# M2C3  MATH MODELING LESSON OVERVIEW

**LESSON TITLE:**  Soccer Team Selection

**STANDARDS ALIGNMENT:**

| GRADE 3 | GRADE 4 | GRADE 5 |
|---|---|---|
|  | **4.NF** Extend understanding of fraction equivalence and ordering. <br>**4.NF.7:** Compare two decimals to hundredths by reasoning about their size. | **5.NBT** Understand the place value system <br>**5.NBT.3:** Read, write and compare decimals to thousandths. |
| **MP: 1**  Make sense of problem and persevere in solving them. <br>**MP: 3**  Construct viable arguments and critique the reasoning of others. <br>**MP: 4**  Model with Mathematics | **MP: 1**  Make sense of problem and persevere in solving them. <br>**MP: 3**  Construct viable arguments and critique the reasoning of others. <br>**MP: 4**  Model with Mathematics | **MP: 1**  Make sense of problem and persevere in solving them. <br>**MP: 3**  Construct viable arguments and critique the reasoning of others. <br>**MP: 4**  Model with Mathematics |

### *CONNECTIONS (Consider while planning):*
• **Previous Math Knowledge:**
- Work with different kinds of data
- Compare whole numbers
- Compare and contrast using different criteria
- Understanding decimal values

• **Cultural/Community/Family Connections**:
- Fairness/unfairness
- Determining criteria for fair sharing of resources
- *Kids may have knowledge of soccer and the sorts of player skills that are necessary to make a balanced team*

**Language Considerations:  specialized terms:**  Soccer may be better known as football to some students.  Soccer specific terminology such as "shots on goal" and "defensive blocks" needs to be discussed.

### *TASK VARIATIONS*

**Routine 1: Mathematizing World – Open Ended (10 Minutes)**
Show slides and discuss the variety of player skills soccer teams need in order to be successful.
- What do you notice:  What do these pictures/videos make you think about? Class discussion.
- What questions do you have?

**Routine 2: Mathematizing World – Specific Questions (20 Minutes)**  Sense making and assumption building.
Show the table with information about four soccer players.  The table lists information about the players from the first day at camp.

**Task Part 1:** Work with your partner to make sense of the information in the table and divide the 4 players into 2 fair teams.

- What information does each column in the table provide?
- How does the information or data given in the table relate to the player skills good soccer teams need in order to be successful?
- How did you use these data to divide the 4 players into 2 fair teams? What assumptions did you make? What information did you use?

| Player Name | Gender | 100-meter sprint time (seconds) | Shots on Goal (out of 5 tries) | Defensive blocks |
|---|---|---|---|---|
| Brianna | girl | 13.80 | score  score  wide  block  block | 7 |
| Danielle | girl | 14.23 | score  score  score  wide  wide | 9 |
| Ed | boy | 15.30 | score  score  score  score  block | 7 |
| Kofi | boy | 15.15 | score  score  score  score  score | 5 |

Record your method for dividing the players.

**Routine 3: Full Modeling Task (60-90 minutes)** Students participate in the entire modeling cycle. Using the table with 12 players, students will analyze and organize the data and use this organization to divide the 12 players into two fair soccer teams.

> **Task Part 2: Forming Fair Teams**
> As a group, use the information in the table to divide the players into fair teams. There are 12 players. Divide them into 2 teams, with 6 players on each team.

> **Task Part 3: Product: Write a Letter to the Coaches**
> (1) Describe how the coaches can use the information in the table to divide the 12 players into 2 fair teams.
> (2) Tell the coaches how they could use your method in future years to divide players into fair teams.

**ANTICIPATED STUDENT ASSUMPTIONS:**

**In this task, students will have to make many decisions based on assumptions.**

Students may

- assume that speed is the only or most important criterion for assigning players to a team so they may order the 12 players by time to complete the 100-meter sprint and not consider any of the other data.

- assume that defensive blocks (saves) are the most important skill and assign players based on the number of defensive blocks (saves).

- Assume that scoring in the most important and assign players on who high scorers are

**ANTICIPATED STUDENT STRATEGIES:**

Students may

- focus on speed as the sole criterion for team selection.

- make a table ranking the players in each category and pick the best defensive players first, then assign based on speed.

- find it difficult to organize the "shots on goal" data because it is not numeric.  They could assign numbers such as 2 for score, 1 for block, and 0 for wide to quantify and rank these data.

- just describe the two teams but not explain in any detail how they used each criterion to divide the players into teams, in their letter to the coach.

- not understand the importance of defensive blocks and ignore these data entirely.


### MATERIALS

- Soccer Team_Student Task
- Soccer Team_Lesson Slides