

Appendix Table 1 Transcript of Event					
Turn #	Talk	Sequence #	Notes/Comments	IODM	TAP (Toulmin Framework)
1.	Kelly: Br <sub>2</sub>				
2.	Daniel: Good question Emma		Looks at Kimmy		
3.	Kimmy: Kimmy				
4.	Daniel: I mean Kimmy				
5.	Kimmy (looking at Emma) It's all right, I'm used to people calling me Emma (laughs).		Looks at Emma		
6.	Kimmy: Talk. What's going on in your brain? I can't hear you. Not listening.	1	Talks to Kelly and Linda who are at the board	M1	
7.	Linda: Remember Filippa?	1	Looks behind to Filippa	Q3, M1	
8.	Amari: Wouldn't the Br pull off one hydrogen?	1	Points finger to board, raises questions (safe?)	R4	Claim
9.	Filippa: Umm, the Br <sub>2</sub> pulls of the hydrogen,	1	Points finger to board, Agrees with Amari (Supporting Amari)	R1	Backing
10.	Amari: The first hydrogen	1	Expands Filippa's statement, gives specific details	R3	Backing
11.	Filippa: The electron moves onto that and then they form a double bond	1		R3	Claim
12.	Kelly: Yeah we did it	1	Agrees with Filippa	R5 (Evaluating through agreeing with the use of "yeah")	Backing
13.	Linda: And then what?	1		Q2	
14.	Amari: And then so it pulls off the other one also and that. Isn't it also like the half?	1	Points finger to board. Raises question (safe?)	T1, T3 or Q4	Backing

15.	Filippa: Yeah then the Br also pulls off	1	Puts hands on top of head as in stretching pose, agrees with Amari	R1 and R3, R5	Backing
16.	Linda: Oh yeah	1		R5	Backing
17.	Kelly: No it's the top reagent	1		T1	Rebuttal
18.	Kimmy: The Br pulls off the hydrogen so then that becomes a	1	Interrupted	R1	Claim
19.	Kelly: OK and then you just... just have a Br	1		R3 or T1	Backing
20.	Kimmy: Wow	1		R5	
21.	Kelly: Hanging around	1	Taps on board with marker	R3	Continuation of turn 19, backing
22.	Linda: Yeah but Br pulls this. The electrons in that bond moves to form the double bond	1		T3 or T1	Claim
23.	Filippa: So now the extra Br	1		R3	
24.	Amari: No but the hydrogen needs to come off because of the octet	2		T1 or T3	Rebuttal
25.	Kimmy: So the hydrogen comes off from the Br	2	Raises hand, open-faced towards board. Fine-tunes statement. She repeats her statement from turn 21	R1	Claim
26.	Linda: Yeah they pull all the hydrogen off	2	Fines tunes statement	R2	Warrant
27.	Kimmy: That's what makes it positive	2	Hand raised, open faced towards the board. Fines tunes statement	R3	Warrant
28.	Kelly: And these electrons shift...moves	2	Fines tunes statement	R3	Backing
29.	Amari: But the carbon on top because then now you can't have that new double bond because	2	Points finger to board	T1	Claim

30.	Linda: That's what I was thinking	2		R5	
31.	Amari: It has to pull off another hydrogen that's why there's two Br's	2	Points finger to board	T1 and T3 (to turn 32)	Warrant
32.	Filippa: But...but wouldn't it be	3	Points finger to board	T1	Start of Rebuttal
33.	Linda: Hold on	3		M1	
34.	Filippa: Wouldn't it be a radical type of thing because when they...?	3	Points finger to board	T1 and Q2	Rebuttal
35.	Amari: Yeah Br <sub>2</sub> is a radical right that's how I learned it. Its Br <sub>2</sub> over light	3	Talking to Filippa	R2, R4	Backing
36.	Linda (softly to Kelly): This? I don't think so	3		T3	
37.	Kelly: So this one over here. You have one left Br	3		R2 (from turn 34)	Grounds (based on concept)
38.	Linda: Yes	3		R5	
39.	Kelly: And the electrons move	3		R3	Continuation of Grounds (based on concept)
40.	Linda: Yes	3		R5	
41.	Kelly: Oh I get it. This Br pulls off the hydrogen	3	Taps at board	R1 (from turn 11, 12, 21, 25, 29)	Claim
42.	Linda: Yeah the hydrogen also	3		R1	Grounds
43.	Kelly: That's all	3		R5	
44.	Linda: Yeah	3		R5	
45.	Kelly: That's all and then you're left with this	3	Taps at board	R5	Grounds
46.	Linda: But like the Br accepting as bases	3		T1	Claim

47.	Daniel: So are the Br's accepting as bases?	3	Reinforcing a Question (manipulation)	Q1	
48.	Linda: No. They can't be acting as bases	4	Slaps hands together loudly talking to Daniel	T3	Rebuttal (to self)
49.	Daniel: I thought bases attract protons	4		T1	Rebuttal
50.	Linda: The NaOH should be the base	4		T3	New Claim
51.	Kimmy: Why is the NaOH? What is that doing?	4	Talking to Linda	Q2	
52.	Daniel: I think that's a cata...I think that's a catalyst	4		T1 and T3	Claim
53.	Linda: Don't the Br's add and then...?	4	Talking to Filippa	Q2	Claim
54.	Amari: No, that's if you're using HBr	4		T3	Rebuttal
55.	Filippa: But then will the NaOH take on a proton?	4	Speaks loudly 55=56 (overlap)	Q2	Grounds
56.	Amari: But these are two Br's	4		T3	
57.	Linda: That's what I thought the NaOH has to yeah take off the proton and yeah	4		R3 (to turn 55: Filippa)	Backing/Warrant
58.	Elijah: Does it take off a proton if there is like no Chlorine or something?	4		Q1	Claim/Warrant
59.	Kelly: Exactly something takes off the Hydrogen	4		R1	Claim (basis of the argument)
60.	Kimmy: We're not in Organic Chem		Under breath	T1	
61.	Daniel: Pardon?			Q2	
62.	Kimmy: (louder) We're not in Organic Chem			R1 (Turn 66)	

63.	Daniel: Look I want you guys to reflect how much you remember			M3	
64.	Amari: Well it's not Br <sub>2</sub> over NaOH because when I did it with Vanica [organic professor], it was NaOH by itself or Br <sub>2</sub> over light	5	Kelly taps on board	R4, T3, T4	Claim, Grounds, Warrant
65.	Kimmy: Yeah I remember Br <sub>2</sub> over light	5	Open palm; facing board	R1	Warrant/Backing
66.	Linda: Okay, if you add Br <sub>2</sub> over light then Br <sub>2</sub> gets added to the single bonds	5	Crossed arms	R5 (Okay), T1	Claim
67.	Amari: No it doesn't. It pulls off	5		T3	Rebuttal
68.	Elijah: It goes through free radicals reaction	5	68=69 (overlap)	T1	Claim
69.	Amari: Yeah it's a radical reaction but it ends up pulling off	5		R3, T4	Qualifier Claim/Backing sequence
70.	Linda: How do you pull it off?	5	70=71 (overlap)	Q2	Rebuttal
71.	Amari: And you get a double bond	5		T4 (to turn 75)	Claim/Backing sequence
72.	Amari: Because look	5	Gets up and walks towards the board. Takes marker from Kelly	T1	Claim/Backing sequence
73.	Elijah: Basically it turns into	5		R2	Claim/Backing sequence
74.	Amari: It's umm...Extend this side it's with the arrow thing. The light <u>release</u> it so you get one like this and one like that so then you end up	5		T3, R3	Warrant/Backing sequence
75.	Linda: Right	5		R5	Backing
76.	Amari: And then this pulls off one and you do the same mechanism again	5	Erases writing after being done	T3	Warrant/Backing sequence

77.	Linda: So then we don't need the base?	5		Q2	Claim
78.	Amari: So then this would come here because there's still that umm Hydrogen Carbon bond so one goes here and these form one so then you have one HBr and then another Br radical floating around and then it's the same thing and it comes here. So then that's how you get your double bond	5	Drawing on board	T3	Claim/Grounds/Warrant/Backing sequence
79.	Kelly: I'm going to agree with you	5	<i>Looks at Amari then to Linda</i>	R5	Backing (Linda? Or encouraging Linda to come over?)
80.	Linda: No.	6		R5	Rebuttal
81.	Daniel: Okay guys	6	Comes in right after Linda's "No". Breaking patterns, making it safe	M1	
82.	Linda: How come you can't?	6		Q2	
83.	Daniel: Nothing you're doing fine. So I'm...I'm hearing there's two proposed mechanisms. One's a free radical and one's a base mechanism	6		T2, T4	
84.	Linda: Right	6	Amari sits down	R5	
85.	Daniel: Okay.	6		R5	
86.	Filippa: They both	6	Safe	T1	Claim
87.	Kelly: They both work	6		R1	Claim
88.	Filippa: They both	6	Filippa shut down	R1	Backing
89.	Linda: But which one is the correct one in this case?	6	<i>Talking to Daniel</i>	Q4	

90.	Amari: Anyone because you still get your product. I mean you still get what you're looking for.	6	Talking to Linda	T3	Claim
91.	Linda: I mean wherever this reaction is going on it can't be anyone	6		T1	Claim
92.	Daniel: It depends what you put in there. You put Br and NaOH because we had no other option than Br and NaOH. Cuz that's what you told me to put in there.	6	Talking to Linda	T3, T4	Warrant (Backing Amari)
93.	Linda: Yeah	6		R5	
94.	Daniel: Ok so that's fine. Is there... is there maybe more than one way to get an H <sub>2</sub> O across, I mean, a <b>double bond</b> ?	6	Synchronized with Linda	T4, Q1, M3 (okay that's fine), M4	
95.	Linda: <b>Double bond</b>	6	<i>Synchronized with Daniel (Linda comes over)</i>	R1	
96.	Linda/Filippa/Amari/Kimmy: Yea...yes	6		R5	
97.	Daniel: That's it. So we've now had two students propose one.	6		R3	