

# TEACHING & LEARNING SERIES

Created by psychologist  
Eve Ash



## TEACHING NUMERACY WORKBOOK

# TEACHING & LEARNING SERIES

**NEW DVDs 2009 release!**

TEACHING & LEARNING is designed for teachers, staff and educators of young children. These programs, filmed on location, feature teachers, students, educators and parents. They provide practical examples and scenarios to ensure best practice in K-6 school level teaching and learning.

- 1. Teaching Literacy 22 mins
- 2. Teaching Numeracy 16 mins
- 3. Peer Mediation 15 mins
- 4. Effective Schools 15 mins

**1. Teaching Literacy** 22 minutes **DVD**

TAL1: ISBN 978-1-921409-63-9  
Learning to read and write can be fun! By identifying individual needs and implementing effective teaching methods, students can be motivated to learn through creative programs and word games that students enjoy. This program demonstrates shared reading, guided reading, and uses "Learning Centres" to: Make the learning focus clear through rephrasing, reinforcement and summarising Encourage students to predict, reflect, discuss and support each other.

**2. Teaching Numeracy** 16 minutes **DVD**

TAL2: ISBN 978-1-921409-64-6  
Maths is a numbers game – at least it can be! This program shows how to encourage students to learn and develop their numeracy skills through fun and challenging activities. Activities are designed with a clear purpose, helping students to explore and think for themselves, share strategies, and gain understanding. Time to practise and discuss enables students to learn from each other and share their experiences. As students explore the activities, they develop stronger numeracy skills and methods to find solutions.

**3. Peer Mediation** 15 minutes **DVD**

TAL3: ISBN 978-1-921409-65-3  
Four young primary school students are encountering problems in the schoolyard. Peer mediators are assigned to help sort out their issues – without teacher involvement – by listening, understanding and empowering them to agree on a solution. Peer mediation is an effective initiative to enable intervention with minor issues and prevent them from becoming major problems and learning distractions. Older students, equipped with training and a mediator's kit, are trained and empowered to mediate their younger peers and make them feel comfortable to talk about their problems. By listening and understanding, they can guide young students to agree on solutions and manage future problems.

**4. Effective Schools** 15 minutes **DVD**

TAL4: ISBN 978-1-921409-66-0  
Effective schools develop strategies to ensure learning is the key focus and the school is a friendly place. They use open communication and focus groups to engage students, staff and parents in the planning process, to review and develop ideas for improvement. Effective schools have practical strategies for managing bullying and difficult students. Peer mediation is an innovative way to develop student leaders, and to help students manage conflict, build confidence and develop negotiation skills. Teachers need to be goal focused and ensure students are connected, happy and motivated to learn.

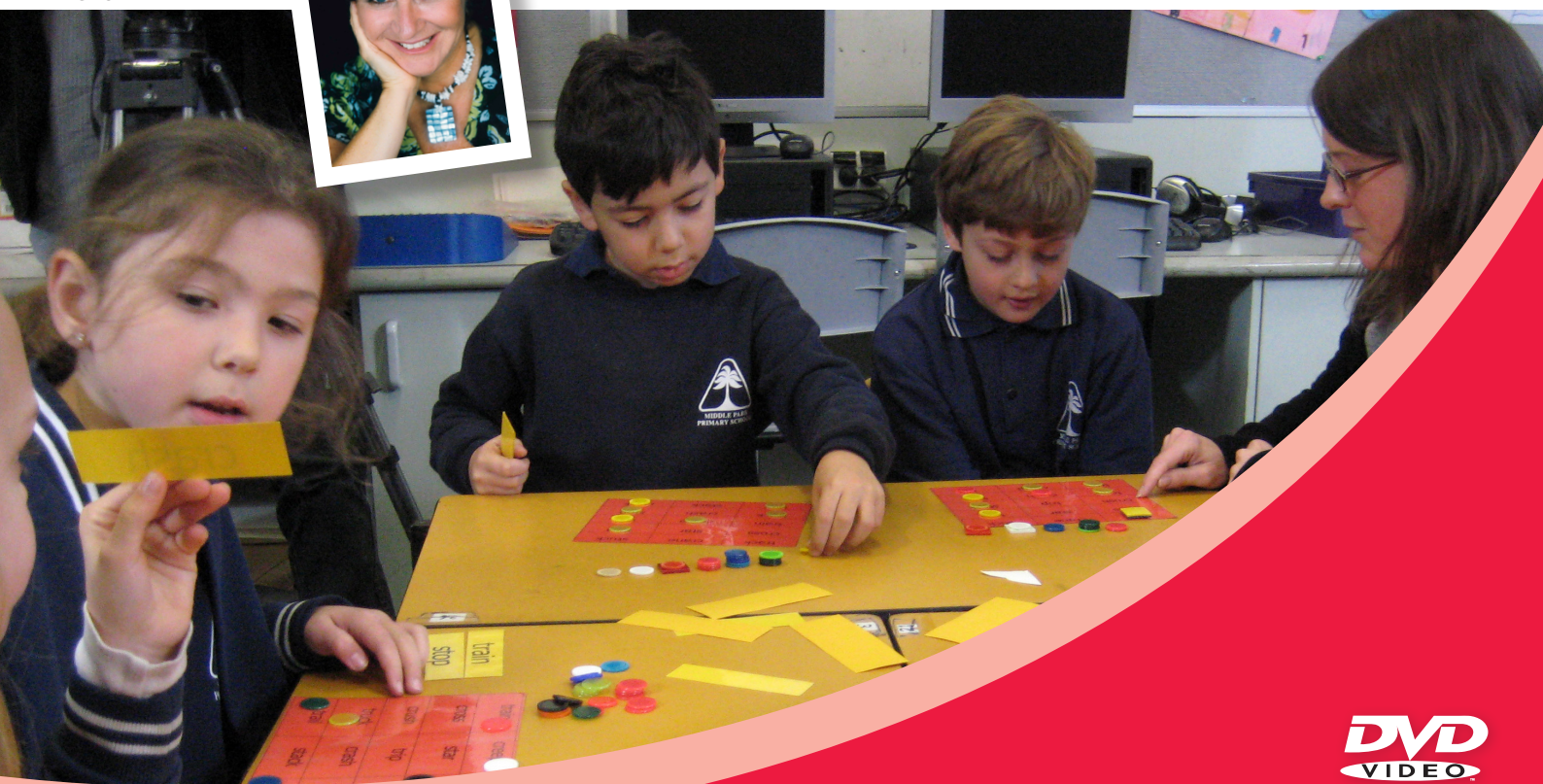
**4 DVDS WITH WORKBOOKS** 

**SET OF 4 DVDS (TALSET)**



© SEVEN DIMENSIONS  
Produced and distributed by  
**SEVEN DIMENSIONS Pty Ltd**  
www.7dimensions.com.au  
PH: +61 3 9686 7577  
FX: +61 3 9686 7577  
EM: eve@7dimensions.com.au

Created by psychologist  
Eve Ash



# TEACHING & LEARNING SERIES

## PROGRAM 2: TEACHING NUMERACY

ISBN: 978-1-921409-64-6

DURATION: 16 minutes.

### SYNOPSIS

Maths is a numbers game – at least it can be! This program shows how to encourage students to learn and develop their numeracy skills through fun and challenging activities. Activities are designed with a clear purpose, helping students to explore and think for themselves, share strategies, and gain understanding. Time to practise and discuss enables students to learn from each other and share their experiences. As students explore the activities, they develop stronger numeracy skills and methods to find solutions.

This program was filmed on location at Middle Park Primary School, Middle Park, Victoria Australia in a Year 5/6 Classroom with Jane.

### USES OF THIS PROGRAM

- Professional development for teachers of mathematics - part of a one day program, or even over a lunch time development session
- Developing general teaching techniques – eg questioning styles, explaining tasks clearly, listening skills, developing share time strategies
- Learning to use the specific activities shown in this program
- Reviewing a range of activities for teaching mathematics and then being creative in developing new activities
- Collaborative learning – using this program to practise observing a teacher in action, and then practising skills for giving and receiving feedback
- Studying student interaction and responses
- For new teachers for their induction
- For parent information sessions.

# KEY LEARNING POINTS

## WHOLE CLASS FOCUS

- Explore possibilities
- Accept all suggestions
- Time to practise
- Allow for thinking time
- Share strategies
- Allow for trial and error
- Use open-ended activities

## SMALL GROUP ACTIVITIES

- Explain the purpose of activities
- Clarify activity
- Encourage discussion
- Learn from each other
- Ask open-ended questions
- Challenge students

## SHARE TIME

- Value all comments
- Rephrase to clarify
- Have fun with maths!

## DISCUSSION QUESTIONS

1. How can we overcome students thinking negatively about numeracy?
2. How can we make learning mathematics fun and exciting?
3. How do we manage students of different skill levels in the same class?
4. What is the best way to manage someone who does not understand the concepts during whole class activities?
5. Why is it important to explain the purpose of the activity?
6. What is the importance of trial and error in learning mathematics?
7. What kind of small group activities work best and for what sizes of groups?
8. How can the techniques shown in the video be applied to different ages and class levels?
9. What is the best way to help students clarify and refresh what they have learned in the class?
10. Why is giving feedback to students important?
11. When is it important to give quiet individual feedback to students and when is whole class feedback important?
12. What makes a good prompt or question for **share time**?

## **ACTIVITY 1. PROGRAM NOTES**

**An exercise to encourage learning during program viewing.**

Watch the program and make notes on key learning points and any ideas or activities you can adopt for teaching mathematics.

## **ACTIVITY 2. NUMERACY ACTIVITY DESIGN**

**A practical exercise to develop creativity in teaching numeracy.**

Design a numeracy activity for your class using the 'Teaching Numeracy' guidelines and make suggestions for small group activities to support the main activity. Then demonstrate your activity in front of a group of students.

## ACTIVITY 3. FEEDBACK PARTNER ACTIVITY

**An exercise to practise observation and feedback skills.**

Watch the DVD as if you were an observer in Jane's class. Make notes on this page and use it to give feedback to "Jane". Form pairs, compare notes, and combine the feedback. Then have one person take on the role of "Jane" so she/he can receive the feedback whilst the other person gives the feedback. Debrief by discussing what you have both learned, and what changes or ideas you might adopt to improve your own teaching style.

### KEY OBSERVATIONS OF TEACHING SKILLS AND TECHNIQUES WATCHING THE DVD

#### FEEDACK I WOULD GIVE JANE ABOUT HER TEACHING TECHNIQUES

What she did well and why:

Suggestions for improvement and why:

Changes or ideas I will adopt to improve my teaching techniques as a result of viewing this program:

# SCRIPT: TEACHING NUMERACY

16 minutes

7D LOGO

EXTERIOR OF THE SCHOOL – STUDENTS ARRIVING AND PLAYING. MUSIC.

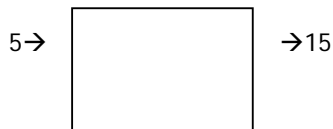
**SUPER: TEACHING & LEARNING**

STUDENTS IN CLASS AND NUMBERS APPEAR ON THE SCREEN AROUND THE TITLE AND JANE STARTS LESSON

**SUPER: TEACHING NUMERACY**

**JANE:** Alright, now we had a look yesterday at if we know what we know and we're going to move on today (**SUPER: Whole Class Focus**) to try and get some thinking about 'what's my rule?'... is going to be our activity we're going to start with... 'Cause we're all talking about thinking with maths not about doing bigger numbers and all of that sort of thing. So I want people to be really thinking about what's going on. Have a look; this is a magic box. (JANE INDICATES BOARD) Now in this box, it actually changes numbers and I want you to have a think about: what might be my rule if I put 5 in and 15 comes out, what could be my rule?

ON WHITEBOARD JANE HAS A 5 AND AN ARROW AT LEFT OF BOX AND AN ARROW TO 15 ON THE RIGHT SIDE



**JANE:** What's happening in that box? What do you think Bailey?

**SUPER: Explore possibilities**

**BAILEY:** 10... it's adding on 10.

JANE WRITES "+10" UNDER THE BOX

**JANE:** So it could be adding on 10. What else could it be?

**JACK:** Times 3.

**JANE:** OK, could be.

JANE ADDS " X 3" TO LIST UNDER BOX

**SEAN:** Plus 5, plus 5.

JANE ADDS "+5+5" TO LIST UNDER BOX

**JANE:** OK, so it might be... OK.

**SUPER: Accept all suggestions**

**JANE:** Any other ideas? What else could be happening in the box? Alex?

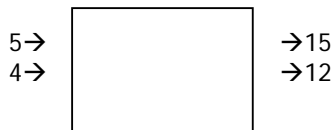
**ALEX:** Plus 8, plus 2.

**JANE:** OK, could be.

JANE ADDS "+8+2" TO LIST UNDER BOX

**JANE:** What about if I tell you that if I put 4 into the box, out is going to be 12?

JANE ADDS THE 4 AND ARROW ON LEFT OF BOX AND ARROW TO 12 ON RIGHT SIDE OF BOX



**JANE:** What do you think... Brayden?

**BRAYDEN:** Times 3.

**JANE:** Ok, so you think it's a times 3.

JANE TICKS "X 3"

**JANE:** Anything else?

**ALEX:** Um... adding 8. Oh...



**JANE:** Now... Yeah, so it has to be... the same rule has to apply to both numbers OK? So at the moment we think it's that one. Could it be any of the other rules? OK. What else? Sean?

**SEAN:** Plus 4 plus 4.

**JANE:** Now does plus 4 plus 4 work for this one? No, OK. So the same rule... So we think that in this box, it could be times 3. Alright, let's try and see if... If that's the case, what will be the number that comes out of here? (JANE INDICATES THE 10) Bailey?

5→		→15
4→		→12
10→		

**BAILEY:** 30.

**JANE:** OK, and it is. (JANE ADDS 30 ON RIGHT SIDE OF BOX) That one's a times 3 rule in that box.


JANE CLEANS THE WHITEBOARD

**JANE:** Let's have a look at this one. Now this time I want you with your partner and your whiteboard...

**SUPER: Time to practise**

**JANE:** We've got one here that I want you to have a look at...

JANE HAS A NEW EXAMPLE ON A PAGE SHE PUTS UP

5 --→		→11
10-→		→21
2--→		→ 5
6--→		→13
11-→		→ 23
100→		→ ?

**JANE:** Now with your partner I want you to have a discussion about what do you think this number here is going to be? (CLOSE UP ON EXAMPLE ON WHITEBOARD AS JANE VO CONTINUES) So the first thing I want you to do, is I want you to think about what rule could it be? So go for the first one. What rule could it be? And then see if that rule fits all of the numbers and see if you can work out what this missing number is. OK, so turn yourselves around (BACK TO WIDE SHOT), work with your partner, talk about it amongst yourselves, and see what rule could this one be.

**JACK:** Jane, we've got it, we've got it.

**JANE:** OK, well keep it to yourself and write it down. Write it down there so you can show me. OK, write it down so you can show me.

**SUPER: Allow for thinking time**

SEE STUDENTS WORKING ON THEIR BOARDS

**JANE:** (VO) Give people a bit of thinking time. Write your answer to this one down when you've (100%) got it. Hold onto it. (STUDENTS WORK ON THE EXAMPLE) Give people a bit more thinking time. OK. Turn your boards around and show me what your number is.

STUDENTS HOLD UP THEIR WHITEBOARDS

**JANE:** Hmm... interesting. Everybody has exactly the same number. So who can suggest what helped them to get to that answer? Jack?

**JACK:** Like for the first one, you know how it's 5? If you double it, it's 10, then add 1 and all of them will get worked out like that. So if you double a hundred twice it equals 200, add one and it's 201.

**JANE:** OK, so you thought that the rule was: double plus one?

JANE WRITES "X 2 + 1" ON BOARD.

**JACK:** Yeah

**JANE:** Now, was that the first rule that you thought?

**JACK:** Um yep.

**JANE:** OK, so you... it worked for you straight away. Who tried a couple of rules that didn't work first off? (STUDENTS PUT THEIR HANDS UP) What did you try Sarah?

**SARAH:** We did plus 6.

**JANE:** OK so you tried plus 6 and then how did you know it wasn't that?

**SARAH:** Because 10 plus 6 is 16 and it's not 21.

**JANE:** Fantastic, so you ruled it out straight away. So then what did you do next?

**SUPER:** **Share strategies**  
**Allow for trial and error**

**SARAH:** Well, 5 plus, wait ... times 2 plus 1 is 11 and 10 times 2 plus 1 is 21.

**JANE:** OK, so you went to... you tried a different one. So you did it by trial and error. Fantastic. So how could we write this? If we wanted to make it a rule, how might we be able to write it? What could I put here instead of a number? (STUDENTS PUT THEIR HANDS UP) What could I put?

**WILL:** Double it then add 1.

**JANE:** Yeah we could write 'double it and then add 1.' But what about if wanted to actually write it as an equation? So if I wanted to write times 1 plus... times 2 plus 1 equals – how can I write it?

**BRAYDEN:** Letters.

**JANE:** Letters, we could use letters. Or I've actually got a triangle and a diamond here, so how would I actually write that for all of these? How could I actually write it as an equation? What do you think Lachlan?

**LACHLAN:** You go, triangle times 2, plus 1 equals diamond.

JANE WRITES THE EQUATION ON THE BOARD

**JANE:** What do people think about that?

**STUDENTS:** Yeah...

**JANE:** Makes sense? OK. We could write it: triangle times 2 plus 1 equals diamond.

DISSOLVE TO INTERVIEW SEGMENT WHERE JANE EXPLAINS STRATEGY TO VIEWERS

**JANE:** This activity we're starting off, because we're looking at the area of structure in our course. (VISION OF JANE WITH WHOLE CLASS AND JANE VO CONTINUES) We're actually starting the thinking and the working mathematically with it. So we're actually... (100%) want to have them as open-ended as we possibly can so the students can come up with their own ideas and then as we move along, hopefully we'll be able to - from symbols - we'll be able to talk about: "well we're using 'N' in place," and then we might even get to using 'x' and 'y' and those sorts of things. So this is actually beginning to get children thinking about what's happening with structure and working mathematically.

DISSOLVE TO STUDENT INTERVIEWS

**JACK:** I think, I think she has good methods with her teaching, 'cause it gets us involved and we learn.

**SEAN:** She explains it easier so we can do it without any like, um... difficulty.

**ALEX:** Well I've learnt that, um...like, you can find out different ways and then pick others from that so it's like easier to do that.

CUT TO INTERVIEW SEGMENT

**SUPER:** **Use open-ended activities**

**JANE:** I suppose what I try and do is do lots of this sort of thinking. It's not important that you can add big numbers together but you're actually thinking about what you're doing and trying to come up with some activities where they can put their maths into practice in a different way. So that's what we're trying to do and some of the other activities we're going to do in the rest of the session, where they're going to be playing some games and making up some of their own maths, hopefully is using... applying the maths that they know but using it so that it's something that they can feel they've had input into.

SPIN TO STUDENTS IN CLASS GETTING INTO SMALL GROUPS

**SUPER:** **Small Group Activities**

JANE EXPLAINS TO VIEWERS HOW THE CAMEL RACE WORKS

**JANE:** I've got a game called the 'Camel Race' and the camel race is based on the camel races that happen up in Darwin, where camels of course go... can head in one direction but turn around and they're actually going to use a dice and they're going to... The number on the dice is 'N', so they're going to decide, with their dice, which way they're going to move their camels. So each team is going to have four camels and they've got to decide: are they going to move the camel forward? Are they going to bring another camel on? And how are they going to get all four of their camels around

to the start. So they're the two main activities that we're going to do and then the two groups will get together and share what they've learnt today. But particularly...

**SUPER: Explain the purpose of activities**

**JANE:** I didn't really sort of want to mention the word 'algebra' to people, but it's just heading towards that, so you can see that's why we're doing it.

DISSOLVE TO JANE EXPLAINING TO STUDENTS

**JANE:** ... for people who are going to be working on 'What's My Rule?'... I want you to see if you can come up with a rule that you will be able to write like this. You'll be able to try it out and then you'll be able to share it with someone else to see if they can guess your rule. So some of you are going to be working on making up your own rule.

CUT TO STUDENTS IN PAIRS AND SMALL GROUPS.

JANE EXPLAINS TO STUDENTS HOW THE CAMEL RACE WORKS

**JANE:** You're working with a partner today so that you can talk about what your strategy is going to be, to try and win the camel race. OK, so each team is going to have four camels and we'll be using the counters and the dice from here. So if your team chooses a colour, so you might be red, you get four red camels and the other team might get the four blue camels. When you roll the die, you're going to roll it and 'N' is the number on the die. So, if I rolled a 3 then you ... you want to look at what your... what it is on here. So N is a 3, so you move three places along. OK? But then when you're on there, you've got a different formula to look at. So if I rolled a 3 and I was on here and it says (CUT TO CLOSE UP OF CAMEL GAME)  $2 + N$ , how many places am I going to move? Sean?

**SEAN:** Five.

**JANE:** Yeah, you're going to move five. But you might choose to bring another camel on, 'cause you might not think you're going to get far enough with that rule. You might think: oh no, I'll bring another camel on and I'll get started. So there's a lot of strategies that we'll talk about. So basically, you roll the die, you look at what the rule is and you move that number of places. Now it's going to be a bit of trial and error for you to have a go at learning how to do it. OK?

DISSOLVE TO STUDENTS PLAYING THE GAME – SEE CLOSE UPS OF THE GAME

**OLIVIJA:** We put another camel on – where do we...

**SUPER: Clarify activity**

**JANE VO:** You always bring the camel on at the beginning, OK?

DISSOLVE TO STUDENTS PLAYING CAMEL RACE

**JACK:** We're going to have... You roll yours...

**STUDENT:** 5

**JACK:** You've gotta beat 5.

**BEN:** 3.

**JANE:** So you're checking out who's going first?

**JACK:** Tick-tock, tick-tock, tick-tock...

**SEAN:** 2...

**SUPER: Encourage discussion**

**JANE:** I'll leave you guys to talk about it and work out what's happening.

CUT TO ANOTHER GROUP

**ARIADNE:** So you put one camel don't you?

THE STUDENTS CONTINUE TO PLAY THE CAMEL GAME, JANE SITS WITH TWO GIRLS

**JANE:** So check what... make sure you check so that each rule... each one follows the rule... OK...

THE GIRLS DISCUSS. JANE SITS WITH TWO BOYS

**JANE:** Now boys what rule are you working on at the moment?

**BRAYDEN:** He's trying to guess it.

**JANE:** So you made this one Brayden, did you?

**BRAYDEN:** Yes.

**SUPER: Encourage students to learn from each other**

**JANE:** So is this 6?

**BRAYDEN:** Yep. That's 4.

**JANE:** And this is 4 coming out here? OK. So, so you think it's take away 2 do you?

**ADRIEN:** Yeah...

**JANE:** Try it with this one, what happens if you take away 2 from 62?

**ADRIEN:** 60?

**JANE:** Ah well what's this one here?

**ADRIEN:** 32.

**JANE:** 32. So do you think that take away 2 rule works?

**ADRIEN:** No.

**JANE:** Alright...

**SUPER:** **Ask open-ended questions**

**JANE:** What might you think about now?

CUT TO PAIR OF GIRLS AT WORK ON THEIR ACTIVITY

CUT BACK TO BOYS WITH JANE

**JANE:** Oh, Brayden's changing it. No?

**BRAYDEN:** Just to help him a bit

**JANE:** OK... oh, just to help him a bit? OK, so Brayden's going to help you out a bit. That's fantastic. So, it's very close to... If you look at 400 and 200, what do we know about those two numbers?

**ADRIEN:** It's half.

**JANE:** That's half. OK now that's a clue that Brayden's been giving you. So what do you think might be the clue?

**ADRIEN:** Half?

**JANE:** Half. But half of 400 you said was 200 and the number is 201. So what could it be?

**ADRIEN:** 101?

**JANE:** What's half of 6?

**ADRIEN:** 3.

**JANE:** Plus 1?

**ADRIEN:** (WRITES ANSWER) Nup... oh yeah...

**JANE:** Oh, it does, OK? So what's his rule?

**ADRIEN:** You have to halve it plus 1.

**JANE:** Half and plus 1. Fantastic. Now because Brayden set ...

FADE TO BLACK, DISSOLVE TO ANOTHER SMALL GROUP

**JANE:** Set some addition, subtraction, maybe a multiplication or a division as well; so maybe two operations in it to see what's happening...

**SUPER:** **Challenge students**

**JANE:** And don't do it from a small number to a big number; mix up your numbers so that you've actually got an in – you might start with a small number then do a big number, then you might start with a small number again – so you're mixing it up. So this time, you're making up a rule for your partner and see how that goes. And then we'll swap over again.

DISSOLVE TO ANOTHER SMALL GROUP

**JANE:** What are (**SUPER: Invite students to share strategies**) some of the things that you found already Lachlan? What are some of the things that you found, in terms of strategies that you need to think about when playing the camel race?

**JACK:** Our strategy was... like they're all... all these people are thinking of just getting one around at a time. We think if we move them all at once we'll get through quicker than just one at a time.

**JANE:** OK, so you're trying to get all four of your camels on?

**JACK:** Yeah, we've already got all four.

**JANE:** Right. OK. Fantastic. Girls what's the strategy that you're using over there?

PAN TO GIRLS' GROUP

**OLIVIJA:** Well... well we're just looking at...um... we're moving... we keep on putting more camels and then we look at which number would take us further, and then we move that one, and then we keep moving the ones that have the highest amount.

**JANE:** Great. Now, if you're – hang on guys – if you're concentrating on moving your camels around, are you finding the rules easy to follow? Are you finding your rules where it says "N" for the dice?

**SARAH:** They're all different, so... like some of them are really easy - like N plus 3 – they're the easy ones but some of them are quite hard.

CUT TO JANE WITH WHOLE CLASS

**SUPER: Share Time**

**JANE:** I'm going to ask everybody to finish this sentence today for maths... "Today I discovered:"

**BAILEY:** I discovered that sometimes when things look tricky, they're not tricky in the end.

**GAYE:** Today I discovered that there's a lot of ways of finding out things... like it could be times and then it could be divide, but in the end actually it was something else.

**SUPER: Value all comments**

**JANE:** OK.

**LACHLAN:** Where some things that seem easy are actually difficult but, and some things that seem difficult are actually easy.

**JACK:** I learnt that like, little numbers like 10 and like 2 can be just as hard as like really high numbers...

**JANE:** OK.

**JACK:** So like it doesn't matter about size.

**JANE:** So maths isn't always about wanting to do bigger numbers...

**JACK:** Nah, little numbers are just as hard.

**JANE:** So did today challenge you with maths today?

**JACK:** Nah.

STUDENTS LAUGH

**JANE:** No? OK, great. Well that means that you can... But that's great because that means you can teach everybody else the camel race because you'll be able to understand it to teach other people.

**WILL:** ... and like no one can figure this out.

**JANE:** Oh, so you've got a rule... Actually give me that, we might finish with that, we'll see if we can figure it out. OK.

**SARAH:** I discovered like if there's a number and you're like: "oh, I can't do that", but like if you work it out a different way, then you can get it just as easy as like... easy sums.

**SUPER: Rephrase to clarify**

**JANE:** OK, so it means... what you mean is you're trying to... you can do things in lots of different ways to work them out?

**SARAH:** Yep.

**OLIVIJA:** I discovered that when you have to actually stop before you do something and think... well if um... if I try it a different way, you might um... get a better answer.

**JANE:** OK, so don't give up if it doesn't work one way; try it a different way. Alex?

**ALEX:** Well I discovered like Natasha, like if you put your mind to it, it looks really hard...if it looks really hard, you can actually do it if you put your mind to it.

**JANE:** OK.

**ARIADNE:** I discovered that, like, you can replace numbers with symbols and letters and stuff and yeah. It... like Natasha said, it's like... easy if you put your mind to it and stuff.

**JANE:** So, if I said that was leading up towards what we're going to be doing with algebra, how do people feel about starting to do some algebra? Bailey?

**BAILEY:** Quite good.

**JANE:** OK why? What in particular?

**BAILEY:** Because it looks really... you think: "oh algebra, that seems really hard", cause you hear like, geniuses know the best of algebra. But then it's actually really... it's... when you start to get your mind to it, you actually... it actually turns out to be easier.

**JANE:** All right.

CUT TO

**JANE:** Just to finish off, this was the one – now I've worked this one out – so this was the one that Will said people were having trouble trying to work it out. Who's worked it out? What do you think it is Ben?

**BEN:** It's a quarter of that, of that number that goes in.

**JANE:** OK, it's a quarter of or it's divided by four.

**SUPER: Have fun with maths!**

**SUPER: Thanks to all the teachers, parents and students that helped make this program**

7D logo

© Seven Dimensions