



Lesson 29: Drawing a Conclusion from an Experiment

Student Outcomes

- Students carry out a statistical experiment to compare two treatments.
- Given data from a statistical experiment with two treatments, students create a randomization distribution.
- Students use a randomization distribution to determine if there is a significant difference between two treatments.

Classwork

MP.3

In this lesson, students will develop a comprehensive poster summarizing the experiments involving helicopter Groups A, B, and C. The poster should address the results of both Experiments 1 and 2 regarding the effects of both body width and wing length.

As part of the lesson, students should be provided with an instructor customized rubric for assessing a poster. A sample rubric from the American Statistical Association (ASA) is attached at the end of the teacher notes and was taken from "Poster Judging Rubric" at the "Poster Competition and Project Competition" page of the American Statistical Association, www.amstat.org/education/posterprojects/pdfs/PosterJudgingRubric.pdf. It is stated in the student lesson that the instructor will provide more specific instructions and possibly a more defined (or otherwise modified) rubric. Specifically, it also says, "Your instructor will provide guidance as to groups, amount of time to spend, the rubric to be used for evaluation, etc. Your poster should address the results of both Experiments 1 and 2 regarding the effects of both body width and wing length." Please consult this ASA rubric and modify as needed.

Read through the lesson with students. Convey to students that in addition to making their posters visually pleasing, they need to include answers to the focus questions presented in the lesson. Allow students to work with their partner or group to prepare the posters.

In this lesson, you will develop a comprehensive poster summarizing your experiments.

Characteristics of a Good Poster

Your instructor will provide you with specific instructions and a rubric for assessing your poster (taken from "Poster Judging Rubric" at the "Poster Competition and Project Competition" page of the American Statistical Association, www.amstat.org/education/posterprojects/pdfs/PosterJudgingRubric.pdf).

Generally speaking, the presentation of a statistical analysis and/or experiment should clearly state the question or purpose. The presentation should lead to the conclusion on a path that is easy to follow. The results of the study should be immediately obvious to the viewer. Any graphs included should be relevant to the question of interest and appropriate for the type of data collected.

Exploratory Challenge (45 minutes): Explaining the Experiment and Results**Exploratory Challenge: Explaining the Experiment and Results**

Your classwork will involve developing your poster. Your instructor will provide guidance as to groups, amount of time to spend, the rubric to be used for evaluation, etc. Your poster should address the results of both Experiments 1 and 2 regarding the effects of both body width and wing length.

In addition to the general concerns of colors, fonts to use, etc., in preparation for creating your poster, consider (and answer) these classwork questions:

- What was the objective of the experiment?
- How did you collect your data?
- What summary values and graphs should you present?
- How will you develop and present a summary of the experiment in a way that it is easy to follow and effortlessly leads the viewer to the conclusion?
- How will you explain "statistical significance"?

To be Customized by the Instructor:

Note: The rubric was taken from "Poster Judging Rubric" at the "Poster Competition and Project Competition" page of the American Statistical Association, www.amstat.org/education/posterprojects/pdfs/PosterJudgingRubric.pdf.

Rubric for the Judging of Statistics Posters

Score	Overall Impact of the Display (Use of space, dimensions of question, readability, neatness, poster design aspects)	Technical Aspects (Spelling, Grammar, Consistency of colors or patterns)	Clarity of the Message (How well is a story told?)	Appropriateness of the Graphs for the Data (Statistical Appropriateness)	Creativity (Data collection methods, sample size issues, who cares factor)
5	Poster is neatly constructed, including good use of fonts, pictures, and extras. The overall display is eye-catching but remains statistical substance. Good use of space for graphical presentation. Addresses multiple dimensions of the question or problem.	Poster uses colors and patterns well. Correct grammar and spelling are used.	Question or purpose is clearly stated, and the presentation leads to the conclusion on a path that is easy to follow. The results of the study are immediately obvious to the viewer.	Graphs are appropriate for the question and data, and they are correctly constructed.	Overall question is interesting, phrasing of titles, captions, and question are creative. Shows creative thought in topic, graph design, or data collection. Collects data appropriately. Answers an important topic.
4	Addresses multiple dimensions of a question. Good use of space. Fonts could be larger but do not really detract from the message. Could be a little neater but really does not detract from the message.	Better use of color or patterns would help the presentation, but in general the poster grabs the attention of the viewer. Correct grammar and spelling are used.	At least one link in the chain from the question through the results to the conclusion is difficult to follow.	Errors or inaccuracies are present in at least one graph. More appropriate display(s) would improve the presentation.	Overall question is interesting. Some creativity in design or data collection. Collects appropriate data.
3	Good use of space. Addresses multiple dimensions of a question. Readability or neatness detract from the overall appeal of the poster.	Use of more or different colors, would vastly improve the appeal of the poster. Minor grammar and/or spelling mistakes.	The progression from question to conclusion can be followed, at least in part, but only with considerable effort, and the information on the back may be needed to confirm.	Significant gap exists in the demonstration of understanding of the graphics, or how the graphics relate to the purpose of the poster.	Some creativity. Data could be better but it doesn't distract.
2	Serious problems with neatness or organization prevent the poster from being eye-catching and understandable. Multiple dimensions of the question addressed. Could use space better.	Serious problems colors or patterns prevent the poster from being eye-catching and understandable. OR Multiple mistakes in grammar or spelling prevent the poster from being eye-catching and understandable.	The information on the back is required in order for any relationships in the poster to be understood.	Although some part of the graphs is correct, substantial errors lead to invalid or inappropriate conclusions.	Creativity and topic are of some interest. Data collection could be improved with larger samples.
1	The poster is unidimensional. Poor use of space for graphics. Major neatness or readability issues.	The poster is has multiple spelling or grammar/spelling errors AND isn't consistent with colors or patterns so much so that it severely distracts from the poster.	The poster is virtually incomprehensible.	The displays are inappropriate and incorrect for the research question and data types. The question is badly misunderstood and the results are nonsensical.	The poster appears to have been constructed with very little or no creativity or with improper data collection methods.

Note: There is no specific Exit Ticket or Problem Set for this lesson. The finished poster will represent these lesson components.