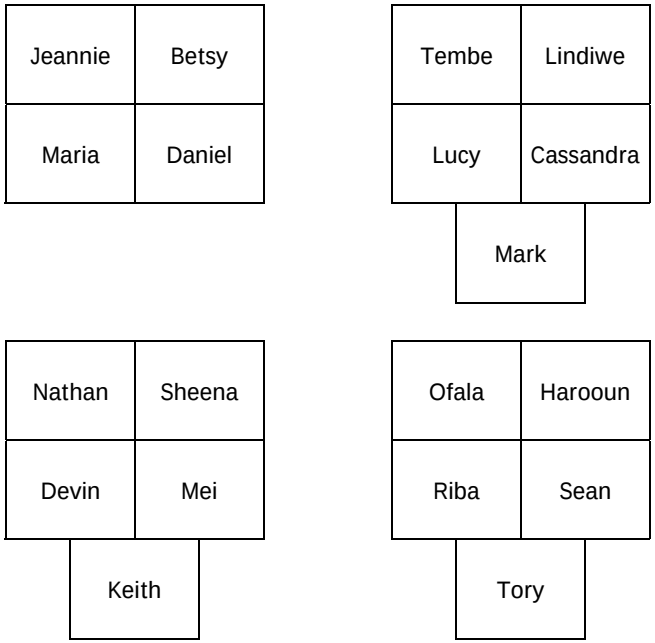
Third grade, Public Elementary School, Michigan
Friday, January 19, 1990

Seating Arrangement



January 19, 1990.

On this day, the teacher began the class by asking students for comments on the meeting they had had the previous day where they talked about even and odd numbers with students from another class. A few minutes into the discussion, a boy named Nathan made the observation that even numbers can be "made" from two other even numbers-like 4+4 or 6+6. This video segment opens with the teacher asking if anyone has other comments. She calls on Sean who has his hand raised. Sean doesn't have a comment about the meeting, but he has noticed something special about the number six, which he claims can be an odd and even number.

1:05:29

Teacher: More comments about the meeting? I'd really like to hear from as many people as possible- What comments you had or reactions you had to being in that meeting yesterday. Sean?

Sean: I don't have anything about the meeting yesterday, but I was just thinking about six. It was a- I'm thinking that it's a- it's an odd- it can be an odd number too 'cause there could be two- Two, four, six, and two- three twos, that would make six-

Teacher: Uh-huh.

Sean: And two threes. It could be an odd and an even number. Both. Three things to make it, and there could be two things to make it.

Teacher: Uh-huh. And the two things that you put together to make it were odd, right? Three and three are each odd?

Sean: Uh-huh, and I think the other- the twos were even.

Teacher: So you're kind of- I think Nathan said then that he wasn't talking about every even number. Right, Nathan? Were you saying that? Some of the even numbers, like six, are made up of two odds like you just suggested.

Teacher: Other people's comments? Cassandra?

1:06:36

Cassandra: I disagree with Sean when he said that six can be an odd number. I think six can't be an odd number because- Look- (*gets up and walks to the board*)

Teacher: Jeannie, Betsy?

Cassandra: Six can't be an odd number because this is (*points to the number line above the board*) even, odd, even, odd, even, odd, even. How could it be an odd number because...

Sean: Because-

Cassandra: (*starting with zero*) Even, odd, even, odd, even, odd. Zero's not an odd number.

Sean: Because six- Because there can be three of something to make six, and three of something is like odd. Like see, you can make two, four, six. Three twos to make that, and two threes makes it.

Keith: But that doesn't-

Teacher: Keith?

Keith: That doesn't necessarily mean that six is odd.

Students: Yeah.

Teacher: Why not, Keith?

Keith: Because- just because you need two odd numbers to add up to an even number doesn't mean it has to be odd, you know what I mean.

Teacher: What's the definition- What's our work- Sean, what's our working definition of an even number? Do you remember from the other day the working definition we're using? What is it?

Sean: It's that- I forgot.

Teacher: Could somebody help us out with this? 'Cause we need in the group to have an idea that we're working with. What's the working definition we're using? Do other people know it besides Lucy and Sheena? I think other people do. Maria, do you know what the definition is that we've been using for an even number?

1:08:16

At this point the teacher thought Sean was just confused about the definition for even numbers. She thought if they just reviewed that, he would see that six fit the definition and was therefore even. She assumed after this they would be able to get on with the discussion.

Within a couple of minutes, they had settled on a definition of even numbers. Jeannie said:

Jeannie: If you have a number that you can split up evenly without having to split one in half, then it's an even number.

So the teacher turned to Sean in order to make the connection and clarify things:

Teacher: And can you do that with six, Sean? Can you split six in half without having to use halves?

Sean: Yeah.

Teacher: So then it would fit our working definition. Then it would be even. Okay?

Sean: Yeah. And it could be odd. Because three twos could make it.

Teacher: Okay. One of the points here is that if it fits the definition then we would call it even. If it fits our working definition, then we would call it even.

Sean: It can fit the definition for odd too.

The teacher began to see that the issue was more complicated than she had thought.

Teacher: What is the definition for odd? Maybe we need to talk about that.

Before this they had had an explicit definition for even numbers only. The teacher had assumed this was sufficient, but apparently it was not. The class turned to discuss a definition of odd numbers and agreed that odd numbers were numbers you could not split up fairly into two groups. But this still did not satisfy Sean. He persisted with the observation he had made about what made six special:

1:11:24

Teacher: I'm confused now.

Sean: You could split six fairly, and you can split six not fairly. You can like- cut six in half.

Teacher: Uh-huh.

Sean: There's like- Say there's two of you... And you had six cookies, and you didn't want to split it in half and, so

that each person would get three, and you wanted to split it by twos. Each person would get two and there would be two left.

Teacher: For which number now? For six?

Sean: Six. Uh-huh.

Teacher: So, are you saying all numbers are odd then? (*draws on the board:*)

Sean: No, I'm not saying all numbers are odd, but-

Teacher: Which numbers are not odd then?

Sean: Two, four, six- six can be odd or even-

Students: No.

Sean: Eight.

Tembe: I don't know how to.

Sean: Because there's three twos.

Cassandra: Prove to us that six can be odd.

Sean: There's three twos: One, two. Three, four.

Cassandra: Prove to us that it can be odd.

Sean: Five, six.

Tembe: Prove it to us. Prove to us.

Sean: Okay.

Teacher: Does everybody understand what Sean's trying to argue? He's saying six could be even or it could be odd.

Student: I don't think...

Teacher: Well watch what he's going to prove and then you can ask him a question about it.

Sean: Because, see this? (*draws on the teacher's diagram*) There's two. Number two over here. Put that there. Put this here. There's two, two, and two. And that would make six.

Cassandra: I know, which is even.

Mei: Oh, I think I know what he's saying.

Tembe: Which is even, Sean.

Teacher: Mei? (*to Sean:*) Could you stay there? People have some questions for you.

Mei: I think what he is saying is that it's almost- I think what he's saying is that you have three groups of two, and three is an odd number, so six can be an odd number and an even number.

Teacher: Do other people agree with that? Is that what you're saying, Sean?

Sean: Yeah.

Teacher: Okay, do other people agree with him? Mei, you disagree with that?

Mei: Yeah, I disagree with that because it's not according to like- Here, can I show it on the board?

Teacher: Uh-huh.

Mei: (*walking up to the board*) It's not according to like how many groups it is.

Teacher: Riba, can you watch what Mei's doing?

Mei: Let's say that I have... Let's say- If you call six an odd number, why don't-

Sean: And it can be an even.

Mei: Let's see if I can find... Let's say ten. (*draws on the board*) One, two... And here are ten circles. And then you would split them. Let's say I wanted to split them by twos. Go one, two... Well look- one, two, three, four, five.

Then why do you not call ten a, like a-

Sean: I disagree with myself.

Mei: an odd number and an even number? Or why don't you call other, like, numbers an odd number and an even number?

Sean: I didn't think of it that way. Thank you for bringing it up. So, I say it's- Five- ten can be an odd and an even.

Mei: Yeah, but what about- what about other numbers? Like, if you keep on going on like that and you say that other numbers are odd and even, maybe we'll end it up with all numbers are odd and even. Then it won't make sense that all numbers should be odd and even, because if all numbers were odd and even, we wouldn't be even having this discussion!

1:15:40

The teacher decided that if they were going to pursue this, more people should be invited to join in. So she turned to the rest of the class.

1:17:21

Teacher: Are people following this disagreement? This is an important thing that I didn't even realize we were disagreeing about. So it's important to see if we can try to figure this one out. What are you going to show?

Ofala: Well, I don't really need to show.

Teacher: You don't need to show something? What are you trying to say?

Ofala: I just wanted to say if you wanted an odd number, you just have to take one- one off of it.

Teacher: Why would that work?

Ofala: Because usually odd numbers are like-

Teacher: Cassandra, can you hear Ofala okay?

Ofala: This. That is kind of like have ones in the middle? Like five. (*draws:*)

And there's a one in the middle, or nine. (*draws:*)

Sean: I think it's better with circles.

Ofala: (*continues to draw)* This two together, this two together, this two together, and this two together.

There's one left. And even numbers, like six- (*draws:*)

You can't get anything in the middle. There isn't one left.

Teacher: So you're saying the even numbers are the ones where you can group them all by twos, and the odd ones are the ones where you end up with one left over?

Mei: Yeah, I think I agree.

Sean: But-

Sean: If six is an even number, then how come there's three here and there's not one left out?

Ofala: Because, even numbers are like things like this. They have- Even numbers have two in them, and also odd numbers have two in them, except they have one left.

Mei: Yeah.

Teacher: Okay, so, Ofala, you're- You actually are suggesting a definition. I think. Let's have everybody hear that one more time.

Sean: But I'm using-

Teacher: Listen carefully.

Sean: I'm not using nine!

Teacher: Ofala's proposing a definition for odd numbers.

Sean: We're not using nine...

Teacher: Can we listen to her one more time? Say again one more time what you're saying the definition is of an odd number.

Ofala: Well, an odd number is something that has one number left over.

Teacher: After you do what?

Ofala: After you circle the twos.

Teacher: Any questions? Are you clear about what she's trying out?

Sean: It doesn't always have to have-

Teacher: Just a second, Sean. Let's make sure people understand what she's suggesting. Who thinks they could come up and try a number on the board using her definition, to test to see if it's even or odd? That would be a way of seeing if we understand what she's trying to say.

Teacher: Betsy, you think you could try one?

Betsy: Yup.

Teacher: Ofala, watch and see if she's using the way you're thinking about it. What number are you going to experiment with?

Betsy: I'll experiment with twenty.

Teacher: What would you predict twenty-

Betsy: Twenty-one.

Teacher: What would you think twenty-one should be?

Betsy: Odd.

Teacher: Okay, so if her method works, what will happen?

Betsy: There will be one left over.

Teacher: Okay, everyone watch now and see if Betsy's experiment works out.

Betsy: Four, five, six, seven, eight, nine...

1:20:33

NAME	GENDER	RACE	COUNTRY	ENGLISH PROFICIENCY	HOW LONG AT THIS SCHOOL[1]
Lindiwe	M	African American	U.S.A	native speaker	just started
Nathan	M	White	Ethiopia	fluent	3 years
Betsy	F	White	Canada	native speaker	4 months
Cassandra	F	African American	U.S.A.	native speaker	12 months
Daniel	M	Asian	Indonesia	developing	3 years
Jeannie	F	White	U.S.A.	native speaker	3 years
Keith	M	African American	U.S.A.	native speaker	just started
Tembe	M	African Black	Kenya	fluent	3 years
Mei	F	Asian	Taiwan	fluent	2 years
Lucy	F	White	U.S.A.	native speaker	3 years
Maria	F	Latina	Nicaragua	beginning	4 months
Mark	M	White	U.S.A.	native speaker	2 years
Ofala	F	African Black	Nigeria	fair	3 years
Devin	M	White	Nepal	beginning	5 months
Riba	F	White	Egypt	good	3 years
Harooun	M	Asian	Indonesia	developing	12 months
Sean	M	White	U.S.A.	native speaker	2 years
Sheena	F	African American	U.S.A.	native speaker	4 months
Tory	F	White	U.S.A.	native speaker	just started

[1] *NOTE*: This column reflects the length of time the child had been in this *school* as of 1/19/90. No one had been in this *class* longer than 4 months (since September).