Championing Statistical Thinking
An ASA INSPIRE Project

Student: **Sr. Alice Hess**, Archbishop Ryan High School Philadelphia PA
Mentor: **Prof. Robert Carver,** Stonehill College, Easton MA

Using timed events from summer Olympics, our goal was to identify rich data sets that would engage teenagers taking AP statistics. We set out to use the data sets in lesson plans that would lead teachers and their AP Statistics students to statistical sleuthing. The result was a package of assignments and small datasets that would emphasize the processes of statistical reasoning that are embedded in specific techniques and would afford students the chance to solidify their understanding of some basic, but sometimes elusive, statistical concepts.

Datasets are provided in Minitab format, but Sr. Alice successfully taught these lessons exclusively using the TI-84 Plus Silver Edition. Other instructors can surely use comparable tools and software.

Populations Studied
  • Participation in summer Olympics 1900—2004—Numbers and percentages of male and female participants.
  • Men and women's Marathon finishing times in Summer Olympics 2004.
  • Qualifying Times for 800 m Women's Freestyle Swimming Even from Sydney and Athens Games.

| Technique, Topic, or Concept	Brief description of dataset and assignment
Describing a distribution (center, shape, spread)	Marathon (Men and Women's) Olympics 2004– descriptive statistics--possibly showing symmetry, skewness, single- and multiple peaks.
Non-linear decay in time series	800 m Women's Freestyle Swimming Event
Uses of data transformation (logs, quadratics, etc)	Participation in Summer Olympics 1900-2004
Confidence Intervals—one & two sample t	**One-sample**: **Two-sample**: Qualifying Times—800 m Woman's Freestyle Event from Sydny and Athens Games.
Tests of significance—one and two-sample t	**One-sample**: **Two-sample**: Qualifying Times—800 m Woman's Freestyle Event from Sydny and Athens Games.
Simple linear regression, including inference for slope	**Do large countries win more medals than smaller countries?** Simple regression for 2004 summer Olympics; X = population of country, Y = # medals won.
Chi-square test of Goodness of Fit	**Participation in Olympics 1900 to 2004**

One example:

One dataset contains the total number of female and male athletes participating in the Summer Olympic games from 1900 – 2000. Among other questions, students see this one:

In 1944 the International Olympic Committee (IOC) changed its charter to

encourage women in sport.

- Research this topic.
- From a statistical standpoint, what should/could we accept as evidence that the IOC was succeeding or failing in its attempt to encourage female participation? In other words, what kinds of statistical evidence would we want to look at to form a judgment? State your case clearly and then perform a test.

Here is one piece of the evidence:
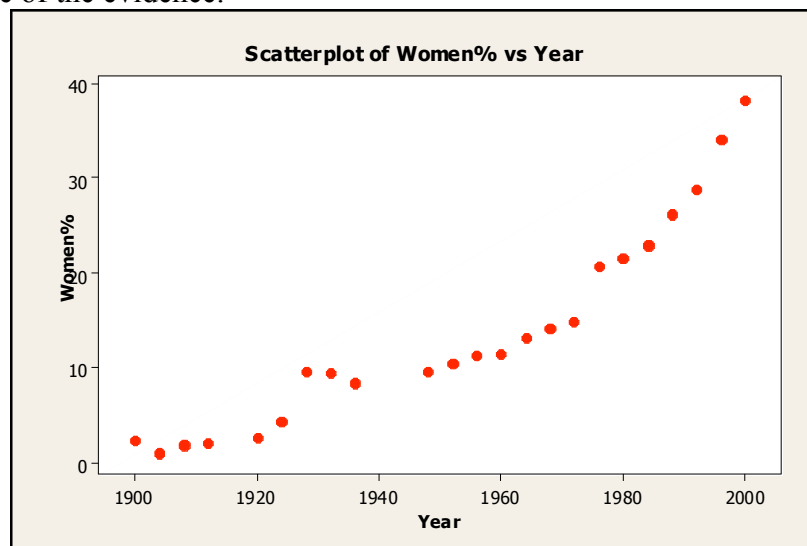
To download presentation and datasets, visit:
http://faculty.stonehill.edu/rcarver/conference_presentations.htm
Select USCOTS

Corresponding Author Contact: rcarver@stonehill.edu