hline 70 \\ 13 \\ \hline 83 \end{array}$	<div style="text-align: center; margin-bottom: 10px;">↓</div> <div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	<div style="text-align: center; margin-bottom: 10px;">↓</div> <div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Tens</div> <div style="border-bottom: 1px solid black; padding-bottom: 5px; width: 40%;">Ones</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	$\begin{array}{r} 37 \\ + 46 \\ \hline 13 \\ 70 \\ \hline 83 \end{array}$

5. Complete worksheet A

6. Play games
- A. First to 100
 - B. Partner Cooney

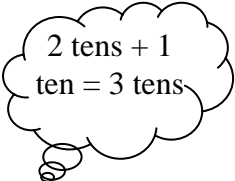
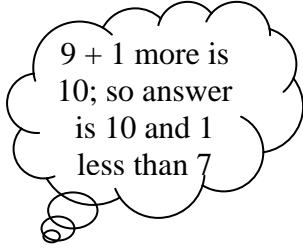
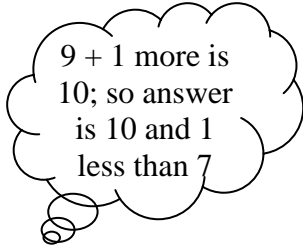
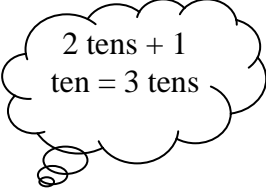
7. Pose a Problem: “John caught 29 fish and Fred caught 17 fish. How many fish altogether?” Ask: *How do we write this as symbols?*

$$\begin{array}{r} 29 \\ + 17 \\ \hline \end{array}$$

Ask students to imagine this as cards. Say: *Shut your eyes. Imagine $29 + 17$ with cards. Open your eyes. Now use the imaginary cards to work it out. Write down the symbols as you go!*

If students have difficulties, say: *How do we show the tens?* [By turning over a card for each ten]. *So imagine the cards and add the tens in your mind. The answer is?* [3 tens].

Say: *How do we show the ones?* [With a 9 card and a 7 card] *How do we add these?* [Making a 10 and turning over a card to cover extra ones needed on the other card]. *So imagine that you do this with cards; the answer is?* [one ten and 6 ones]

<p><u>Tens First</u></p> $\begin{array}{r} 29 \\ + 17 \\ \hline \end{array}$ <p style="text-align: center;">↓</p> <div style="display: flex; align-items: center;"> $\begin{array}{r} 29 \\ + 17 \\ \hline 30 \end{array}$ <div style="margin-left: 20px;">  </div> </div> <p style="text-align: center;">↓</p> <div style="display: flex; align-items: center;"> $\begin{array}{r} 29 \\ + 17 \\ \hline 30 \\ 16 \\ \hline 46 \end{array}$ <div style="margin-left: 20px;">  </div> </div>	<p><u>Ones First</u></p> $\begin{array}{r} 29 \\ + 17 \\ \hline \end{array}$ <p style="text-align: center;">↓</p> <div style="display: flex; align-items: center;"> $\begin{array}{r} 29 \\ + 17 \\ \hline 16 \end{array}$ <div style="margin-left: 20px;">  </div> </div> <p style="text-align: center;">↓</p> <div style="display: flex; align-items: center;"> $\begin{array}{r} 29 \\ + 17 \\ \hline 16 \\ 30 \\ \hline 46 \end{array}$ <div style="margin-left: 20px;">  </div> </div>
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8. Complete worksheet B
9. Play games
 - C. Dicing with cards
 - D. Dicing with partners

UT2 – Tens-Ones Chart

TENS	ONES

UT2 – Worksheet A

Complete the examples using cards on tens-ones chart.
Place letters above numbers to answer the riddle!

$$\begin{array}{r} \text{E} \quad 36 \\ + \quad 23 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{W} \quad 14 \\ + \quad 34 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{Y} \quad 26 \\ + \quad 56 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{U} \quad 27 \\ + \quad 49 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{O} \quad 38 \\ + \quad 54 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{M} \quad 64 \\ + \quad 27 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{L} \quad 29 \\ + \quad 46 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{J} \quad 32 \\ + \quad 19 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{R} \quad 43 \\ + \quad 28 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{A} \quad 28 \\ + \quad 57 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{P} \quad 35 \\ + \quad 48 \\ \hline \\ \hline \end{array}$$

What do you get when you cross a sheep with a kangaroo?

$$\begin{array}{cccccccccccccc} & * & & & & & * & & & & & & & \\ \hline 85 & 48 & 92 & 92 & 75 & 75 & 82 & 51 & 76 & 91 & 83 & 59 & 71 \\ \hline \end{array}$$

UT2 – Game A: First to 100

Materials: Tens-ones charts, card deck 1, pen and paper

Number of players: 2-4

Directions:

- 1) Deck is shuffled and placed between players.
- 2) To start, each player selects a card and places it in ones position of tens-ones chart, unless it is a 10 where it is turned over and put in tens position.
- 3) From then on, each player selects the top card from the deck and adds the ones to their tens-ones chart. If there is more than ten in the ones position, cards are turned over to make tens and to cover ones in other cards. Where possible turned over tens are moved to tens position.
- 4) Players keep a running tally of their number on paper.
- 5) First player to 100 wins.

UT2 – Game B: Partner Cooney

Materials: Card decks 1 or 2, counter for each partner, gameboard, pen & paper

Number of players: 4

Directions:

- 1) Players sit around a table – opposite players are partners.
- 2) Cards are shuffled with 5 cards being dealt to each player.
- 3) Players determine the sum of their cards using methods from UT1 and write them down.
- 4) Partners combine their scores to get final result.
- 5) Partners with highest score, may move one place along board from start.
- 6) First partners to finish win.

UT2 – Partner Cooney Game Board

Partners 1

Partners 2

START	START
FINISH	FINISH

UT2 – Game C: Dicing with cards

Materials: Card deck 2 (without 10s), die (4,5,6 replaced with 1,2,3) , pen & paper

Number of players: 2-6

Directions:

- 1) Players write 0 on paper and shuffle cards
- 2) To start, players in turn throw die and take top card. Die gives tens and card gives ones. Players write this number on paper under 0.
- 3) Players in turn continue to throw die and take cards, adding number made to existing number and keeping a running tally.

For example:

Start		0
Throw 2	Select 7	27
Throw 1	Select 4	41 (add 14)
Throw 3	Select 8	79 (add 38)

- 4) First player to 200 wins.

UT2 – Game D: Dicing with partners

Materials: Card deck 2 (no 10s), die (4,5,6 replaced with 1,2,3)

Number of Players: 4

Directions:

- 1) Players sit around table and shuffle cards. Opposite players are partners.
- 2) Each player in turn throws a die and selects card (die is tens and card is ones) to get a number.
- 3) Players add their and their partner's numbers (players "think cards" if this is difficult)
- 4) Partners score points as follows

Added Numbers	20 – 39	40 – 59	60 – 79
Score	1 point	2 points	1 point

- 5) First partners to 10 points, win.

UT2 – Worksheet B

Complete the following examples.

Place the letters above the numbers to answer the riddle!

$$\begin{array}{r} \text{R} \quad 35 \\ + \quad 23 \\ \hline \end{array}$$

$$\begin{array}{r} \text{C} \quad 34 \\ + \quad 54 \\ \hline \end{array}$$

$$\begin{array}{r} \text{K} \quad 16 \\ + \quad 22 \\ \hline \end{array}$$

$$\begin{array}{r} \text{N} \quad 34 \\ + \quad 24 \\ \hline \end{array}$$

$$\begin{array}{r} \text{W} \quad 82 \\ + \quad 17 \\ \hline \end{array}$$

$$\begin{array}{r} \text{S} \quad 29 \\ + \quad 41 \\ \hline \end{array}$$

$$\begin{array}{r} \text{U} \quad 38 \\ + \quad 38 \\ \hline \end{array}$$

$$\begin{array}{r} \text{T} \quad 26 \\ + \quad 39 \\ \hline \end{array}$$

$$\begin{array}{r} \text{E} \quad 53 \\ + \quad 29 \\ \hline \end{array}$$

$$\begin{array}{r} \text{D} \quad 26 \\ + \quad 35 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Y} \quad 35 \\ + \quad 27 \\ \hline \end{array}$$

$$\begin{array}{r} \text{A} \quad 47 \\ + \quad 39 \\ \hline \end{array}$$

$$\begin{array}{r} \text{O} \quad 27 \\ + \quad 27 \\ \hline \end{array}$$

What did the peanuts say to the biscuits?

99 82 86 58 82 60 76 65 70 86 60 61 62 54 76

86 58 82 88 58 86 88 38 82 58 70

ACTIVITY UT3

[Subtracting from ten and going down from ten]

Materials: Hands, card decks 1 and 2, gameboards, worksheets, pen and paper, attached games and gameboards, tens-ones chart

Directions:

1. Direct the students: *Hold both hands up. State: Put down 3 fingers. How many fingers are left?* [7] Ask: *What does 10 subtract 3 give you?* [7].
Repeat by putting down (a) 6 fingers; (b) 4 fingers; and (c) 9 fingers.
2. Hand out card deck 1. State: *Pick up a 2 card. Ask: How many left if I subtract 2 from 10?* [8] Ask: *How does the card show this?* [the dotted circles].

Repeat for 5 card and 8 card.

3. Play games: (a) Game A: Subtract from 10 racetrack
(b) Game B: Subtract from 10 noughts and crosses

4. Write on the board:

$$\begin{array}{r} 10 \\ - 3 \\ \hline \end{array}$$

Put out a 10 card and a 3 card from card deck 1. Ask: *What is left when I subtract the 3 from the 10?* [7] *How do you know?* [the dotted circles on the 3 card]. Ask: *Would it be the same if I turned over a card for the 10?* [Yes].

Repeat for (a) 10–6; and (b) 10–8.

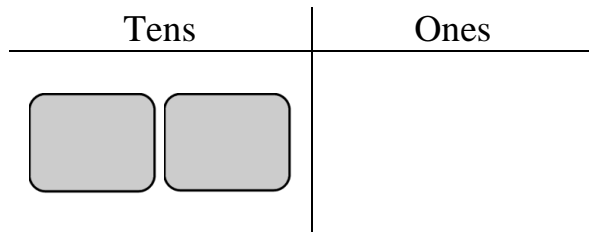
5. Write on the board:

$$\begin{array}{r} 20 \\ - 6 \\ \hline \end{array}$$

Ask: *Put out cards to show 20 on the tens-ones chart. Look at the 6 card. What is left after I subtract it from 20? How could we do this?*

Act this out with cards recording as you go (do not remove the 6 but pull it down the chart).

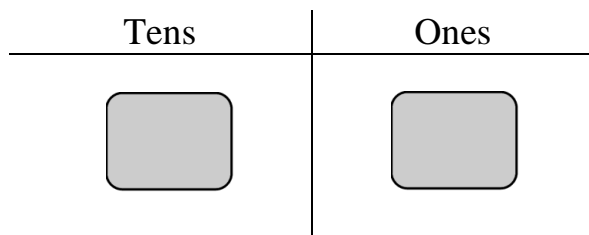
(a) Set up



$$\begin{array}{r} 20 \\ - 6 \\ \hline \end{array}$$



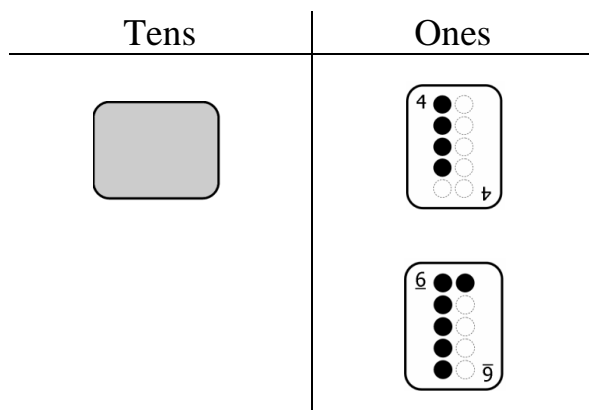
(b) Select a 10 from which to subtract the 6



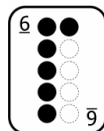
$$\begin{array}{r} 20 \\ - 6 \\ \hline \end{array}$$



(c) Subtract 6 from 10 (move 6 down to leave answer at top)



$$\begin{array}{r} 20 \\ - 6 \\ \hline 14 \end{array}$$



If difficulties, direct students to look at $10-6$ and then add another ten.

Repeat for (a) $30-8$; and (b) $50-3$.

6. Think cards: Look at these examples (write on board)

$\begin{array}{r} 70 \\ - 9 \\ \hline \end{array}$	and	$\begin{array}{r} 40 \\ - 4 \\ \hline \end{array}$
--	-----	--

Say: Imagine these as cards. Work them out in your head and write the answers down.

If difficulties, say: *Look at 70 subtract 9. How many tens in 70? [7] Remove one of these tens to subtract the 9 from. How many tens remain? [6] How many ones after 9 removed? [1].*

Show recording:

$$\begin{array}{r} 70 \\ - 9 \\ \hline \end{array} \longrightarrow \begin{array}{r} 6 \ 10 \\ - 9 \\ \hline \end{array} \longrightarrow \begin{array}{r} 6 \ 10 \\ - 9 \\ \hline 6 \ 1 \end{array}$$

7. Complete worksheet.

UT3 – Game: Subtract from 10 Racetrack

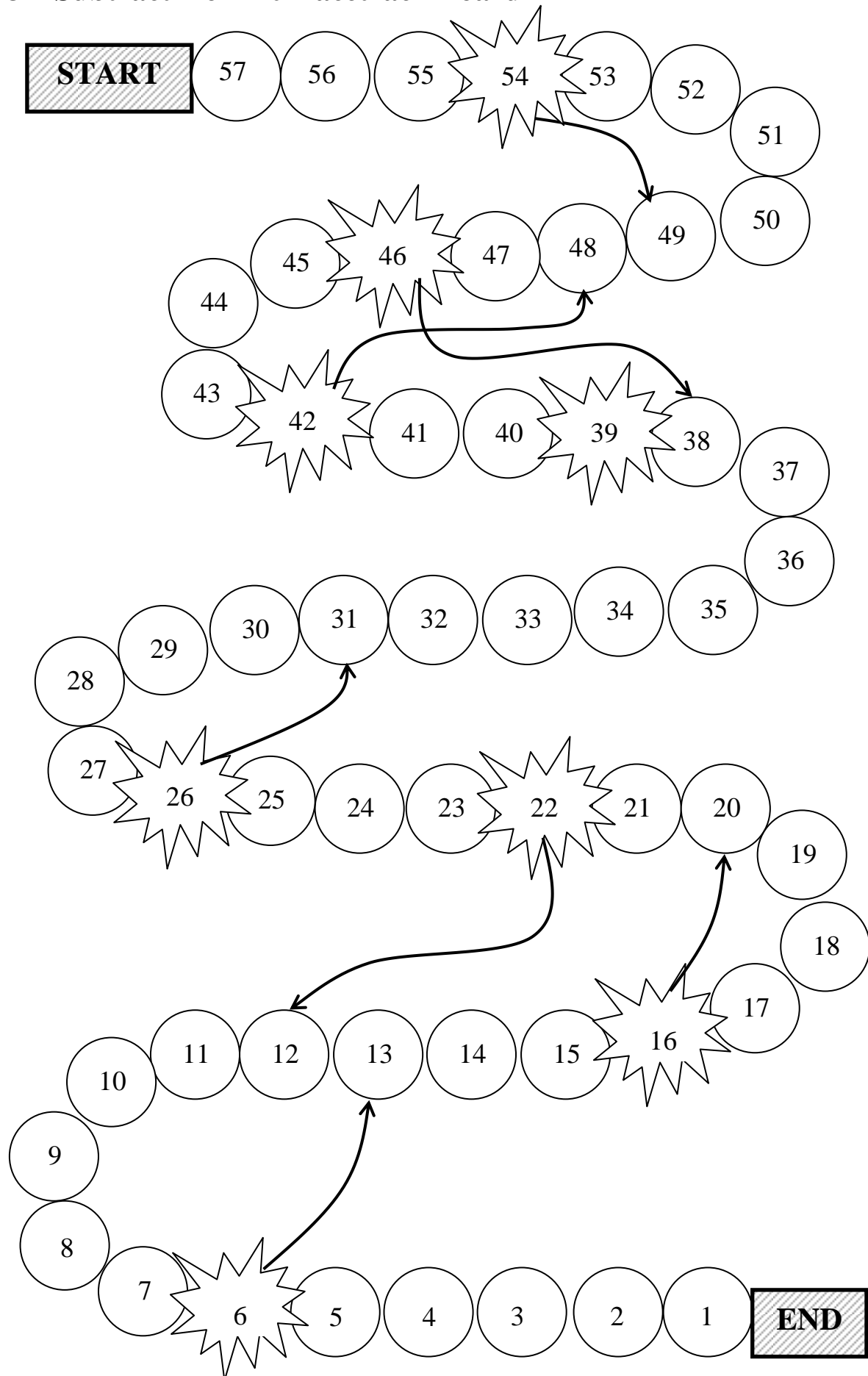
Materials: Different coloured counter for each player, Subtract from 10 Racetrack Board, card deck 1 and 2 (without 10s)

Number of players: 2-4

Directions:

- 1) Players begin at START (place counters there)
- 2) In turn, each player selects a card from deck 1 and calculates what 10 subtract this number is
- 3) Then player moves backwards along racetrack this subtraction (e.g., if select 3 card, $10-3$ is 7, so move backwards 7 places)
- 4) If land on a star, go where arrow leads
- 5) First to END wins
- 6) Replay the game with card deck 2

UT3 – Subtract from 10 Racetrack Board



UT3 – Game: Subtract from 10 noughts and crosses

Materials: Set of counters of one colour (unifix would be good) for each player, gameboard, card decks 1 and 2 (without 10s)

Number of players: 2

Directions:

- 1) Players in turn select a card and subtract that number from 10
- 2) Players then cover this subtracted number with their counter. If this number is already covered with the opponent's colour, it can be replaced
- 3) Winner is first with 3 in a row (across, down, or diagonal) – like noughts and crosses

UT3 – Subtract from 10 “Noughts and Crosses” Board

7	3	8
1	5	2
9	4	6

UT3 – Worksheet

Complete the following Think cards. Shade the answers.

Find the way to the ice cream. (Use a card deck if needed.)

(1)	$\begin{array}{r} 10 \\ -6 \\ \hline \end{array}$	(2)	$\begin{array}{r} 30 \\ -7 \\ \hline \end{array}$	(3)	$\begin{array}{r} 40 \\ -3 \\ \hline \end{array}$	(4)	$\begin{array}{r} 50 \\ -8 \\ \hline \end{array}$
-----	---	-----	---	-----	---	-----	---

(5)	$\begin{array}{r} 90 \\ -2 \\ \hline \end{array}$	(6)	$\begin{array}{r} 80 \\ -1 \\ \hline \end{array}$	(7)	$\begin{array}{r} 70 \\ -4 \\ \hline \end{array}$	(8)	$\begin{array}{r} 20 \\ -9 \\ \hline \end{array}$
-----	---	-----	---	-----	---	-----	---

(9)	$\begin{array}{r} 60 \\ -5 \\ \hline \end{array}$	(10)	$\begin{array}{r} 70 \\ -8 \\ \hline \end{array}$	(11)	$\begin{array}{r} 130 \\ -4 \\ \hline \end{array}$	(12)	$\begin{array}{r} 190 \\ -7 \\ \hline \end{array}$
-----	---	------	---	------	--	------	--



56	77	78	88	134	27	61
36	66	89	6	4	55	10
11	26	37	87	43	67	126
42	83	12	79	23	183	53
62	12	29	73	197	31	49



ACTIVITY UT4

[Subtracting tens and ones]

Materials: Card decks 1 and 2, tens-ones chart, pen and paper, attached games and gameboards, worksheets A and B

Directions:

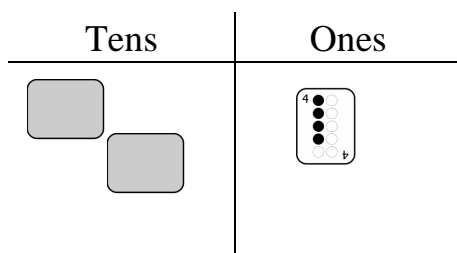
1. Provide students with a problem. “There were 24 people at the party and 7 left. How many at the party now?” Ask students: *How do we write this problem in symbols?*

Elicit the following – do not say horizontal is wrong, just not what is wanted.

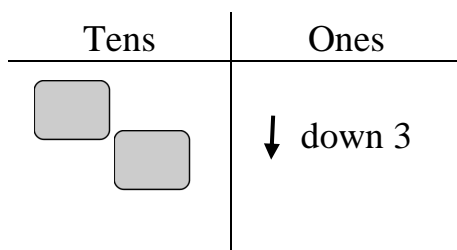
$$\begin{array}{r} 24 \\ - 7 \\ \hline \end{array}$$

Write this on board.

2. Direct students to get out card deck 1 and the tens-ones chart of UT2. Ask: *How many tens and ones in 24?* [2 tens 4 ones]. Direct students to put 2 cards upside down in tens position (to show 2 tens) and a 4 card in the ones position.

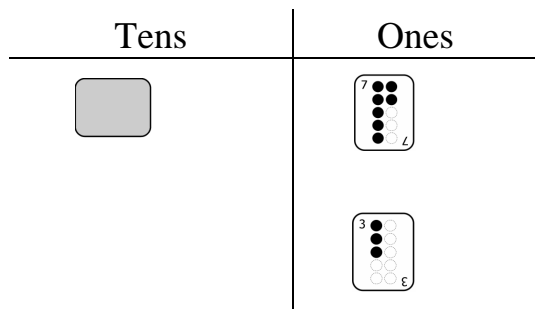
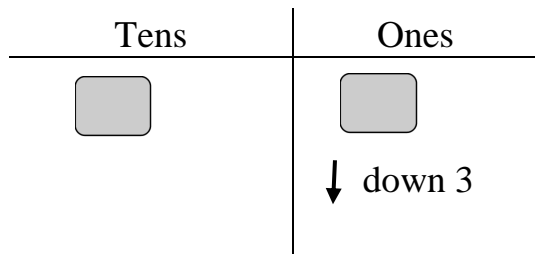


Look at the 7 card that has to be subtracted. Ask: *how many ones to be removed?* [7]. *If we remove the 4 card, how many ones still to subtract?* [3]. Record the thinking on the board:



Discuss that this could be considered as “2 tens down 3”. Direct students to use UT3 method for 20–3.

Record the thinking on the board. (Don’t remove the 3 – pull it down to bottom of chart – answer is on the top of the chart).



Say: *What is 1 ten and 7 ones?* [17].

Recap what is happening with recording:

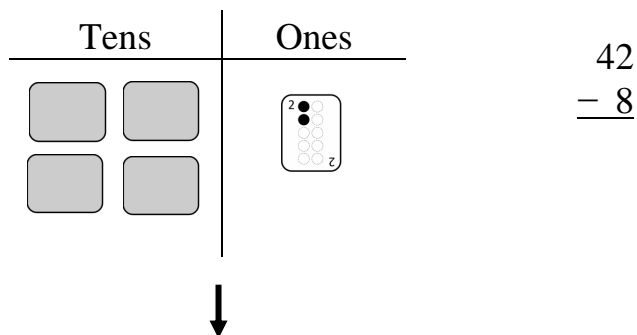
$$\begin{array}{r}
 2 \\
 - 7 \\
 \hline
 \end{array}
 \longrightarrow
 \begin{array}{r}
 4 \ 2 \\
 - 3 \\
 \hline
 \end{array}
 \longrightarrow
 \begin{array}{r}
 2 \ 0 \\
 - 3 \\
 \hline
 1 \ 7
 \end{array}$$

or

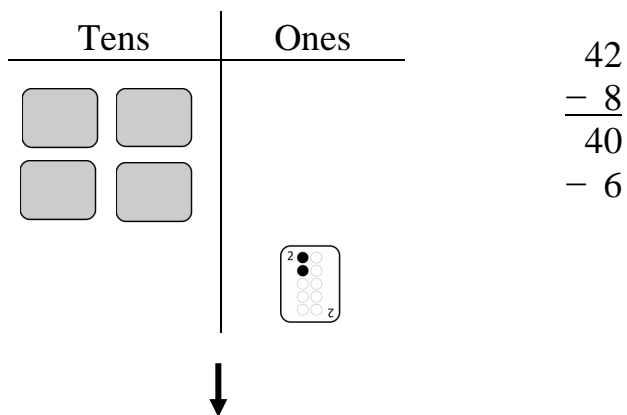
$$\begin{array}{r}
 2 \ 4 \\
 - 7 \\
 \hline
 \end{array}
 \longrightarrow
 \begin{array}{r}
 2 \ 4 \\
 - 7 \\
 \hline
 2 \ 0 \\
 - 3 \\
 \hline
 \end{array}
 \longrightarrow
 \begin{array}{r}
 2 \ 4 \\
 - 7 \\
 \hline
 2 \ 0 \\
 - 3 \\
 \hline
 1 \ 7
 \end{array}$$

3. Repeat for example 42–8 showing recording as you go:

(a) Show 42

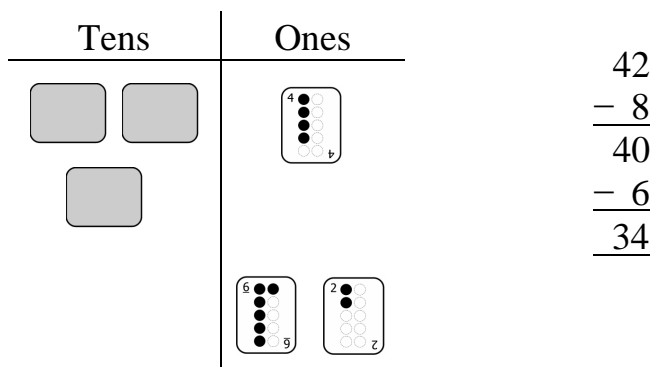


(b) Remove 2 and work out how many more still to subtract



$$\begin{array}{r} 42 \\ - 8 \\ \hline 40 \\ - 6 \end{array}$$

(c) Use a 10 to subtract the 6



$$\begin{array}{r} 42 \\ - 8 \\ \hline 40 \\ - 6 \\ \hline 34 \end{array}$$

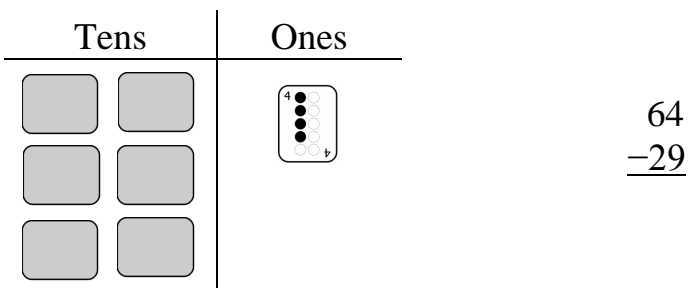
4. Complete Worksheet A

5. Play game – Game A: Instant subtraction

6. Provide students with a problem: “I had \$64. I gave \$29 to Jane. How much do I have left?” Elicit that this can be written as:

$$\begin{array}{r} 64 \\ - 29 \end{array}$$







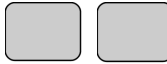





Ask students how many tens and ones in each number and then to represent 64 on tens-ones chart with cards and write subtraction beside it:



$$\begin{array}{r} 64 \\ - 29 \end{array}$$

Ask students how numbers could be subtracted? Elicit that the ones and tens could be subtracted separately and then results combined. Do not be concerned about order, tens first or ones first are equally good. Direct students to do subtraction – using the techniques of UT3. Record as you do this. Ensure just pull subtracted material down to bottom of chart.

<u>Tens First</u>		<u>Ones First</u>																									
<u>Materials</u>	<u>Symbols</u>	<u>Materials</u>	<u>Symbols</u>																								
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	$\begin{array}{r} 64 \\ - 29 \\ \hline 44 \\ - 9 \\ \hline 40 \\ - 5 \\ \hline \end{array}$		$\begin{array}{r} 64 \\ - 29 \\ \hline 60 \\ - 5 \\ \hline 55 \\ - 20 \\ \hline \end{array}$																								
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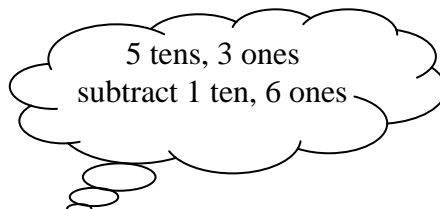
Tens	Ones		Tens	Ones	
		$\begin{array}{r} 64 \\ - 29 \\ \hline 44 \\ - 9 \\ \hline 40 \\ - 5 \\ \hline 35 \end{array}$			$\begin{array}{r} 64 \\ - 29 \\ \hline 60 \\ - 5 \\ \hline 55 \\ - 20 \\ \hline 35 \end{array}$
					
	 			 	

7. Think cards: Write example on board:

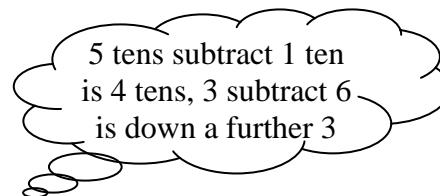
$$\begin{array}{r} 53 \\ - 16 \\ \hline \end{array}$$

Say: *Think of 53 as cards – 5 tens and a 3 card. Subtract 16 by removing a ten and 6 from the rest.*

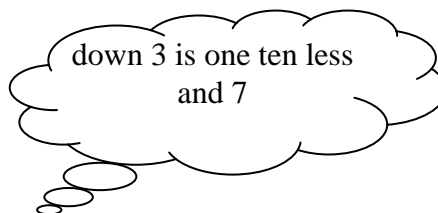
$$\begin{array}{r} 53 \\ - 16 \\ \hline \end{array}$$



$$\begin{array}{r} 53 \\ - 16 \\ \hline 40 \\ - 3 \\ \hline \end{array}$$



$$\begin{array}{r} 53 \\ - 16 \\ \hline 40 \\ - 3 \\ \hline 37 \end{array}$$



8. Complete Worksheet B

9. Play games: Game B: Dicing with cards backwards.

Game C: Dicing with partners backwards

UT4 – Worksheet A

Complete the examples using cards on tens-ones chart. Place letters above numbers to answer the riddle!

$$\begin{array}{r} \text{W} \quad 54 \\ - 26 \\ \hline \end{array}$$

$$\begin{array}{r} \text{O} \quad 62 \\ - 18 \\ \hline \end{array}$$

$$\begin{array}{r} \text{E} \quad 53 \\ - 15 \\ \hline \end{array}$$

$$\begin{array}{r} \text{I} \quad 47 \\ - 18 \\ \hline \end{array}$$

$$\begin{array}{r} \text{A} \quad 83 \\ - 38 \\ \hline \end{array}$$

$$\begin{array}{r} \text{S} \quad 72 \\ - 26 \\ \hline \end{array}$$

$$\begin{array}{r} \text{T} \quad 36 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} \text{P} \quad 61 \\ - 43 \\ \hline \end{array}$$

$$\begin{array}{r} \text{L} \quad 56 \\ - 29 \\ \hline \end{array}$$

$$\begin{array}{r} \text{K} \quad 66 \\ - 27 \\ \hline \end{array}$$

$$\begin{array}{r} \text{H} \quad 44 \\ - 29 \\ \hline \end{array}$$

What was the mad water skier looking for?

 45 27 45 39 38 28 29 17 15 45

46 27 44 18 38

UT4 – Game A: Instant Subtraction

Materials: Card decks 1 and 2, pen and paper

Number of players: 2-6

Directions:

- 1) Deck is shuffled and placed between players (deck 1 in early games, deck 2 in later games)
- 2) To start, each player puts 8 tens in tens-ones chart (8 cards turned over)
- 3) Each player in turn selects a card and subtracts it from what is on their chart, keeping a running tally with pen and paper. (As tens are used to subtract from, they are removed.)
- 4) First player to zero wins

UT4 – Worksheet B

Complete these subtractions. Imagine you are using cards. Place letters on answers to solve the riddle.

$$\begin{array}{r} P \quad 58 \\ - 44 \\ \hline \end{array}$$

$$\begin{array}{r} I \quad 84 \\ - 71 \\ \hline \end{array}$$

$$\begin{array}{r} W \quad 77 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} R \quad 62 \\ - 36 \\ \hline \end{array}$$

$$\begin{array}{r} L \quad 48 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} N \quad 57 \\ - 33 \\ \hline \end{array}$$

$$\begin{array}{r} D \quad 71 \\ - 26 \\ \hline \end{array}$$

$$\begin{array}{r} E \quad 54 \\ - 37 \\ \hline \end{array}$$

$$\begin{array}{r} S \quad 87 \\ - 26 \\ \hline \end{array}$$

$$\begin{array}{r} Y \quad 43 \\ - 28 \\ \hline \end{array}$$

$$\begin{array}{r} A \quad 60 \\ - 28 \\ \hline \end{array}$$

What's black and white and red all over?

45 32 13 29 15

24 17 58 61 14 32 14 17 26

UT4 – Game B: Dicing with Cards Backwards

Materials: Card deck 2 (without 10s), die (4, 5, 6 replaced with 1, 2, 3), pen and paper

Number of players: 2-6

Directions:

- 1) Players write 200 on paper and shuffle cards.
- 2) In turn, players throw die and take top card (die gives tens and card ones). Players subtract this number from their existing number, keeping a running tally with pen and paper.

For example:

Start	200
Throw 2 and select 7 (-27)	173
Throw 1 and select 4 (-14)	159
and so on	

- 3) If make a mistake, miss turn.
- 4) First player to zero wins.

UT4 – Game C: Dicing with Partners Backwards

Materials: Card deck 2 (without 10s), die (4, 5, 6 replaced with 1, 2, 3)

Number of players: 4

Directions:

- 1) Players sit around table and shuffle cards. Opposite players are partners.
- 2) Each player throws die and selects card (die is tens and card is ones) to get a number.
- 3) Players subtract their numbers (larger–smaller) by “thinking cards” if this is difficult.
- 4) Partners score points as follows:

Subtracted numbers	0 – 9	10 – 19	20 – 29
Score	1 point	2 points	1 point

- 5) First partners to 10 points, win.