3.0.142	T/R 1:	How many of you like chocolate? [Hands are raised]. Pretty much everybody. Right. Um, you know, we were talking about sharing things that people like and I was talking to, um, Tom earlier and I was talking to Amy. And, um, I said you know, Mrs. H. was nice enough to bring some candy because I thought we would look at some nice fraction problems and I said, well if we share these. So Tom said, I want one-half a candy bar and Amy said, I want one-half a candy bar. So I said okay, you each can have a half and I gave them each a half and they were so angry with me. They looked at me and said, well Tom was happy, but Amy said to me I don't really like what you just did. That didn't seem really fair. Now, how could that be? It seemed fair to me. I gave one-half to Tom and I gave one-half to Amy. Didn't I do the right thing? Meredith doesn't think so, and- Mark, what do you think?
3.0.143	Mark:	You probably gave Tom the, uh, bigger, a bigger half than Amy.
3.0.144	T/R 1:	Can a half be a bigger half? You told me when I called this one, the red rod, right; this is one half and this is one half, how could one be a bigger half? They're the same size. The two reds make a half and the two reds make a half. Is that what you were thinking I did Meredith? Gave a bigger half? And does that make sense to give a bigger half?
3.0.145	Mere:	Mm, hmm [positive response].
3.0.146	T/R 1:	How?
3.0.147	Mere:	Well, say you gave, this was one [indicates a yellow and light green train] and then you gave this much to Tom [yellow rod] and this much to Amy [the light green rod]. That wouldn't be a fair cut.
3.0.148	T/R 1:	I agree with that but I wouldn't call that a half. Why wouldn't, why wouldn't I call this, if I called this one I wouldn't call green a half and I wouldn't call yellow a half. If I did, Dr. L. wouldn't let me come back. She'd say stay out of that class, what are you teaching these students? Would I have called it a half? David?
3.0.149	David:	No, because it wasn't even.
3.0.150	T/R 1:	What do you mean by that, David?
3.0.151	David:	Well, um, the half should be even so that the other side is the same as it is. So the yellow is bigger than the green and the half should be the same size.

3.0.152	T/R 1:	So all of you know what a half would look like, wouldn't you? Does this have a half by the way? Can you find me a rod that would be called a half, if this was my candy bar? If I called my candy bar dark brown right instead of yellow and green, it's the same size isn't it? I want to use, uh, Sarah and Audra's trick and I want to call yellow and green dark brown. Is that okay? Okay? So according to David, David's thinking that I would have in mind giving the purple to Tom and the purple to Amy. I would know they should be the same size. [OHP - yellow and green train, brown rod, and two purple rods] Brian?
3.0.153	Brian F.:	Two purple would make a half.
3.0.154	T/R 1:	Each of those would be one half?
3.0.155	Brian F.:	Yeah.
3.0.156	T/R 1:	Do you agree with that? What could I have done David? So I didn't violate that condition. What could I have done to make Amy so annoyed at me? Like I thought she wasn't going to stay. Audra, what do you think?
3.0.157	Audra:	Because, see, you had the red. Well, if the candy bar was this size [holding up a train of green and yellow] and you were to divide it in half and then Amy probably got a piece like this [green rod] and..
3.0.158	T/R 1:	But I didn't do that. I really made the halves of the candy bar the same size, so I didn't trick her that way. What else could I have done that could have made her feeling badly about this? Do you want me to tell you? How many of you want to know what I did? Tell me if what I did was right or wrong. [She holds up a large candy bar.] I gave Tom Purdy half of this candy bar, right down the middle, right? You like that? [students giggle] I gave him half didn't I? [students agree] Yeah, and Dr. Martino, what did I do? [T/R 1 holds up a small candy bar.] Right down the middle, right two equal parts. Right? I can't imagine. I gave them each a half. Why should she [Amy] be annoyed with me? [Children are giggling.] Did anyone ever pull that on you? You wouldn't pull that on a younger brother or sister would you?
3.0.159	Students:	Yes!
3.0.160	T/R 1:	You would! Ok tell me why Dr. Martino was annoyed with me. What do you think, Caitlin?
3.0.161	Caitlin:	Cause they're weren't the same size chocolate bar.

3.0.162   T/R 1:   They weren't the same size. How may of you agree they weren't the same size? They weren't the same size chocolate bars, right! That's right! They weren't the same size chocolate bar. What does that have to do with what we're doing here, if anything? Brian?

3.0.163   Brian F.:   We're working with halves.

3.0.164   T/R 1:   That's true, we're working with halves. Audra.

3.0.165   Audra: Because, see, since we're working with halves you took these two together [She indicates a yellow and light green train] and you called it, called it two and it would be like one candy bar and the other candy bar. And, if you put the reds on top, um, I think, someone, they said that if it was a half, if you put two reds on top of the green and it isn't 'cause the two reds is bigger than one green, than one light green and it can't be half. [As she speaks, T/R 1 adds four red rods to the model on the OHP] Just like the chocolate bar couldn't be a half.

3.0.166   T/R 1:   That's very interesting, what I'm hearing Audra say. Let me try to say it with candy bars. [T/R 1 uses the large candy bar to find one half of it; uses the smaller candy bar to find one half of it] Audra is saying it's sort of like what I did. If I call this candy bar one; one candy bar right? Then I could call this half a candy bar, agreed? You all agree with that, if I call this one? If I call this one [holds up a small candy bar], then I can call this a half [points to two of the four squares of the small candy bar]. She's saying what I'm doing is a little bit like taking a piece of this candy bar and taking a piece of this candy bar and mixing up my ones. Is that sort of what you're saying Audra? Is that allowed when you're comparing things? Are you allowed to mix up your ones? 'Cause then I could say to you, is it fair to compare different sizes? Cause then I could say to you, what do you think is bigger, one half or one third. What do you think is bigger, one half or one third? You could even think of this candy bar here. Can you all imagine half of it? [Mmm hmmm] How do you imagine a half of a candy bar, Jackie?

3.0.167   Jackie: Cut it right down the middle [she motions].

3.0.168   T/R 1:   Okay Jackie says she would cut it right down the middle, here, right, for a half. Why wouldn't she cut it long ways for a half very easily? Why couldn't she do that? Why not Graham?

3.0.169   Graham: 'Cause there's three of them [three sections across the bar].

3.0.170	T/R 1:	Cause there's three of them.
3.0.171	Graham:	And you would need to have four so I could cut it in half.
3.0.172		[The candy bar is scored in a three by four grid pattern.]
3.0.173	T/R 1:	[T/R 1 asks what about a third of the candy bar.] Okay, so if I cut it in half, do you see how many pieces she would get here? How many of these little chunks she would get? How many?
3.0.174	Jackie:	Six
3.0.175	T/R 1:	So you would get six out of a total of twelve, right?
3.0.176	Jackie:	[Nods.]
3.0.177	T/R 1:	But if you got a third, can you tell me what you would get? Can you all see? Gregory? If I gave you a third of this candy bar; we shared it among all three of you here? Which part would you get, which part would Dr. Landis get, and which part would Danielle get? To be fair Gregory. How could we share this three equal ways? [starts talking, inaudible] Gregory, nice and loud. [T/R 1 drops the candy bar.] Gregory, nice and loud so everyone can hear you back there.
3.0.178	Gregory:	Well, Danielle will have one row and Dr. Landis will have one row, then I would have one row.
3.0.179	T/R 1:	And how many wedges would that be for you?
3.0.180	Gregory:	Um, four.
3.0.181	T/R 1:	Four out of twelve, right? So when you got half, Jackie said you got six out of twelve [this is melting in my hands] and when we got a third, you got how many out of twelve?
3.0.182	Gregory:	Um, four.
3.0.183	T/R 1:	Four out of twelve. Who got more? The person who got one half or the person who got a quarter, a third? Who got more? What do you think Amy?
3.0.184	Amy:	The person who got a half.
3.0.185	T/R 1:	How many of you agree? The person who got half a candy bar got more than the person who got a third. You all agree with that, you all understand that? [All children agree.] And no one could convince you otherwise and you'd make sure you got your fair share. I know that you would get your fair share if you were negotiating among yourselves. I'm not sure with a younger brother or sister how that would work. However, as this is melting, let's switch candy bars. So of that candy bar, right, you'd pick what? How many of you would pick a half of it? How many of you would pick a third

		of it? You'd all pick a half, right? There's no question. However, is it possible, is it possible, if I were talking about different candy bars? Like these here, right, different size candy bars. Could you imagine if it were possible that a third could be more than a half? How many of you could imagine that? Suppose I gave you half of this candy bar, right, the little one. Suppose I gave you a third of the big one. What would you want? Andrew?
3.0.186	Andrew:	I would want the third
3.0.187	T/R 1:	Of the big one.
3.0.188	Andrew:	Yeah
3.0.189	T/R 1:	How many of you would want the third of the big one? You could sit and study these candy bars. So what's wrong if I say to you. You say I want a half and I could be a very clever older sister and say okay I'll give you a half and I go back and get my little candy bar, right, and I say you got a half. And then your little brother or sister says you got a third and how come you have more? You're confusing your little brother or sister. How come you have more? Michael?
3.0.190	Michael:	Because you, uh, you were gonna split up a big one, so, but then she ran back and got the little one and split that in half and gave that half to him and then she took the big one and got a third of it and ate that piece.
3.0.191	T/R 1:	Sort of a little dishonest, is she? So it's sort of dishonest to switch candy bars, isn't it, right? Isn't that right? Now, we have to be very careful, because, you know, this often happens, you order a pizza pie, you go out with a group of friends, and you say, ok, um, I would like one third of that pizza pie. And someone else says, ok, that's fine, um, I'm going to take one half. And there's this little pie that gets delivered, did you ever see these personal pizzas, these small ones, right? And you get one half of this little pie, and then they have this big pie, and you get one third. Who has the better buy? David?
3.0.192	David:	The guy with one third.
3.0.193	T/R 1:	The guy with one third. So what's the question you should always be asking yourself when you're comparing fractions? Meredith?
3.0.194	Mere:	Which one's bigger.
3.0.195	T/R 1:	Which?
3.0.196	Mere:	Which thing is bigger.

3.0.197	T/R 1:	Which thing is bigger. Which object is bigger. Are you allowed to compare different things when you compare fractions? Is that really fair? Is that really fair?
3.0.198	Students:	No.
3.0.199	T/R 1:	No, it's not really fair. I mean it's sort of a kind of tricky kind of thing people might do, but you know what, you could get tricked into that. If you don't think carefully about when someone is asking you to compare. Because when we really ask the question, which is bigger one half or one third, what are we, what are we assuming? What's sort of the common understanding about that? When I ask you that question? Michael?
3.0.200	Michael:	Well, normally half is bigger than one third, but if you got a bigger piece of a candy bar or pizza, you got a big pizza, and you get and you get half or one third of that, then that'll be more than just a little pizza that you get half of.
3.0.201	T/R 1:	Okay. We don't want to fall into that trap; can we have an agreement in this class? And maybe you want to think about this the rest of your life in mathematics. When we compare fractions, it's the same thing. We're not gonna play tricks on each other. If I ask you, which is bigger, a half or a third, we mean of the same object. Okay? You're not allowed to think a half of one cake and a third of another cake. We're talking about either cakes that are exactly the same size or candy bars that are exactly the same size. Do you understand that? We're not allowed to switch. Do we agree on that? Because once we have those rules then maybe we can talk to each other and argue. Now, I have one last problem for you to do. I think we still have 10 minutes. We're gonna go til ten after. One last problem. I wanna see if you fall into the trap. If we agree on we must keep whatever it is we're comparing the same unit. So if I'm comparing one half and one third, what I call one has to be the same for one half and it has to be the same for one third. Is that clear here? [Mmm hmm.] Alright. I want you to draw me a model with your, make me a model with your Cuisenaire rods and to show me which is bigger one half or one third. And I want you to tell me, show me which is bigger and I want you to tell me how much bigger and be able to convince me. Which is bigger, one half or one third?