

**Title of Lesson: Lesson 1 Descriptive Statistics**  
**Subject : Applied Statistics**

### LESSON PLAN 1

**Name:** Dadan Rosana  
**Title of lesson:** **Descriptive Statistics**  
**Date of lesson:** 2012  
**Length of lesson:** 2 x 50 minutes  
**Description of the class**  
**Name of course:** Physics Education  
**Grade level:** 3<sup>th</sup>

**Source of the lesson:**

Welkowitz, Joan, Robert B. Ewen, and Jacob Cohen. *Introductory Statistics for the Behavioral Sciences*. Third edition. San Diego, CA: Harcourt Brace Jovganovich Publishers, 1982

Kuehl, Rober O. *Statistical Principles of Research Design and Analysis*. Belmont, CA: Duxbury Press, 1994

Peck, Roxy, Chris Olsen, and Jay Devore. *Introdcution to Statistics and Data Analysis*. Pacific Grove, CA: Duxbury, 2001

<b>Duration: 2x50 minutes</b>	
<b>Lesson aims:</b> Learners to understand and use Descriptive Statistics .	
<b>Specific learning outcomes:</b> Students will be able to:	<b>Assessment method(s):</b> <ul style="list-style-type: none"><li>• Group activities</li></ul>

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Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

- Question & Answer during the session..
- Learner engagement during session.
- Worksheet

**Linked Functional Skills:**

*Speaking, listening and communicating:*

Students participate in discussions during the session, how they articulate answers and communicate with other learners.

**Previous knowledge assumed:**

Understand and use positive and negative numbers of any size in practical contexts.

Carry out calculations with numbers of any size in practical contexts.

Extract and interpret information

**Materials and equipment required:**

Powerpoint.

Worksheet

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<b>Time/ Stage</b>	<b>Subject Matter/Content</b>	<b>Teacher Activity</b>	<b>Student Activity</b>	<b>Resources/ Notes</b>
5 min	Introductory Activity: What chance of being right?	Have students use the KWL chart as a Think-Pair-Share. Have students consider and fill in what they learned as individuals first, discuss their successes and questions with a partner, and then share what they have learned as a group. Have students share things that they learned as well as questions they still have.	Discussions and agreement. Identify chance of being right.	This activity is designed to introduce probability in terms of the word 'chance'.
10 min	Explanation and discussion.	Distribute the KWL chart regarding descriptive statistics and have students complete what they already know and what they want to know individually.	Ask questions.	Chance is something most people use their instinct to decide. This activity and explanation is to establish that mathematics can be used to assess chance (i.e. probability).

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10 min	Small Group Activity:	<p>Students should be able to discuss the effects of outliers on the measures of center and what that would look like on a graph of the data. Students should be able to discuss the effects of extreme values on the decision-making process in the context of a problem.</p> <p>Students should be able to explain how measures of spread might affect their decision-making process within the context of a set of data.</p> <p>Students should be able to organize multiple sets of data for comparison and articulate similarities and differences.</p>	<p>Ask Questions</p> <p>Discussions and agreements.</p> <p>Feedback comments and questions.</p>	<p>At the first selection, the probability will be the same for each group, but this will change as the selection process continues.</p>
5 -10 min	Explanation and discussion.	<p>At the first selection the probability will be the same for each group. This will change as the selection process continues.</p>	<p>Ask Questions.</p>	
25 min	Worksheet	<p>1. Group students and distribute a set of the test data per group. Have students organize the data visually on chart paper and display them in the front of the room. As a class, discuss which class performed the best, based on the visual representations</p>	<p>Complete worksheet.</p>	

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		<p>alone and have students justify their reasoning. For instance, a student might explain that 6<sup>th</sup> period is the strongest because they have the highest score or that 5<sup>th</sup> period is the most consistent because they have the smallest spread. Differences in scale and choice of representation may affect the appearance of the data. Encourage students to look closely and discuss the differences and how the representations may mislead the viewer.</p> <p>2. Give each group calculators, chart paper, and all three sets of data to organize and compare. Groups may choose to compare their data by any means they find most useful. Have students calculate the measures of center and spread in order to help the comparison. Groups should discuss which class they feel is the strongest as a group, as well as which class they would prefer to be in if they did not yet know</p>		

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		<p>their individual test score. These answers may not be the same for all students within the group, and they may not be the same for both questions. For example, students may feel as though 3<sup>rd</sup> period is the strongest because they have the highest median, but they may want their score to come from 5<sup>th</sup> period to avoid the low outlier in 3<sup>rd</sup> period.</p> <p>Have students share and justify their solutions with their group using the measures of center (mean and median) and spread (inter-quartile range, range, and standard deviation).</p> <p>3. Have each group present should present their findings, using graphical displays and descriptive statistics for support. Have them construct arguments for and against the decisions of other, while listening to and valuing all arguments. Encourage students to use appropriate vocabulary when discussing the data and should be encouraged to articulate patterns that they see. For instance, students may</p>		

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		<p>notice that extreme points have an effect on the mean but not the median and they, therefore, may not want to use the mean to support their argument.</p> <p>Have students examine and organize the City Data and organize it in order to decide where they would prefer to live. Encourage students to provide sound mathematical justification for their decision. Have students who prefer City #1 move to the left side of the room and students who prefer City #2 move to the right side of the room. Have groups share the reasons they chose their city, based on the graphical representation and measures of center and spread. If students use the actual numerical data to explain their decision, encourage them to articulate what they believe a given representation might look like based on their explanation. Conversely, a student that only used visual representations in his or her arguments should be encouraged to estimate measures of center or spread. A possible explanation for</p>		

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		City #1 might be that a student would prefer living in a place with a large range of temperatures in order to be able to experience all four seasons. Students should notice that the mean and median temperatures are similar for both cities, but that the spread of the data drastically affects their decision.		
10 min	Worksheet Answers	Provide answers and give explanations where necessary. Ask questions and discuss the checking procedures.	Ask Questions	<ul style="list-style-type: none"> <li>• Are students using the appropriate vocabulary when describing the center and spread of the distributions?</li> <li>• Can students easily explain a decision based on a graphical display of data and the corresponding descriptive statistics?</li> <li>• Can students identify and compare approximate measures of center and spread from a graphical display of data?</li> </ul>
5 min	Conclusion	Guide them to common sense checking.	Ask Questions.	



**Title of Lesson: Lesson 1 Probability**  
**Subject : Applied Statistics**  
**Number Cards: Probability**

1	2	3	4
5	<u>6</u>	7	8







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**Task 4**

At a restaurant customers are asked to complete a survey when they leave. Every month there is a prize draw for customers who complete the survey and include their contact details.

Survey results for last month														
<b>Ratings</b> 5 = Very Good 4 = Good 3 = Satisfactory 2 = Poor 1 = Very Poor														
Survey Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Customer rating of restaurant	5	4	5	3	4	2	5	3	2	4	5	5	3	4
Contact details included in survey	✓		✓	✓		✓	✓	✓		✓			✓	✓

Peter completed Survey Number 10. What is the chance of Peter getting the prize? Justify your decision.

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