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TOPIC: Soccer, Currency, and a Global Market.

NCTM STANDARDS: Numbers and Operations, Algebra, Measurements, Data Analysis & Probability, Problem Solving, Reasoning, Connections, Communication

GOALS:

- Conversion exchange rates in global economy
- Use of line of best fit to model, analyze, and interpret real world situations

INTRODUCTION:

Soccer or the sport more commonly known as football to the global community is not one of the major sports in the United States, but is one of the world's most popular sports. 208 associations are recognized by Fédération Internationale de Football Association (FIFA or the world governing body of soccer)¹ and a number of these 208 associations have domestic professional leagues. Unlike many United States professional leagues where players and draft picks are traded between teams, these European professional soccer leagues function in a system of transfer. In this system, an individual player may freely transfer to a new team when their contract ends, get loaned to another team by the professional team that pays his contract, or that player may be transferred in a trade of money. In this final exchange, a prospective team will offer the player's current team a sum of money to transfer that player to the prospective team. This exchange of currency for players can often be difficult to understand when players transfer between different countries with different currency.

ACTIVITIES:

• Part 1.

Introduction of Currency: Students will be given a handout called "Would you rather have..." Students will explore the concept of currency exchange rates in the global economy. Currency exchange rate can be found for by going to the currency converter website: <http://www.xe.com/ucc/>

• Part 2.

Introduction of Soccer Transfer System: Students will investigate the top transfers of all time and practice converting them with exchange rates into US dollars and the players' country of origin.

• Part 3.

Incorporation of European Soccer: Students will combine their currency conversion knowledge and line of best fit to compare in US dollars spent on transfers and the record of the team the previous year. Students will pick either Premier League or La Liga to find the transfers for the league's teams and the points record of those teams during the 2007-2008 season. Students will analyze their data plots and lines of best fit through a questionnaire.

¹ <http://www.fifa.com/aboutfifa/federation/associations.html>

ASSESSMENT

Activity #3 RUBRIC

TASK	POINTS	DESCRIPTION
DATA TABLE	20	Students should have identified all 20 teams with their records and transfers in separate columns. Correct conversion of Euros to US dollars for all transfers.
DATA PLOT	20	Students should identify the axes and properly scaled the axes. Data plot should have a header identifying plot.
LINE OF BEST FIT	10	Line of best fit is correctly written as an equation and has been sketched on the data plot.
QUESTIONNAIRE	50	Correct responses to questionnaire. Partial credit may be given.

ACTIVITY #1.1:

WOULD YOU RATHER HAVE ...

Circle the amount of currency that you think is worth more.

1. 1 US Dollar or 10 Pesos

2. 1600 Yen or 15 US Dollars

3. 20 US Dollars or 20 Canadian Dollars

4. 20 Swiss Franc or 25 Euros

5. 5 British pounds or 40 Danish Kroner

6. 230 Yen or 30 Pesos

7. 200 Pesos or 8 British Pounds

8. 2 Euros or 2000 Italian Lira

9. 200 Spanish Pesetas or 10 Austrian Schillings

10. 5 Deutsch Marks or 300 Greek Drachmas

ACTIVITY #1.2: CURRENCY CONVERSION

- 1) How would you define the following terms (Write in space provided)

CURRENCY:

CURRENCY EXCHANGE RATE:

- 2) Go to <http://www.xe.com/ucc/>. Use the currency converter to investigate different relationships of world currency. Write down 3 of these relationships in the table provided.

X of Currency A	=	Y of Currency B
	=	
	=	
	=	

- 3) The specific definition of **EXCHANGE RATE** is the ratio (**R**) of your relationship for currency of one country (A) to another (B). Write this definition using fraction notation

Exchange Rate (R) = _____.

- 4) Solve for the exchange rates for each relationship in Question 2. Write the ratio and then solve for its decimal form rounded to 3 decimal places in each column.

Ratio			
Decimal			

ACTIVITY #2: Soccer Transfers

Soccer is a global sport where players not only change teams within their own leagues, but can even move to different country's league. This creates a global economy based around soccer through the transfer system that soccer uses in the movement of players across borders of many countries that don't share a common currency. Let's use our knowledge of exchange rates to see how valued different soccer players have been when they transferred teams.

- 1) How do we use exchange rates to convert one country's currency to another?
- 2) **Choose 5 players from the transfer fee list at http://en.wikipedia.org/wiki/Football_transfer**
- 3) You will use the values of the transfer fee in Euros (second column).
- 4) Convert each value to US dollars.
- 5) Click on each player to find out his country of origin. And then using <http://www.xe.com/ucc/> find the exchange rate for Euros to the national currency.
- 6) For each of your five players, give the transfer fee in Euros, US dollars, and the national currency of his country. (Write in the Table Provided)

<u>PLAYER</u>	<u>EUROS</u>	<u>US DOLLARS</u>	<u>NATIONAL CURRENCY</u>

ACTIVITY #3: Modeling European Soccer League Spending

You will choose either the English Premier League or Spanish La Liga to gather data about the 2007-2008 seasons. You will look up the 20 teams in each league, how many points did the teams accumulate during the season for their record and how much money did they spend in transfers. Every team play 38 games in a season and earns 3 points for a win, 1 point for a tie and 0 points for a loss. These values are used to calculate the points' record of a team during the league season.

ENGLISH PREMIER LEAGUE:

- **2007-2008 Transfers:**
<http://www.soccernews.com/2007-2008-transfer-news/english-premier-league-transfers-2007-2008>
- **2007 – 2008 Record by points:**
http://en.wikipedia.org/wiki/Premier_League_2007%E2%80%932008

SPANISH LA LIGA:

- **2007 – 2008 Transfers:**
<http://www.soccernews.com/2007-2008-transfer-news/spanish-la-liga-transfers-2007-2008/>
Notice not all teams have disclosed transfer fees. If they do not have complete data, you will want to leave them out.
- **2007 – 2008 Record by points:**
http://en.wikipedia.org/wiki/La_Liga_2007%E2%80%932008

- After the data has been collected, convert all transfer values into US dollars.
- For each team, plot the amount of transfer spending (x) and the point record (y).
- The x values will be represented by spending and y values will be represented by record so that the line of best fit should predict how spending effects a teams record in league play.
- Plot the line of best fit to predict how spending effects a teams record in league play.
- This may be done with the graphing calculator and graph link, or with an Excel spreadsheet.

ACTIVITY #3. Part 2.

Answer the following questions, and submit with data tables, and complete graphs, which may be a printout or a sketch.

- 1) What is the range of spending by all teams in your league?
- 2) What is the range of points earned by all teams in your league?
- 3) Based on your data plot can you suggest any general trend between how much a team spends and how well that team should perform? State how you reached this thought?
- 4) How much money did the team that won your league spend PER point it earned?
- 5) How much money did the worst team in your league with transfers spent recorded spend PER point it earned?
- 6) What is the equation of the line of best fit?
- 7) If a team spent no money in transfer fees, then what record would you expect them to have?
- 8) Generally, for every million dollars a team spends in the transfer market, how many points do they expect to gain for their record?
- 9) How much would a team need to spend if they wanted to go undefeated? Does this value seem reasonable?
- 10) Based on your data plot and your line of best fit on top of it, how well do you think your model predicts how spending effects record? Write a few sentences describing how you reached this decision.

TEACHER NOTES/ SOLUTIONS:

Notes/ Solutions for Part 1:

- All solutions for “*What would you rather have...*” are the first choices of the paired options.
- Specific definitions for *Currency Conversion* Question 1:
Currency is a unit of exchange, particularly you might be familiar with buying and selling goods, most commonly referred to as money.
Currency Exchange Rates are ratios that can turn one form of currency to an equal amount in another.

Notes/ Solutions for Part 2:

Answers will vary based on players chosen.

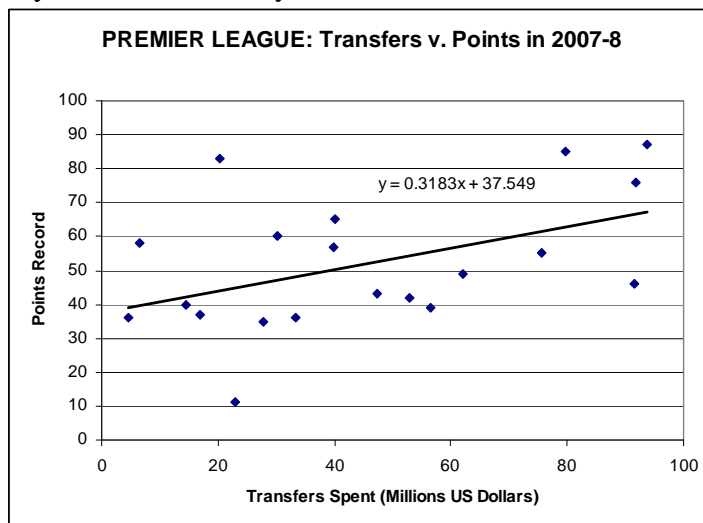
Notes/ Solutions for Part 3:

• ENGLISH PREMIER LEAGUE:

- Please note that in the 2007-2008 transfers data the following errors should be identified:
 - Sunderland has double listing of G. Halford
 - Tottenham has double listing of d. bent
 - Birmingham has double J. McFadden use 7.4
 - Charlton did not play in premier league during 07-08

➤ DATA PLOT

This data is using the exchange that 1 EUR = 1.25047 USD, but the exchange may change when you use this activity.



- 1) (4.626739, 93.78525) these are scaled by millions of US dollars
- 2) (11, 87)
- 3) Look at possible correlation as positive => increasing

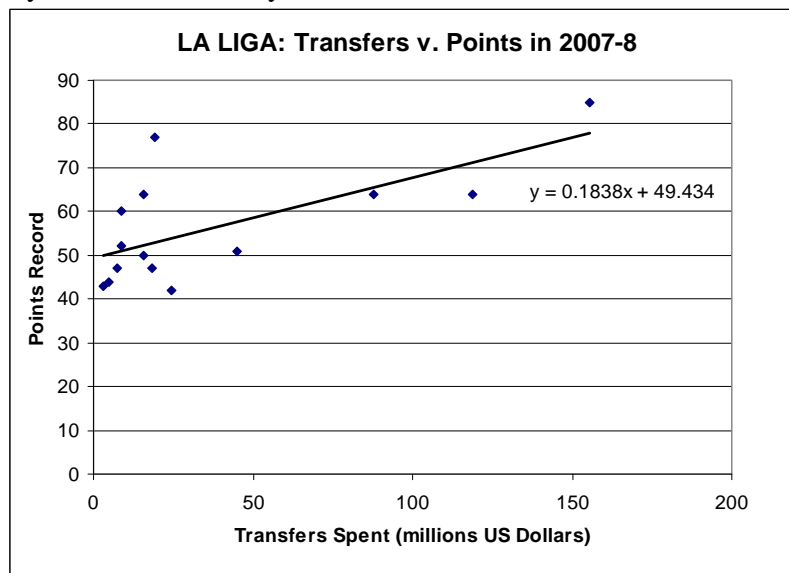
- 4) \$1,077,991.38
- 5) \$2,091,695.27
- 6) $y = 0.3183x + 37.549$
- 7) Y-Intercept of Line of Best Fit
- 8) Slope of Line of Best Fit
- 9) Let $38 \times 3 = 0.3183x + 37.549$.
- 10) Consider correlation OR difference of observed v. predicted values OR line's distance to data points

• **SPANISH LA LIGA:**

- Please note that in the 2007-2008 transfers data the following errors should be identified
 - Betis and Real Betis are the same teams
 - Santander and Racing Santander are the same teams
 - Real Sociedad and Celta Vigo didn't play in la Liga in 07-08

➤ **DATA PLOT**

This data is using the exchange that 1 EUR = 1.25047 USD, but the exchange may change when you use this activity.



- 1) (3.126175, 155.3084) these are scaled by millions of US dollars
- 2) (26, 85)
- 3) Look at possible correlation as positive => increasing
- 4) \$1,827,157.65
- 5) \$66,514.36
- 6) $y = .1838x + 49.434$
- 7) Y-Intercept of Line of Best Fit
- 8) Slope of Line of Best Fit
- 9) Let $38 \times 3 = .1838x + 49.434$
- 10) Consider correlation OR difference of observed v. predicted values OR line's distance to data points