- 1 Fabian: Here the car's going to go (point to top of "Giant Hill") 2 Student: Can't hear. 3 Fabian: Here the car's going to go down and going to go around and going to go like that (points to different hills drawn on white board). 4 5 Student: Can't hear. 6 T: He can't hear you. Can you speak a little more loudly? 7 Fabian: If we- If we put the car here, it's going to go rolling down and going to be moving 8 and go over there. 9 T: OK. So wait. What he's saying is that if you put the car here (points to top of hill), it's going to go down? (looks at Fabian) 10 Fabian nods and looks at SF. 11 12 T: It's gonna go down and then what's going to happen after that? 13 Fabian: It's going to go up the hill. Then it's going to go like that (points to loop). 14 T: All the way around-15 Fabian: Like that and then just (looks at SF). 16 Student: But I have a question. 17 T: And then he was saying that it's going to jump at the end. 18 Kerban: I have a question. How can a-how can a car go upside down? It will just fall. 19 Student 2: And how's it gonna turn? 20 Fabian looks at SF. 21 Student 3: By blowing it. 22 Student: Yeah. 23 T: We have a lot of questions. Wait! 24 Student 4: When it's going down the hill, it's going to go too fast and it's gonna go over a 25 hill, but it's gonna go over the other ones. 26 Student 5: How can a car jump? 27 T: So, you think when it's going down a hill, it's gonna go too fast. And what's gonna 28 happen? 29 Student 4: It's going to go, like, on one hill. It's just gonna fly. 30
- 32 to board), right? 33 (students talking)

31

Student 5: Yeah.

T: OK. Well he's kind of saying that here at the end. It's gonna fly. It's gonna jump (pointing

34 T: Well we're. This one's not using a booster. It's just a car. It's just a toy car and it's gonna 35 go down that hill (moves hand in front of her) and around some bumps and then all the way around and it's gonna go out and jump at the end. 36 Student: But how can it turn, like? 37 38 T: Ask him. 39 Student 1 (?): Fabian, how can it turn? 40 Fabian: I don't know at all, but it'll, uh. It will go, like (moves hand to left side of board, 41 turning toward SF.) 42 Student (?): Then everything will have to be straight. 43 T: Wait. Tell him. Fabian: It will be, like, go a wall here before it cannot go out. The-44 45 T: There would be a wall. Casina, what are you thinking? 46 Casina: How can it jump over? (moves hand in a slant in front of her) 47 T: How can it jump out? Fabian, what would make it jump over? Over what? (Student: Oh!) 48 The bumps? 49 Fabian: Over here? (points to loop) 50 Kerban: You said the jump part (points to the board, the middle) right there? 51 Fabian: Here? (points to first valley) T: At the end, at this part right here? (points to part labeled end) 52 53 Fabian: Oh yeah. Here's the yull (?) ramp. 54 Student: Is it bouncing? 55 T: There's a little ramp to help it jump out. 56 Student: Oh, so, like, when it goes like that, the car could just go like that? 57 Student: Oh! I know what he's talking about! 58 T: Is that what you're saying? Wait Cerney, say that again. 59 Cerney: So, like, when it's like that (Student 6: Straight) the car-60 T: What do you mean like that (puts hand in front of her at an angle)? Cerney: It's like, kind of a hill, but it's not really and it goes up and it, like-61 62 T: So, it's curved upward? And then keep going. And then what? 63 Cernev: Pushing in the car goes up. 64 T: And then the car goes up. 65 Student 7: How come the car- it might crash.

T: OK. So, the car goes up and it jumps and it flies. OK. And then it might crash. Kerban.

66

67 68	Kerban: Uh, um, when they're going down the hill and the- and- and- it will go up and but, um, what if the hill is too high for (inaudible) the car?
69	T: Cernev. Cernev. Don't join the game. Sorry, Kerban, what?
70 71	Kerban: The car's going down the hill and, um, but it will go up and then it-, and then, how it - maybe, maybe the hill is too big for the car to get up.
72	Student 8: It makes it-
73	T: Did you hear Kerban's question?
74	Student: No.
75 76 77	T: Kerban was saying, and tell me if I'm right or not, OK? Kerban was saying that it would go down. Sorry. It would go down and it has to go back up, but maybe the hill's too big and it wouldn't get back up again?
78 79	Kerban: Yeah, because, uh, the hill has to be, like, 100 feet tall and - and then when it's too fast it will do all those(?) things.
80 81	T: So, this part (pointing to top of Giant Hill) would have to be, like, a hundred feet tall and for it to be able to go back up the hill?
82	Kerban: Yeah.
83	Fabian: But these hills are small.
84	T: But, he's saying these hills are small. Ignacio, what are you thinking?
85 86	Ignacio: If it's too big, then it and (inaudible) it will go up. It go- The car could go fast and then - (pointing to board)
87 88	T: Come up and show me where the car's going to go fast. And then I want you to think about what you- what Ignacio's saying. Jared, move. Don't join in his game.
89 90	Ignacio: It could go right here (points to slope of big hill) and then it could go like that, and it could go faster and it could go on top and then-
91	T: So, it'll go fast so it'll make it across there? You think so?
92	Fabian: (inaudible)
93 94 95	T: Raise your hand if you think that Fabian's car would go all the way around that track, would make it all the way around. Raise your hand if you think so. (1/3 of class raises their hands)
96 97 98	T: Raise your hand if you think, No way. He's car's not gonna make it - bless you - all the way around that track. (1/2 of class raises hands). Oh, we have some different ideas. Cernev, what are you thinking? My arm's tired.
99 100	Cernev: I'm thinking that, that hill right there, if it goes down and that middle hill - when it goes up that little hill -
101 102	T: Wait. Cernev, I wonder if everyone's listening to you. Hold on one second. OK. Now, go ahead.

103 104	Cernev: If it goes down that big hill and then that little hill right there when it goes up, I think it's gonna roll back down.
105 106	T: You think it will go down? So, when it goes up here, it'll go back down there (points to 2nd hill).
107	Cernev: No, um,
108	T: You can- oh, you can't come up. Nope, you can't.
109	Cernev: When it goes down that hill and then that little hill right there-
110	T: Right here (points to top of 2nd hill)?
111	Cernev: When it stops at the top, I think it's gonna roll back down.
112	T: It'll fall back down (points to far side of hill)?
113	Cernev: No, like this way.
114 115 116	T: Oh! It would roll back down this way? (points to front side of 2nd hill) Oh! I see! So, you think it'll get stuck right in here? Oh. I like the different ideas. Fernando, what are you thinking?
117	Fernando: The hill I think is too straight when it goes down and it might crash.
118	T: You think this hill is too straight when it goes down.
119	Students: Yeah.
120	T: And so it might crash?
121	Student: What happens if there's a rock?
122	T: If there's a rock where?
123	Student: If it goes - If it goes fast.
124	Student: That thing is like a roller coaster.
125	T: It IS kind of like a roller coaster. That's good thinking.
126	(Students talking at the same time.)
127 128	T: That would be another scenario. It could hit a rock. Timmy and then Kerban and then I want to hear some more about these other ideas.
129 130 131 132	Timmy: I think, um, if you get to the second hill, it should have the energy- the energy of the car - like, the energy - the speed limit - that it should go, like, the speed limit of the car and it should look all the speed limit, maybe, and test it. Maybe it gonna go, like, go and- go, like.
133	T: Can you come up and show us what you mean?
134	(Timmy walks up to the white board.)
135 136	Timmy: Like this, like when it's coming right here, then it should stay right here. Then it should lose the energy of the car-
137	Fabian: It already goes to here-

138 139	Timmy: Right here and stay right here, and then the energy - it gets there (points to bottom of loop). Then it can go and fly.
140 141 142	T: So, Timmy, can you scoot over a little so Erin can see? But wait! No, don't sit down, cuz I have lots of question for you. So, what you're saying is that it will go down and right here it will lose energy?
143	Timmy: No. Like, it should have power right here.
144 145 146 147	T: Oh! So you're saying the car has to have another kind of power, but what if it didn't cuz Fabian's car was just like a regular toy car (Student: How bout a trampoline?) Just like that toy car that I showed you. What if it didn't have any other kind of power? (Student: Trampoline.) (3 sec pause)
148 149	Wait. OK. So what you're saying is that it- it would have to have another kind of power to go back up the hill.
150 151	Timmy: Maybe it's just do like this (moves hand in front of him and pushes it up) and just roll it, roll it fast.
152	T: Oh, so you would have to, like, push it up the hill?
153	Timmy: Push it fast.
154 155	T: Oh, so you would have to push it up. You might have to help it out a little bit? Oh. OK. Do you guys understand what Timmy's saying?
156	Students: Yes.
157 158 159 160	T: Yeah. That it would get stuck down here if you didn't help it out in some way (pointing to first valley) by giving it power or by pushing it. Caleb, go sit by Cernev, please. So, lots of ideas and I've heard a lot from Kerban. I'm wondering what other people are thinking.
161	