

### Video Excerpt 0.1: Heather and Larry

- H: (Places out five red counters and screens them. Then places out four blue counters and screens them.) Five red counters and four blue counters. Can you tell me how many I have altogether this time?
- L: (Immediately.) Six.
- H: Are you thinking? Five and four more. (Points to the screens in turn.)
- L: (Thinks for a few seconds, looking up.) Umm.
- H: How are you going to work out how many that makes?
- L: (Sequentially raises the five fingers of his left hand. Then looks at his right hand while raising one finger.) How many is that?
- H: Five on this one and four on this one. (Points to the screens in turn as before.)
- L: (Sequentially raises four fingers on his right hand and then looks at his left hand.) One, two, three, four (wagging a finger in coordination with each count. Now looks at his right hand.) Five. (Pauses.) Five, six, seven, eight! (Again wagging fingers in turn.)
- H: (Removes both screens.) Have a look.
- L: (Looks at the collection of five counters.) One, two, three, four. (In co-ordination with four points over the collection of five counters. Now looks at the collection of four counters. Points at one counter.) Five. (Pauses.) Five, six, seven, eight! (In coordination with four points over the collection of four counters.)
- H: (Places out 13 counters.) Can you tell me how many counters there are there altogether?
- L: One, two, three . . . twelve. (Moves each of the 13 counters in turn but makes an error in coordinating his counts with his points.)

### Video Excerpt 0.2: Terry and Rita

- T: What's three plus two? (Points to three unscreened counters and then to two unscreened counters.) How many would that be?
- R: (Looks at Terry.) Equals.
- T: What does it equal?
- R: (Immediately.) Equals nine.
- T: Nine do you think? (Points to both collections.) Do you think there are nine counters there?
- R: Uhh, yeh!
- T: I'm going to give you a group of counters Rita. (Places out 13 counters.) Can you tell me how many counters there are?
- R: One, two, three . . . eleven. (Coordinates a number word with each count but omits to point at two of the counters.)

## Video Excerpt 1.1: Mary and Amy

- M: (Places out five blue counters and screens them.) Five counters there. (Places out two red counters leaving them unscreened.) And two counters there. How many altogether?
- A: (Quickly.) Five! Eight.
- M: (Removes the screen covering the five blue counters.) Want to check?
- A: (Looks steadily at the desk on which counters are placed for five seconds and then looks up.) One.
- M: (Waves hand over the counters.) How many altogether?
- A: (Immediately.) Three.
- M: Would you like to count them up?
- A: (Points at one blue counter.) One. (Pauses and then moves the collection of two red counters adjacent to the collection of five blue counters.) One, two . . . seven. (Counts quickly while pointing to each counter in turn.)
- M: This time, there are four counters there. (Places out four red counters and screens them.) And four counters there. (Places out a second collection of four red counters and leaves them unscreened.) How many altogether?
- A: (Looks at the unscreened collection for five seconds.) One.
- M: (Places her hand on the screen.) How many are under here?
- A: (Immediately.) Four.
- M: (Waves her hand over the unscreened collection.) How many here?
- A: (Immediately.) Four.
- M: (Waves her hand over both collections.) How many altogether?
- A: (Looks at the desk for three seconds.) Eight

- M: (Removes the screen.)
- A: (Moves one collection adjacent to the other and begins to count while pointing at each counter in turn.) One, two. (Moves a counter which is on top of another counter and then restarts her count, pointing at each counter in turn.) One, two . . . eight.
- M: (Places out seven blue counters and screens them.) This time Amy there are seven under there. (Places out five red counters and does not screen them.) And five there.
- A: (Immediately.) Umm - six!
- M: (Points to the screened collection.) How many under here?
- A: (Looks at the screen for seven seconds.) Eight.
- M: Seven.
- A: Seven. (After 13 seconds.) Six!
- M: (Removes the screen.)
- A: (Moves one collection adjacent to the other and then points at each counter in turn.) One, two . . . twelve.

## Video Excerpt 1.2: Heather and William

- H: (Places out three red counters and screens them.) Three red counters, William. I'm going to put them under there. (Places out two blue counters and screens them.) Two blue counters and I'm going to put them under there. How many counters is that altogether?
- W: (Immediately.) Four.
- H: Would you like to look and check?
- W: (Raises screen and points to three counters in turn.) One, two, three. (Raises the other screen and points to two counters in turn.) Four, five!
- H: Were you right?
- W: (Shakes his head indicating that he was not correct.)
- H: We'll try another one. I'll make it five red counters this time. (Places out two more red counters and screens them.) And four blue counters. (Places out two more blue counters and screens them.) How many does that make altogether?
- W: (Immediately.) Eleven.
- H: Eleven. How did you work that out?

60 Early Numeracy: Assessment for Teaching and Intervention

W: I just knew.

H: (Removes both screens.) Would you like to check and see?

W: (Points to the nine counters in turn.) One, two . . . nine.

Heather then presented a similar task involving a screened collection of nine red counters and a screened collection of six blue counters. William immediately answered 'forty-one'.

Discussion of Video Excerpt 1.2

## Video Excerpt 2.1: Jane and Shirley

The following video excerpt is taken from an MR teaching session.

- J: (Briefly displays and then screens three counters. Then screens two counters.) And two here. How many have I got altogether? Three and two?
- S: (Looks at the screen covering three counters and makes three points in coordination with counting.) One, two, three (turns to the other screen and make two points in coordination with counting), four, five.
- J: (Removes both screens.) Show me.
- S: (Points at each counter in turn.) One, two, three - four, five.
- J: Right. What about if I put five here (screens five counters) and three here? (Screens three counters.)
- S: (Looks at the screen covering three counters and makes three points in coordination with counting.) One, two, three (looks at the other screen and again coordinates a point with each number word), four, five, six, seven (pauses and looks up), eight!
- J: (Removes both screens.) Show me.
- S: (Points at each counter in turn.) One, two, three - four, five, six, seven, eight!
- J: What about if I put ten here (screens ten counters) and three here (screens three counters).
- S: (Looks at the screen covering three counters and makes three points in coordination with counting.) One, two, three (looks at the other screen and again coordinates a point with each number word) four, five, six, seven, eight, nine (pauses and looks up) - ten - eleven, twelve?
- J: Have another think. (Places her hand on the screen covering ten counters.) Start with this side. How many here?
- S: Ten.
- J: Right. Start with this side.
- S: (Looking up) One, two, three, four (in coordination with four points), five, six (looks at the screen and appears to feel the counters).
- J: (Interrupting.) No, don't feel them. How many are here?
- S: (Places left hand on the screen covering ten counters.) Ten there -.
- J: Alright and three there.
- S: (Places right hand on other screen.) Three there. (Looks at the screen covering ten counters and coordinates a point with each number word.) One, two, three, four, five, six (looks at the second screen) seven -.
- J: (Interrupting) No, ten here (points to the screen).
- S: Ten, three (places a hand on each screen).
- J: Start at ten and count these ones on (points to each screen in turn).
- S: (Looks at the screen covering ten counters and then touches the screen four times in coordination with counting). One, two, three, four.
- J: (Interrupting) No, don't touch them. We know how many are there. How many are there? (Removes the screen.) You count them.
- S: (Points to each counter in turn.) One, two . . . ten.
- J: (Rescreens the counters.) Now do we have to count them again? How many are there?
- S: Ten.
- J: Now let's just say ten.
- J: (Points to the screen covering three counters.)
- S: Three!
- J: (Points to the screen covering ten counters.) Ten -. (Points to the screen covering three counters.)
- S: Three.
- J: (Points to the screen covering ten counters.) Ten -. How many altogether? (Points again to the screen covering ten counters.) Ten -.
- S: (Looks at Jane and then looks at the screen covering ten counters and makes ten points in coordination with counting.) One, two . . . ten (looks at the second screen and continues to make points in coordination with counting), eleven, twelve, thirteen!

## Video Excerpt 2.2: Molly and Tom

- M: (Places out five red counters and screens them and then places out four blue counters and screens them.) Now if I've got five counters there Tom and I cover them up and four counters here and I cover them up, how many counters would I have altogether there?
- T: (Smiles and shifts in his seat.) These are the hard ones. (Thinks for three seconds.) Umm.
- M: (Nods and points at each collection in turn.) Five and four?
- T: (Looks momentarily at the screens and then looks up and to his right. Then counts subvocally for seven seconds.) Nine!
- M: Why do you think it's nine?
- T: Because I counted through them.
- M: Did you? How did you count? Could you just tell me?
- T: I went one, two, three, four, five (points at the screen covering five counters and then looks at the second screen), and then one, two, three, four. (Pauses.) So it's seven. I can tell that's seven -
- M: (M interrupts Tom's thinking and removes the screens.) Umm.
- T: So I went - (counts subvocally from one to nine in coordination with moving each counter in turn). Yes!

## 64 Early Numeracy: Assessment for Teaching and Intervention

- M: (Places out seven red counters and screens them and then places out five blue counters and screens them.) Seven red ones and five blue ones. Seven and five. How many would that be altogether?
- T: (Looks at the screen covering seven red counters and counts subvocally. Then looks at the second screen and continues to count subvocally.) Twelve!
- M: (Removes the screens.) Want to check to see if you are right?
- T: (Moves each counter in coordination with counting.) One, two . . . twelve!

### Video Excerpt 3.1: Julie and Tania

- J: I've got five under there (points to a screen), and four under there (points to a second screen).  
T: (Counts subvocally in coordination with pointing in turn at four fingers on her left hand.) Nine.  
J: How did you work that out?  
T: Counted on my fingers.  
J: What numbers did you count?  
T: (Points to her one finger.) Six - (pauses), five, six, seven, eight, nine. (Coordinates the last four number words with pointing to each finger in turn.)  
J: I've got nine under there and six under there. How many altogether?  
T: Nine, ten . . . fifteen (points in turn at the five fingers on her left hand and one finger on her right hand).

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## Video Excerpt 3.2: Jane and Shirley

The following video excerpt is taken from an MR teaching session.

- J: (Points to a screen and then covers four counters with a second screen.) Twelve, and I've got four more under here?
- S: (Places her hand on the first screen and looks ahead.) Twelve. (Moves her hand to the second screen. After three seconds during which time she moves her fingers over the second screen.) Sixteen!

- J: Alright. Maybe we can just pretend. (Places a screen on the desk.) If I say, under here I've got - I'm pretending there's twenty-four. Twenty-four (places out and screens three counters), and three more?
- S: Twenty-four (points to the second screen and answers almost immediately), twenty-seven.
- J: Great work. (Places out a screen.) Let's pretend there's forty-five under here. Forty-five (places out a screen covering four counters), and four more.
- S: (Places her hand on the first screen.) Forty-five (moves her hand over the second screen and counts subvocally), forty-nine!
- J: (Places out a screen.) Let's pretend there's fifty-eight under here. Fifty-eight (places out a screen covering three counters), and three more.
- S: (Places her hand on the first screen. Then moves her hand to the second screen and counts subvocally while moving her fingers.) Sixty-two!
- J: No, have a think. (Places her hand on the first screen) fifty-eight - (moves her hand to the second screen).
- S: (Looks at the second screen for two seconds.) Sixty-one.
- J: (Places her hand on the first screen.) What about if I've got eighty-two under there? (Briefly displays and then screens five counters.) Eighty-two and five more?
- S: (Looks at the second screen momentarily and then looks up and to her left. Counts subvocally for six seconds.) Eighty-seven.



#### Video Excerpt 4.1: Libby and Kelley

- L: (Places out '10 - 7 =', using plastic digits and signs.) This time, ten take seven away?
- K: Ten. (Raises ten fingers directly in front of her. Looks at her right hand and then her left. Lowers two fingers on her left hand and then all five on her right. Picks up the plastic digit for '3' and places it beside the equals sign.)
- L: Right. Okay, now try this one. (Places out '16 - 12 =') Sixteen take twelve away?
- K: (After 20 seconds, raises her thumb and index finger. Then lowers both her thumb and index finger.) Umm fifteen (raises her thumb and then pauses), fourteen, thirteen (in coordination with raising two fingers in turn. Pauses, then raises her third finger and utters uncertainly), twelve. (Looks at her fingers, then simultaneously raises her little finger and lowers her thumb.) Four!

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#### Video Excerpt 4.2: Terry and Sarah

- T: There's eight there, okay? (Places eight counters under a screen.) I'm taking some away (reaches under the screen and removes two counters without displaying them), and I've got six left (momentarily displays the remaining six counters). How many did I take away?
- S: (Immediately.) Two.
- T: How did you do that so quickly?
- S: (Shrugging her shoulders.) I don't know.
- T: Twelve, okay? There's twelve there this time. (Places twelve counters under a screen.) I am going to take some away (reaches under the screen and removes three counters without displaying them), and there are nine left (momentarily displays the remaining nine counters).
- S: (Sequentially raises three fingers.) Three?
- T: Okay, now what numbers were you saying to yourself to get those three?
- S: I was saying twelve, and I took away some and then I counted to nine, so I went, twelve, eleven, ten (in coordination with raising three fingers), and that was nine (moves her fourth finger), so I put that down and then I worked it out.

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### Video Excerpt 5.1: Robin and Allan

- R: (Places 12 counters under a screen.) There were twelve counters and I took away some (removes and screens three counters), and I have nine left. How many did I take away?
- A: (Looks at Robin.) Three.
- R: How did you work that out?
- A: Nine plus three is twelve, and then you take away, it's nine.
- R: (Places 15 counters under a screen and then removes and screens four counters.) This time I had fifteen counters, I took some away and I have eleven left. Fifteen, took some away and I've got eleven left.
- A: (Looks ahead for nine seconds.) Four!
- R: Tell me how you did that one.
- A: Umm, you had fifteen and took some away to make eleven because you just take away four, 'cause if you took away five it would be ten and you just plus it on.
- R: (Places counters under a screen.) What if I start off with fifteen under there (removes, displays and then screens three counters), take three out, how many are left under there?
- A: Twelve.
- R: Hmm, how did you do that one?
- A: Because five take away three is two, and then you just, 'cause there was fifteen so you just take away three and it's twelve.

used spontaneously.

### Video Excerpt 5.2: Kathryn and Loretta

- K: If we have five under there (places five counters under a screen) and four under there (places four counters under a second screen), how many would we have?
- L: (Immediately.) Five and four more is nine.
- K: And how do you know that?
- L: Well, five and three more is eight and so one more is nine.