

APPENDIX 4

DISTRIBUTION OF SENSE-MAKING INSTANCES IN EACH ACTIVITY AND ACTIVITY SUB-SECTION, BY GROUP AND STUDENT

In the tables below, the components of SMD are abbreviated as follows:

CL (**C**larifying the facts of a phenomenon or result), **P** (**P**redicting), **UE** (Describing or providing an **u**nderlying **e**xplanation for a phenomenon or result), **DDC** (**d**efining, **d**escribing, clarifying, and **c**onnecting scientific concepts, procedures, processes, and representations), and **TC** (**t**esting knowledge **c**ompatibility).

Numbers above the dotted lines (-----) represent requests for that particular component of SMD (i.e., they represent instances of the sixth component of SMD). Numbers below the dotted line represent actual instances¹ of that component. Instances of **P** are presented in Level 1/Level 2 format. All times refer to the total time spent in the activity sub-sections where SMD was expected -- not the actual time that students spent engaged in sense-making discussion.

¹ An "actual instance" is an actual act of clarifying, predicting, etc., rather than a request for a clarification, prediction, etc.

Table A4-1. Distribution of sense-making instances for group 1 in activity 1 of cycle 3.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
What does your team think? (2 min)	-----	0/1	-----	-----	-----	1
What really happens? (18 min)	-----	-----	-----	3	1	4
	1	4/2	3	5	3	18
Prepare your wipe board! (5 min)	-----	-----	-----	-----	-----	-----
	-----	-----	-----	2	-----	2
	-----	-----	-----	-----	-----	-----
Total (25 min)	-----	-----	-----	3	1	4
	1	4/3	3	7	3	21

Table A4-2. Distribution of sense-making instances for each group 1 student in activity 1 of cycle 3.

Student	CL	P	UE	DDC	TC	Total
Darla	-----	-----	-----	1	-----	1
	-----	-----	-----	4	-----	4
Grace	-----	-----	-----	2	1	3
	-----	1/0	1	-----	1	3
Lacey	-----	-----	-----	-----	-----	-----
	1	3/3	-----	3	2	12
Porter	-----	-----	-----	-----	-----	-----
	-----	-----	2	-----	-----	2

Table A4-3. Distribution of sense-making instances for group 2 in activity 1 of cycle 3.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
What does your team think? (2 min)	----- 1	----- 0/2	----- 1	----- 1	----- 1	----- 5
What really happens? (21 min)	----- 1	----- 2/0	----- 1	----- 3	----- 2	----- 7
Prepare your wipe board! (6 min)	----- 1	----- 1	----- 1	----- 1	----- 1	----- 3
Total (29 min)	----- 1	----- 2/2	----- 2	----- 5	----- 3	----- 15

Table A4-4. Distribution of sense-making instances for each group 2 student in activity 1 of cycle 3.

Student	CL	P	UE	DDC	TC	Total
Arthur	----- 1	----- 1/0	----- 1	----- 2	----- 3	----- 8
Roxanne	----- 0	----- 0/1	----- 1	----- 2	----- 1	----- 4
Jasper	----- 0	----- 0	----- 0	----- 0	----- 0	----- 0
Sabrina	----- 0	----- 1/1	----- 0	----- 1	----- 1	----- 3

Table A4-5. Distribution of sense-making instances for group 1 in activity 2 of cycle 3.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
What does your team think? (2 min)	-----	-----	-----	2	-----	2
	-----	-----	-----	3	-----	3
What really happens? (8 min)	-----	-----	-----	-----	-----	-----
	-----	2/0	-----	-----	-----	2
Making sense (3 min)	-----	-----	-----	-----	-----	-----
	2	1/0	2	3	1	9
	-----	-----	-----	-----	-----	-----
Total (16 min)	-----	-----	-----	2	-----	2
	2	3/0	2	6	1	14

Table A4-6. Distribution of sense-making instances for each group 1 student in activity 2 of cycle 3.

Student	CL	P	UE	DDC	TC	Total
Darla	-----	-----	-----	2	-----	2
	1	1/0	-----	1	-----	3
Grace	-----	-----	-----	-----	-----	-----
	1	1/0	-----	2	1	5
Lacey	-----	-----	-----	-----	-----	-----
	-----	-----	1	1	-----	2
Porter	-----	-----	-----	-----	-----	-----
	-----	1/0	1	2	-----	4

Table A4-9. Distribution of sense-making instances for group 1 in activity 3 of cycle 3.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
Let's find out! (12 min + 4 min = 16 min; all SMD #s are from day 2)	2			4		6
	-----	-----	-----	-----	-----	-----
	2			13		15
Making sense (7 min + 0 min = 7 min; all SMD #s are from day 1)						
	-----	-----	-----	-----	-----	-----
				1	1	2
	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----
Total (19 min + 4 min = 23 min)	2			4		6
	-----	-----	-----	-----	-----	-----
	2			14	1	17

Table A4-10. Distribution of sense-making instances for each group 1 student in activity 3 of cycle 3.

Student	CL	P	UE	DDC	TC	Total
Darla				2		2
	-----	-----	-----	-----	-----	-----
				4	1	5
Grace						
	-----	-----	-----	-----	-----	-----
	2			4		6
Lacey	2			2		4
	-----	-----	-----	-----	-----	-----
				5		5
Porter						
	-----	-----	-----	-----	-----	-----
				1		1

Table A4-17. Distribution of sense-making instances for group 1 in activity 1 of cycle 4.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
What do you think? (5 min)	1					1
	-----	-----	-----	-----	-----	-----
	7	2/2	1		4	16
Prepare your wipe board! (5.5 min)						
	-----	-----	-----	-----	-----	-----
		0/3			1	4
	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----
Total (10.5 min)	1					1
	-----	-----	-----	-----	-----	-----
	7	2/5	1		5	20

Table A4-18. Distribution of sense-making instances for each group 1 student in activity 1 of cycle 4.

Student	CL	P	UE	DDC	TC	Total
Darla	-----	-----	-----	-----	-----	-----
	3	2/1	1		1	8
Grace	-----	-----	-----	-----	-----	-----
		0/1				1
Lacey	-----	-----	-----	-----	-----	-----
	3	0/3			4	10
Porter	1					1
	-----	-----	-----	-----	-----	-----
	1					1

Table A4-21. Distribution of sense-making instances for group 1 in activity 2 of cycle 4.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
Rubbing hands and sanding blocks (8 min)	-----	-----	2	-----	-----	2
	6		4		2	12
Applying energy ideas (6 min)	-----	-----	4	-----	-----	4
	2		4		2	8
Exploring bumpiness and applying push/pull ideas (5.5 min + 2.5 min = 8 min)	-----	-----	1	2	-----	3
	1		3	4	6	14
Making sense (5 min)	-----	-----	-----	1	-----	1
	1			1		2
Total (22 min)	-----	-----	7	3	-----	10
	10		11	5	10	36

Table A4-22. Distribution of sense-making instances for each group 1 student in activity 2 of cycle 4.

Student	CL	P	UE	DDC	TC	Total
Darla	-----	-----	-----	1	-----	1
	1		6	4	5	16
Grace	-----	-----	3	1	-----	4
	3		3			6
Lacey	-----	-----	4	1	-----	5
	6		1	1	4	12
Porter	-----	-----	-----	-----	-----	0
			1		1	2

Table A4-33. Distribution of sense-making instances for group 1 in activity 5 of cycle 4.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
Exploring drag (26 min)	-----	-----	4	-----	-----	4
	1	1/2	7	-----	-----	11
Making sense (skipped by teacher)	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----
Total (26 min)	-----	-----	4	-----	-----	4
	1	1/2	7	-----	-----	11

Table A4-34. Distribution of sense-making instances for each group 1 student in activity 5 of cycle 4.

Student	CL	P	UE	DDC	TC	Total
Darla	-----	-----	3	-----	-----	3
	-----	0/1	3	-----	-----	4
Grace	-----	-----	1	-----	-----	1
	-----	1/1	1	-----	-----	3
Lacey	-----	-----	-----	-----	-----	-----
	1	-----	-----	-----	-----	1
Porter	-----	-----	-----	-----	-----	-----
	-----	-----	3	-----	-----	3

Table A4-51. Distribution of sense-making instances for group 2 in activity 3 of cycle 5.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
What causes gravity? (day 1: 3.5 min)	5		2	3	1	11
	-----	-----	-----	-----	-----	-----
	8		4	4		16
Earth gravity vs. moon gravity (day 2: 7 min)						0
	-----	-----	-----	-----	-----	-----
						0
Making sense (day 2: 2.5 min)			3		1	4
	-----	-----	-----	-----	-----	-----
			2			2
	-----	-----	-----	-----	-----	-----
Total (13 min)	5		5	3	2	15
	-----	-----	-----	-----	-----	-----
	8		6	4		18

Table A4-52. Distribution of sense-making instances for each group 2 student in activity 3 of cycle 5.

Student	CL	P	UE	DDC	TC	Total
Arthur	1		1	2		4
	-----	-----	-----	-----	-----	-----
	6		2	1		9
Roxanne	1		2		1	4
	-----	-----	-----	-----	-----	-----
	1		3	2		6
Sabrina	3		2	1	1	7
	-----	-----	-----	-----	-----	-----
	1		1	1		3
	-----	-----	-----	-----	-----	-----

Table A4-57. Distribution of sense-making instances for group 1 in activity 5 of cycle 5.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
Now what does your team think? (2.5 min)	----- 0	----- 0	----- 0	----- 0	----- 0	0
Prepare your wipe board (11.5 min)	----- 1	----- 0	----- 0	----- 0	----- 0	1
	----- 0	----- 0	----- 0	----- 0	----- 0	0
	----- 0	----- 0	----- 0	----- 0	----- 0	0
Total (14 min)	----- 1	----- 0	----- 0	----- 0	----- 0	1

Table A4-58. Distribution of sense-making instances for each group 1 student in activity 5 of cycle 5.

Student	CL	P	UE	DDC	TC	Total
Darla	----- 1	----- 0	----- 0	----- 0	----- 0	1
Grace	----- 0	----- 0	----- 0	----- 0	----- 0	0
Lacey	----- 0	----- 0	----- 0	----- 0	----- 0	0
	----- 0	----- 0	----- 0	----- 0	----- 0	0

Table A4-59. Distribution of sense-making instances for group 2 in activity 5 of cycle 5.

Section of activity	Instances of Verbal Sense-Making					Total
	CL	P	UE	DDC	TC	
Now what does your team think? (see note)	-----	-----	-----	-----	-----	-----
Prepare your wipe board (see note)	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----
Total (x min)	-----	-----	-----	-----	-----	-----

Note. Sabrina was absent, so the teacher combined teams. No analysis done.

Table A4-60. Distribution of sense-making instances for each group 2 student in activity 5 of cycle 5.

Student	CL	P	UE	DDC	TC	Total
(see note)	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----
	-----	-----	-----	-----	-----	-----

Note. Sabrina was absent, so the teacher combined teams. No analysis done.