

1	Ranking in Sport	Lesson Plan 1
<p><b>Activity</b></p> <p><b>1</b></p>	<p><b>Introduction</b></p> <p>Why do we need rankings in sport? What do they do? (Show the 'best' side or individual at a certain point in time.)</p> <p>What recent examples of ranking do you know about? (e.g. Andy Murray's world ranking in tennis; England's international ranking in cricket after the Ashes, etc.)</p> <p>T: England won the Ashes against Australia but Australia still leads in the international rankings. Why is this the case? (The rankings depend on earlier performances, not just on the most recent event.)</p> <p>Let's consider one example in more detail but it is representative of many sports.</p> <p style="text-align: right;">5 min</p>	<p style="text-align: center;"><i>Notes</i></p> <p>Whole-class discussion Involve several Ps.</p> <p>Build on Ps' knowledge and the examples they give.</p> <p>Elicit that ranking can be used for individual sports (e.g. golf, tennis) for team sports (e.g. England cricket team) or for individual performance within team sports (e.g. goalkeepers in football)</p>
<p><b>2</b></p>	<p><b>Ranking Batsmen in Cricket</b></p> <p>First elicit from Ps the rules of cricket. (T explains if necessary.)</p> <p>What is the simplest way to rank batsmen in cricket? Ask several Ps what they think. (Average number of runs scored in all matches.)</p> <p>What does average mean here? (Total number of runs divided by the total number of matches, i.e. the mean)</p> <p>Suppose a batsman scores</p> <p>BB: <math>x_1, x_2, \dots, x_n</math></p> <p>in his previous <math>n</math> innings. Who could come and write a formula for their average score?</p> <p>BB: <math>\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n}</math></p> <p>Let's check that we are all happy with this general formula.</p> <p>T: <i>If a batsman scores 25, 48, 0 and 79, what is his average score?</i></p> <p>Allow 1 minute, then ask several Ps for the answer. T chooses a P to write the calculation on the BB. Class points out any errors.</p> <p>BB: Average score = <math>\frac{25 + 48 + 0 + 79}{4} = \frac{152}{4} = \underline{38}</math></p> <p>Set <b>Question 1</b> on the worksheet. Allow 2 minutes.</p> <p>Review with whole class. Ps come to BB to show their solutions.</p> <p><i>Solution:</i></p> <p>A: Average score = <math>\frac{27 + 15 + 39 + 36 + 25}{5} = \frac{142}{5} = \underline{28.4}</math></p> <p>B: Average score = <math>\frac{76 + 23 + 37 + 2 + 4}{5} = \frac{142}{5} = \underline{28.4}</math></p> <p>Who thinks that the best batsman is A? Who thinks it is B? Who thinks they are both the same? (Elicit that A is more consistent but B could be a match winner on a good day.)</p> <p>What do you think happens to the calculation if a batsman is 'not out' for one of his innings?</p> <p>Elicit/tell that the score counts in his total but <math>n</math> is reduced to <math>n - 1</math>.</p>	<p>Quick review of rules of cricket. Involve several Ps/</p> <p>Ps tell class their ideas and class agrees/disagrees.</p> <p>T reminds Ps if necessary.</p> <p>Class agrees/disagrees. Make sure that all Ps understand</p> <p>Individual work, monitored</p> <p>Agreement, praising</p> <p>Mistakes discussed and corrected.</p> <p>Individual work, monitored</p> <p>Ask Ps to think about what their answers mean.</p> <p>Agreement, self-correction, praising</p> <p>Whole class discussion</p> <p>Praise Ps who give good reasons for their choice.</p> <p>Ps explain 'not out' first, then suggest how to amend calculation.</p> <p>Agreement, praising</p>

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<p><b>Activity</b></p> <p>2 (cont.)</p>	<p>Let's go back to the very first example. (T points to it on BB.)  T: <i>Suppose in his next innings this batsman scores 37 not out. What would his average be then?</i>  Allow 1 minute, then review. T chooses a P to show solution on BB.</p> <p>BB: Average score = <math>\frac{25 + 48 + 0 + 79 + 37}{4} = \frac{189}{4} = 47.25</math></p> <p>Set <b>Question 2</b> on the worksheet. Allow 4 minutes.  Review with the whole class. Ps give their answers orally and class agrees/disagrees. If problems, ask Ps to show details on BB.</p> <p><i>Solution:</i>  Batsman 1: 53, Batsman 2: 53, Batsman 3: 60  So the best player is Batsman 3.</p> <p style="text-align: center;">_____ 20 min _____</p>	<p style="text-align: center;"><i>Notes</i></p> <p>Individual work, monitored, helped  Class agrees/disagrees.  Mistakes discussed/corrected.</p> <p>Individual work, monitored  Agreement, self-correction, praising</p>
<p>3</p>	<p><b>Weighted Averages</b></p> <p>Do you think that the average score is always a good way of ranking?  Some Ps might think so but others might think of reasons why it could be unfair. T suggests any of the following that Ps miss. e.g.</p> <ul style="list-style-type: none"> <li>• Batsmen play different numbers of matches according to which team they belong to.</li> <li>• Batsmen could miss some games (not picked or injured)</li> <li>• Opposition varies – it is easier to score against poor sides.</li> <li>• The average score does not necessarily represent the batsman's most recent form.</li> <li>• Does not show consistency or recent brilliant form.</li> </ul> <p>T: <i>Work with your neighbour to design a method of ranking which gives more weight to recent performance. You have 3 minutes.</i></p> <p>T chooses Ps to tell class their ideas and class decides whether or not they are feasible. If no P comes up with the following idea, T suggests it.</p> <p>Let's use this system of weighted averages. The more recent the performance, the more it is weighted. The general formula is:</p> <p>BB: <math display="block">\bar{x} = \frac{a_1x_1 + a_2x_2 + \dots + a_nx_n}{a_1 + a_2 + \dots + a_n}</math></p> <p>Who can explain what it means? (<math>a_1, a_2</math>, etc. are the weightings and <math>x_1, x_2</math>, etc are the number of runs.)</p> <p>T: If <math>x_n</math> is the most recent score, which is the greatest weighting?  Elicit that: BB: <math>a_1 &lt; a_2 &lt; \dots &lt; a_n</math></p> <p>T: <i>If the batsman who scored 25, 48, 0 and 79 played the games in that order, with 79 being the most recent, and if the weightings are 1, 2, 3 and 4, how could we calculate his weighted average?</i></p> <p>Ps come to BB or dictate what T should write. Class agrees/disagrees.</p> <p>BB: <math display="block">\bar{x} = \frac{1 \times 25 + 2 \times 48 + 3 \times 0 + 4 \times 79}{1 + 2 + 3 + 4} = \frac{439}{10} = 43.9</math></p>	<p>Whole class discussion  Involve several Ps.  T directs Ps thinking if necessary.</p> <p>Accept and praise responses from Ps but move discussion on to the fact that the most recent innings are a better indicator of future scores.</p> <p>Paired work, monitored, helped</p> <p>Evaluation, praising</p> <p>T could start it and ask Ps how they think it should continue.</p> <p>If there is time, ask Ps what would happen if  BB: <math>a_1 = a_2 = \dots = a_n</math>  (Equal weighting would result in the original average formula.)</p> <p><b>N.B.</b>  If there is time, Ps could find out what would happen with other weightings (using a spreadsheet) e.g. weightings of 1, 2, 4, 8 would put an even greater emphasis on the later scores.</p>

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<p><b>Activity</b></p> <p>3 (cont.)</p>	<p>T: Why is this weighted average higher than the one we calculated first of all? (His most recent performance is best so it is rated the most highly.)</p> <p>T: How can we cope with 'not out' scores using weighted averages? (In the same way as before, except that the weighting is deleted from the denominator.)</p> <p>Let's suppose that the scores are now:</p> <p>BB: 25, 48, 0, 79 37* (where * means 'not out')</p> <p>Who know how to do the calculation? P comes to BB to write and explain, with class helping where necessary.</p> $  \begin{aligned}  \text{BB: } \bar{x} &= \frac{1 \times 25 + 2 \times 48 + 3 \times 0 + 4 \times 79 + 5 \times 37}{1 + 2 + 3 + 4} \\  &= \frac{604}{10} \\  &= \underline{60.4}  \end{aligned}  $ <p>Set <b>Question 3</b> on the worksheet. Allow 4 minutes.</p> <p>Review with whole class. Ps give their answers and class agrees/ disagrees. Mistakes discussed and corrected.</p> <p><i>Solution:</i></p> <p>Average for Batsman A: 29.53; Average for Batsman B: 17.4</p> <p>Using this method, A's average score has increased and B's has decreased compared with the normal average, so A is obviously the better player.</p> <p style="text-align: right;">35 min</p>	<p style="text-align: center;"><i>Notes</i></p> <p>Agreement, praising</p> <p>Allow Ps to make suggestions first but ensure that they know the correct way to cope with this situation.</p> <p>Rest of class could try it in Ex. Bks at the same time.</p> <p>Individual work, monitored</p> <p>Agreement, self-correcting, praising</p> <p>If there is disagreement, ask Ps to show details on BB.</p>
<p>4</p>	<p><b>Reinforcement</b></p> <p>Ps do <b>Question 4</b> under a time limit.</p> <p>Review answers with whole class. Ps show details of calculations on BB if there is disagreement. Mistakes discussed and corrected.</p> <p><i>Solution:</i></p> <p>a) Batsman 1: 78.57, Batsman 2: 51.8, Batsman 3: 50.1, Batsman 1 is the best player.</p> <p>b) Batsman 1: 88.91, Batsman 2: 51.67, Batsman 3: 42.36 Batsman 1 is the best player.</p> <p>Elicit that Batsman 1's average increases (because of his high recent score), Batsman 2 is consistent but Batsman 3 's score decreases because his latest score dominates</p> <p>T: <i>What other weightings could we try?</i> Ps make suggestions. (e.g. 1, 1.2, 1.2<sup>2</sup>, 1.2<sup>3</sup>, ...; 1, 3, 9, 27, etc.)</p> <p style="text-align: right;">45 min</p>	<p>Individual work. Monitor closely, intervening as necessary.</p> <p>Agreement, self-correcting, praising</p> <p>Discussion of what the analysis shows.</p> <p>T writes suggestions on BB.</p> <p>Praising</p>
<p><b>Home work</b></p>	<p>Calculate weighted averages using the suggested weightings for the 3 batsmen's scores and analyse your findings.</p>	<p>Review homework interactively at the start of the next lesson.</p>

### Background Information and Relevant Web Sites

This topic now plays a vital role in so many sports. For example in tennis, players ranked in the top 100 gain automatic entry to the major tournaments. Ranking also provides evidence for sponsors that a particular player is worth investing in. Sponsors such as *Adidas* and *Nike* are always on the look-out for new young players who are advancing up the ranking lists.

The following are some web sites for the major sports where you can access up-to-date rankings and find out how they are determined.

#### Cricket

Test Rankings: <http://www.icc-cricket.com/icc/test/rules.html>

One Day Internationals: <http://www.icc-cricket.com/icc/odi/rules.html>

#### Football

<http://www.fifa.com/en/mens/statistics/rank/procedures/0,2540,3,00.html>

#### Tennis

ATP: <http://www.atptennis.com/en/players/raceleaderboard/>

WTA <http://www.wtatour.com/global/Pdfs/rankings/howitworks.pdf>

#### Golf

[http://www.officialworldgolfranking.com/about\\_us/default.sps?iType=425&icustompageid=736](http://www.officialworldgolfranking.com/about_us/default.sps?iType=425&icustompageid=736)

#### Hockey

<http://www.worldhockey.org/vsite/vfile/page/fileurl/0,11040,1181-153574-170790-66581-0-file,00.pdf>

#### Rugby Union

<http://www.irb.com/WR/RankingsExplained>