Coleman Medal

Full Stop for Full Forwards

The Coleman medal, named after John Coleman (Essendon 1949 to 1954) is awarded to the AFL player that kicks the most goals in a season. Coleman kicked 12 goals in his debut match and still mixes it with the best when it comes to the average number of goals kicked per game. Peter Hudson was the first Coleman medal recipient to kick more than 100 goals in a season (1968, 125 goals), he backed this up with 146 goals in 1970, 140 in 1971 and 105 in 1977. Since this amazing era, players such as Jason Dunstall, Tony Lockett and Gary Ablett (Snr) have collected multiple Coleman medals consisting of more than 100 goals in a season. More recently, recipients of the medal have kicked between 60 and 80 goals per season. Does this recent trend represent a 'full stop' for full forwards?

Your task is to see if data supports the notion that the position of full forward is no longer as critical as it was in the 1970's through to the 1990's.

Coleman Data

Open the TI-nspire file "Full Forward Full Stop".

Navigate to page 1.2.

Player	Alphabetical listing Coleman Medallist.
Team	Team when medal was awarded.
Year	Year when medal was awarded.
Goals	Number of goals kicked in the season.

⚠️ Do not attempt to sort individual columns, this will disassociate the player with their corresponding data. When statistical plots are generated they automatically display in the appropriate order based on the data represented on the x axis.

Page 1.3 contains a Scatter Plot of Coleman medal winners since its inception in 1955.

Author: P. Fox
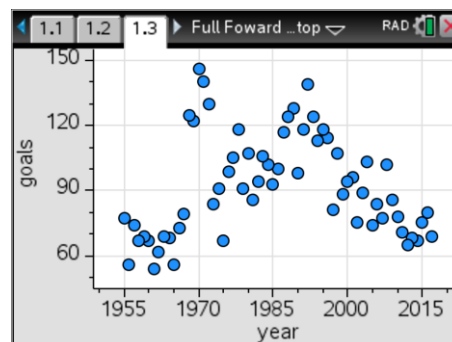
Question: 1.

According to the entire data set, is there an overall tendency for full forwards to kick more or less goals each season? (Support your answer with evidence)

A simplistic application of linear regression shows that there is virtually no correlation. ($r^2 \approx 0.0015$) There are some underlying trends however from 1955 to 1985 showing a general increase in the number of goals scored by the Coleman medallist. This trend is reversed from approximately 1987 through to 2017.

Teacher Notes:

Students can copy and paste sections of data into other cells (columns) and perform regression analysis. For example analysing data from 1985 onwards shows a general trend for a reduction in the number of goals scored each season. ($r^2 \approx 0.674$)

If students want to copy and paste data it is a good idea to insert the data into a spreadsheet in a new 'problem'. [doc▾] > Insert > Problem (Notice the page numbering will change to 2.#) The advantage of using a different problem is that the same variable names can be used and the problem deleted once investigations have been completed.

Students may also find some keyboard shortcuts useful while investigating the data:

Ctrl + 7 = Move to top of list

Ctrl + 1 = Move to bottom of list

Ctrl + 9 = Page up

Ctrl + 3 = Page down

Ctrl + C = Copy & Ctrl + V = Paste

Moving Averages

Navigate back to page 1.2.

Label column E as: "MA3PT" (Moving Average 3 Point)

This column will contain a 3 point moving average for the number of goals kicked by the Coleman medallist each year. The measure of central tendency (average) in this example will be the mean.
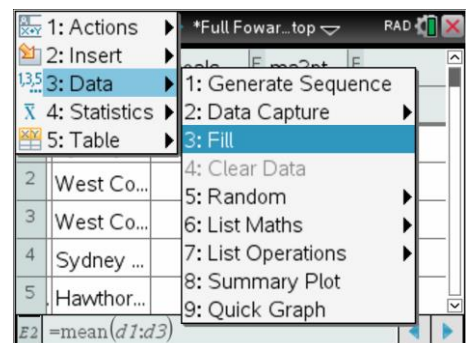
Navigate to cell E2 and enter the formula:

=mean(D1:D3)

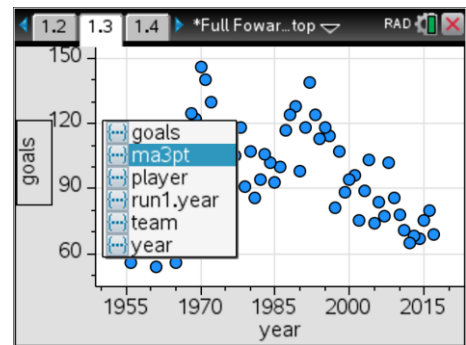Note that " : " can be obtained from the punctuation key. [?!▸]

Once the formula has been entered, select cell E2 and choose FILL from the DATA menu.

Arrow down to cell E62, level with the second last entry in column D and press enter.

Author: P. Fox

TEXAS INSTRUMENTS

Navigate to the scatter plot on page 1.3 and change the scatterplot to show year and ma3pt.

Question: 2.

Does the 3 point moving average show any clear trends in the data?

The data is not 'seasonalised', however the 3 point moving average still provides a level of smoothing, particularly where a particular player dominated in a particular year.

Question: 3.

Why are the first and last cells in Column E left blank?

Cell E1 must be left blank as the first 3 points consist of data in cells D1, D2 and D3, so the first mean is aligned with cell D2. Similarly cell D63 contains the last data value so cell E62 computes the mean of cells D61, D62 and D63. The mean needs to be aligned to cell D62 so E63 will be left blank.

Question: 4.

Use column F to generate a 3 point moving average using the median as the measure of central tendency. Label the column "med3pt"
Hint: The formula in cell F2 should be "=median(d1:d3)" then use the FILL command.

Calculator based skill / question. Answers can be checked by examining student calculators or having students submit their final document. If the document was sent via TI-Navigator, students completed documents can be retrieved all at once.

Question: 5.

Change the scatterplot to show the 3 point moving median data over time.

Calculator based skill / question. Answers can be checked by examining student calculators or having students submit their final document.

Question: 6.

In column G, generate a 5 point moving average (mean) for the Goals data and comment on whether any trends are more prevalent.

The significant influence of Peter Hudson during the period 1968 to 1972 is still prevalent, in the absence of this player during this period there is a general increase in the number of goals scored by the Coleman medallist from 1958 through to 1985 after which there is an equally steep decline.

Question: 7.

Which cells needed to be left blank?

Cells G1 and G2 must be left blank at the start and G62 and G63 are left blank at the bottom of the list.

Extension - Game Development

Many would argue that Australian Rules football has evolved significantly over the past 20 to 30 years. The game is definitely faster. Training has an increased emphasis on speed, digital tracking of players and an increased number of interchange opportunities helps ensure players on the field are fresh and ready to run. Perhaps a faster delivery into the forward line means that full forwards do not have the same opportunities as before.

Author: P. Fox

Texas Instruments

Question: 8.

Investigate the past 30 years of data for the number of goals kicked by the Coleman medallist.

- Identify any trends

- Make predictions for future Coleman medallists (with regards to number of goals)

- Comment on the limitations of future predictions

As an investigation, student answers will vary. Linear regression applied to the past 30 years however provides a relatively good correlation. ($r^2 \approx 0.674$, Goals = -1.82 x Year + 3742) The y intercept of the linear regression equation is irrelevant with regards to practical interpretation, however the -1.82 suggestions that the number of goals scored each year by the Coleman medallist is reducing by approximately 2 goals each year. There are of course limitations on this trend otherwise in 2053 no goals will be scored in any game! It is therefore worthwhile exploring the average number of goals from the top 10 players each year. (Refer Q.9)

Question: 9.

The Coleman medallist is the leading goal kicker for the season across all clubs. Investigate the leading group of goal kickers. The AFL website is brilliant for collecting this type of data.

Check out: http://www.afl.com.au/stats

Change the data to reference players rather than teams.

Ensure "Goals" is included in the list of data (or make it the only selection using the advanced options) and sort from highest to lowest.

Data can be copied and pasted into Excel and then into a TI-Nspire spreadsheet.

Sample below: (Note that the AFL player data is only available for 2001 onwards in this format.)

Looking at the top 10 players reveals a slightly different story with regards to goal scoring. For example in 2001, Matthew Lloyd was the leading goal scorer with a total of 105 goals. The next highest goal scorer for the year was Matthew Richardson with a total of 59 goals. This data tells a significantly different story with regards to predicting the Coleman medallist and the corresponding number of goals when a single player can have such a significant impact on the overall result. This simply highlights that if you are looking for data trends, you have to be very careful about drawing conclusions based on results that could be attributable to an 'outlier'.

	Player	Club	Goals		Behinds	
			TOT	AVG	TOT	AVG
1	Lance Franklin	SYD	73	3	60	2.5
2	Josh J. Kennedy	WCE	69	3.6	39	2.1
3	Joe Daniher	ESS	65	2.8	39	1.7
4	Ben Brown	NMFC	63	2.9	30	1.4
5	Eddie Betts	ADEL	55	2.3	34	1.4
6	Taylor Walker	ADEL	54	2.3	35	1.5
6	Jack Riewoldt	RICH	54	2.3	37	1.6
8	Tom Hawkins	GEEL	51	2.3	26	1.2
9	Charlie Dixon	PORT	49	2.1	30	1.3
10	Robbie Gray	PORT	47	2	29	1.3

Author: P. Fox