

## CONSTRUCT ARGUMENTS: PUMPKIN SEEDS

BRENDA RICHARDSON: How many seeds do you think are in this pumpkin? Stacey, how many seeds do you think I can find in this pumpkin?

STUDENT: Two... 200.

RICHARDSON: You say about 200, so I'm going to put your sticker right here. All right.

LINDA GOJAK: In this lesson, we're going to see students construct arguments about the number of seeds they think there are in a small pumpkin. So they're going to estimate the number of seeds, and then they work to convince others that their estimate is a good estimate.

RICHARDSON: Here we go. I'd like you to take a look at the pumpkin, and now I want you to get another number into your head. How many seeds do you think are in the pumpkin now? Many of my children haven't seen the inside of a pumpkin and needed to have a reference point in judging the number of seeds in the pumpkin.

300.

RICHARDSON: You say about 300. We'll put 300 about right here. And what about you, Shemi?

I say 75 because there's some under the gushy stuff.

RICHARDSON: What Shemi said was that there is pulp inside of the pumpkin.

GOJAK: It's really interesting, because you'll see a small group of students who are arguing over whether there are 80 seeds in the pumpkin or 100

seeds in the pumpkin, and they take this very seriously, trying to construct an argument about why they think their estimate is correct, and then convince the others in their group. The teacher finally intervenes and has the kids at least come to some kind of a consensus, a way that they can agree about what's an appropriate estimate.

STUDENT: How about 80? I mean, there's a lot of pulp.

(students talking)

There's a lot of pulp here. Down here I see some. In the middle. There'd be, like, about 80.

STUDENT 2: No... 1,000.

STUDENT 1: No!

STUDENT 3: 180.

STUDENT 1: It's lower than 100 – I know it.

STUDENT 3: No, 180 because we want it. You say 80, we say 100, so 180.

RICHARDSON: Scoop your jack-o'-lanterns. Did you estimate a number?

STUDENTS: No. All right. If you didn't estimate, you should...

(laughs)

You think there's about 80.

STUDENT: 180!

RICHARDSON: And she says 180, so what are we going to do?

STUDENT: Because we say 100 and he says 80, but we keep saying 100.

RICHARDSON: Who's we? I need to know who's saying 100. Sequoia, me, and Colin say 100, and he says 80.

RICHARDSON: So how are we going to make it so that we can all come to one number, we can all cooperate and choose the number?

STUDENT: 180!

STUDENT: But I don't think there's that much.

RICHARDSON: He doesn't think that it's that much, so what should we do?

STUDENT: It's probably less than 100.

RICHARDSON: You think it's less than 100. So if they think it's 100, what's a number... What's a number that's less than 100, Marissa?

STUDENT: 90?

RICHARDSON: 90, what about 90? Can we agree on 90?

STUDENTS: Yeah.

RICHARDSON: Okay, there you go.

GOJAK: It's really important for students to have a variety of opportunities to not only make mathematical arguments, but to justify their thinking to their classmates. Teachers can really encourage this kind of thinking, this kind of justifying, by asking kids questions like, "How do you know that's so?", or, "How can you convince me that your answer or your estimate is the best one we can come up with?"

STUDENTS: One, two, three...