# Making a Fair Decision

You are a part of a reading club at the school library. The librarian lets you choose your own teams. Each team had to read as many books as they could in a month. The team that worked the hardest gets a chance to go to the town bookstore and pick out a book for free.

The librarian has a problem. She noticed that the teams have a different number of members. This is going to make it hard to decide which team worked the hardest.

The librarian wants it to be fair, so she has asked you to be the judge. You have to come up with a mathematically fair way to pick the hardest working team.

Please write a letter explaining exactly why you picked a certain team and why you think it is a fair decision.

Team 1	
Name	Books
John	5
Clare	5
Beth	2
Cici	4
Jeanne	3

Team 2	
Name	Books
Alicia	4
David	4
Cindy	6

Team 3	
Name	Books
Peter	4
Wendy	3
Mary	4
Terri	3

Grade Levels 3 - 5

## Making a Fair Decision

You are a part of a reading club at the school library. The librarian lets you choose your own teams. Each team had to read as many books as they could in a month. The team that worked the hardest gets a chance to go to the town bookstore and pick out a book for free.

The librarian has a problem. She noticed that the teams have a different number of members. This is going to make it hard to decide which team worked the hardest.

The librarian wants it to be fair, so she has asked you to be the judge. You have to come up with a mathematically fair way to pick the hardest working team.

Please write a letter explaining exactly why you picked a certain team and why you think it is a fair decision.

Team 1	
Name	Books
John	5
Clare	5
Beth	2
Cici	4
Jeanne	3
Team 2	
Name	Books
Alicia	4
David	4
Cindy	6
Team 3	
Name	Books
Peter	4
Wendy	3
Mary	4
Torri	3

### Context

This task can be given to students before they are introduced to the mean average algorithm to get a sense of their natural sense of averaging or fairness. It can also be given as an

assessment piece after a unit on averaging or as a review assessment, months after studying averaging. If students know the average algorithm, however, the range of student work is limited because they have one approach - averaging. Also, if the student has been taught the mean then this task is not considered a "problem" for the student, but an application. The student work that follows came from fourth and fifth grade classes where the algorithm had not been introduced.

As a follow-up to giving the task select three responses. Each response should have selected a different team as a winner. Read each decision and have them discuss the fairness of the decision.

Fairness is a big issue in the fourth and fifth grade and this task will help students understand the challenge of arriving at a decision that all agree is fair when the information presented is not straightforward.

### What This Task Accomplishes

This task allows students to work with data and a situation that does not immediately lend itself to a quick solution. The students will have to analyze the data that is given.

### What the Student Will Do

The student will most likely find the sum of each teams' data. They usually can eliminate Team Three - same number of books read as Team Two, but one more member. Deciding the winner between Team One and Team Two is not as clear.

#### **Time Required for Task**

45 minutes

### **Interdisciplinary Links**

A great social studies problem because students will begin to understand the complexity in making fair decisions.

### **Teaching Tips**

Read the problem out loud. There is a lot of reading and you want to be sure the problem is understood by all. Make a point to mention how the teams are uneven. Ask for any questions to help clarify the task.

### **Suggested Materials**

Linked cubes to represent each person's books. (Each team can have a different color.)\*\*

\*\*For example, Team Two would have two sets of four red cubes linked together and one set of six red cubes linked together. The other teams would have different colors representing each person's books.

### **Possible Solutions**

Team Two has the highest mean average and worked the hardest. Most students can eliminate Team Three. Look for good reasoning for their choice between Team One and Team Two.

### **Benchmark Descriptors**

#### Novice

This student just added the number of books. This is an inappropriate procedure. It does not take into account the uneven teams. Their strategy of just adding will not solve the problem.

#### Apprentice

The student used a strategy that is partially useful. S/he realized that if Team Two and Team Three read the same number of books then Team Three did not work the hardest because they had an extra person. But, his/her reasoning that the fewest number of persons on a team means that they work the hardest is not sound.

#### Practitioner

The solution shows the student has a broad understanding of the problem and the major concepts necessary for its solution. S/he began to look for ways that would make the teams even by looking at just the top three readers in each team. Their strategy leads to the solution of the problem using effective mathematical reasoning.

#### Expert

The first Expert has a good sense of averaging as leveling. This is an efficient and sophisticated strategy leading directly to a solution. The second solution shows a deep understanding of the problem including the ability to identify special factors that could influence their decision - how fast people read and the thickness of books. This student decided to double some members' scores to get the same number of members on each team. I might further question the student as to how they decided what members' books should be doubled.