Dicey games

Annotation

Amalia questions the conclusion that a classmate has drawn about dice being unfair. She agrees with the classmate's results but not his conclusion. She uses a systematic way of exploring the game's fairness by creating a table of all the possibilities. This forms a simple model of the chance situation that Amalia correctly interprets and clearly explains.

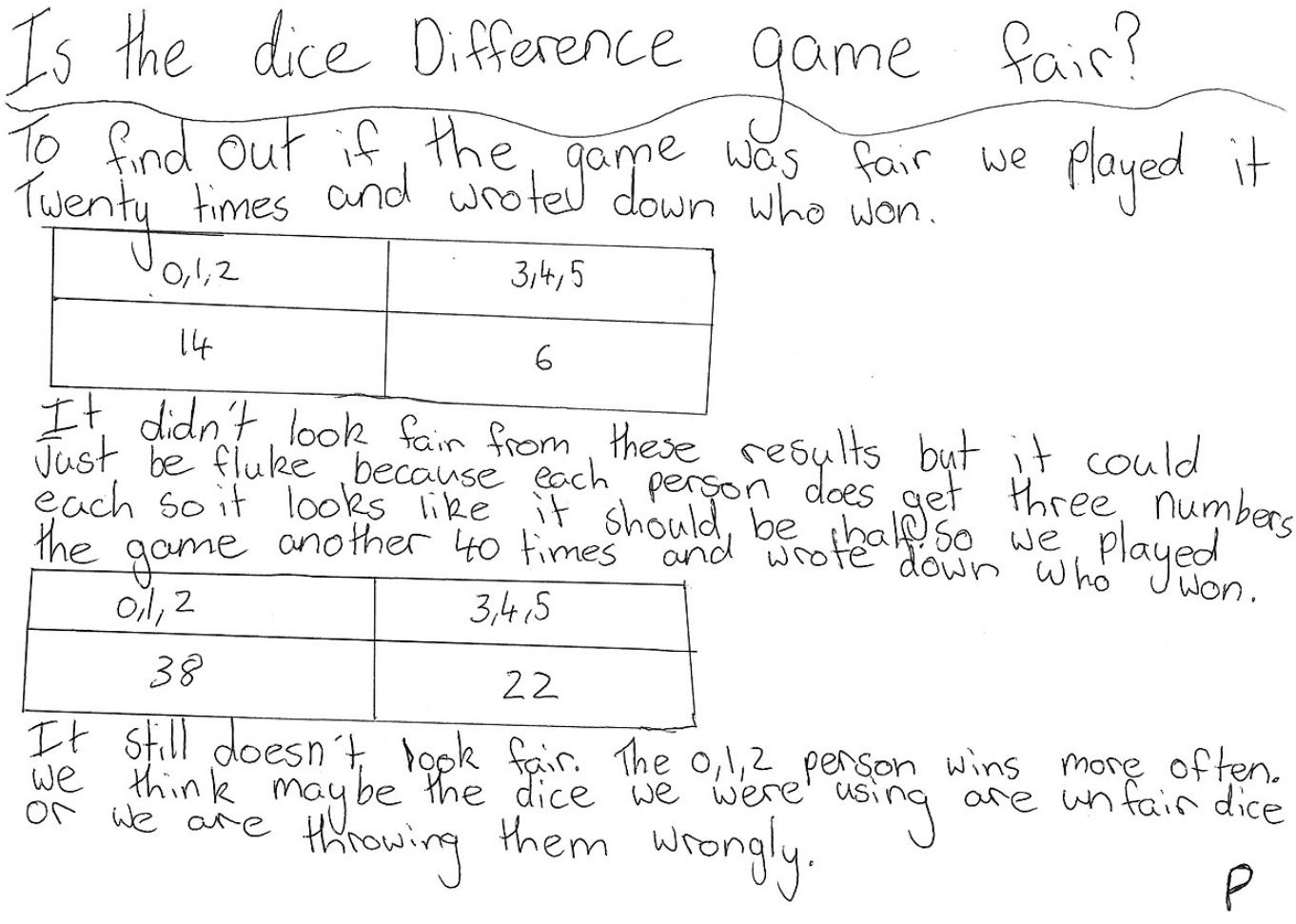
Problem: Dicey games

The students are playing a game where they find the difference between the numbers on two dice. If the difference is zero, one or two, one player takes a counter. If the difference is three, four or five, the other player takes a counter. After 30 throws, the person with the most counters wins.

After the students have played the game a number of times, the teacher challenges the class to investigate the game by posing a question:

Is this game fair?

The students make a poster showing their conclusions:

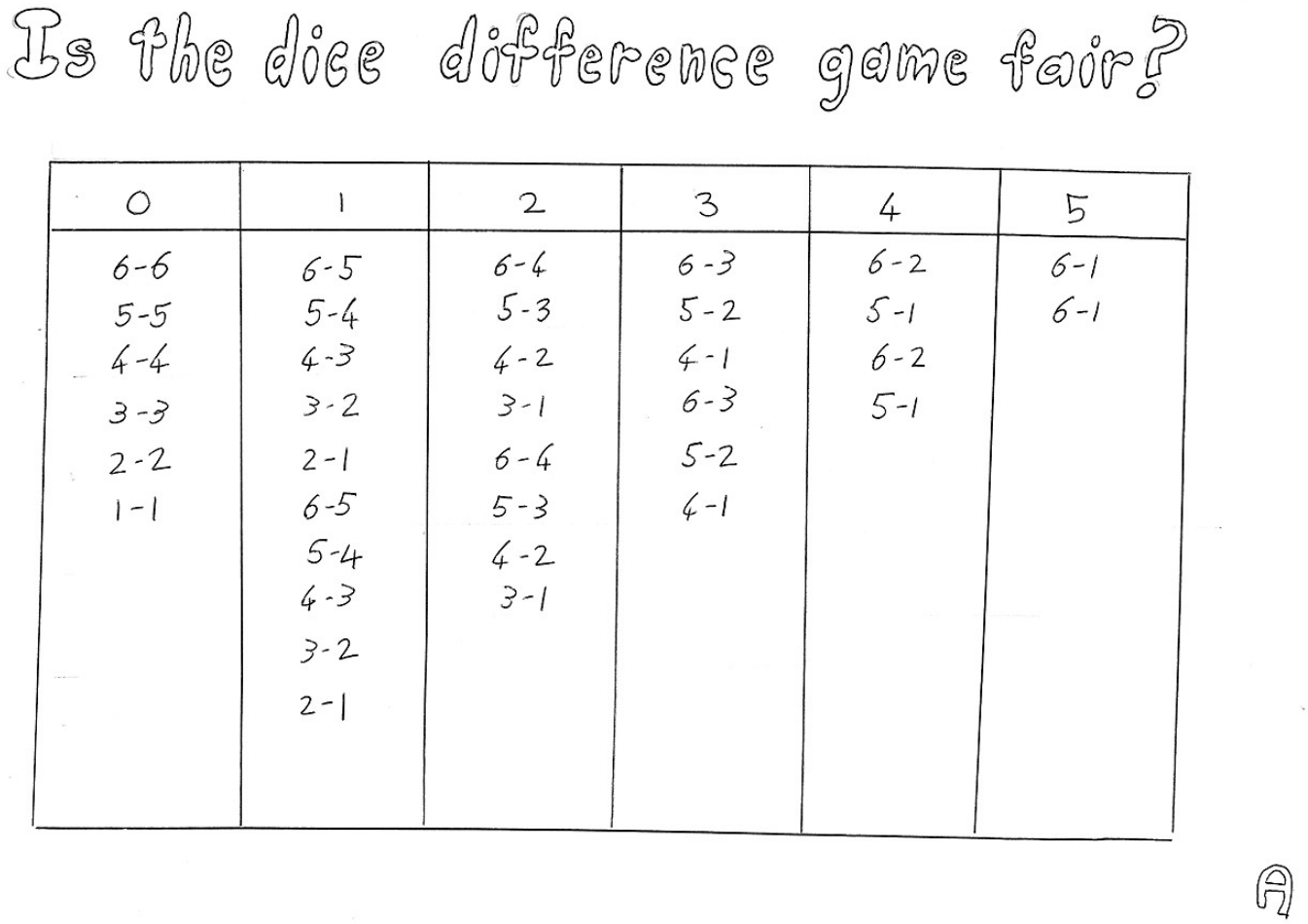


The teacher discusses Pravir's poster with the students and asks:

Who thinks there might be another reason why the 0, 1, 2 person seems to win more often?

Student Response

Amalia comes to the board to explain her thinking. She puts up her poster:



Amalia: I think Pravir's results are right. It's not because the dice are wrong.

Teacher: Tell me some more about that.

Amalia: Well, I worked out all the ways you could get the answers. That's this, on my poster (pointing to her poster). There are more ways to get the low answers.

Teacher: Tell me some more about your thinking.

Amalia: There are two dice, so actually there are two ways to get the answers: red dice take away white dice and white dice take away red dice. That means that there are more ways than I thought to begin with. When you write them all down, there are lots for one and two, and hardly any for five, so the person who is low numbers is going to win more times. It looks fair because each person has three numbers, but it isn't.