

**By Chance  
or Statistically Significant?**

Friday, May 6, 2016  
Session #372 (9-12) 11:30 am - 12:30 pm  
Bauer - LaDue  
Mary Walz  
of Sauk Prairie High School,  
Prairie du Sac, Wisconsin

---

---

---

---

---

---

---

---

*Engage in problem-based, student centered tasks that exemplify Common Core State Standards. Using participant collected data, we will use simulations and graphical displays to help decide whether differences between treatment means are significant. We will use the free java apps in Core Math Tools, available at the NCTM website.*

---

---

---

---

---

---

---

---

**Common Core State Standard:**

Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

- ❖ S.IC.4
  - ❖ Use data from a randomized experiment to compare two treatments; use simulations to decide if the differences between parameters are significant.

---

---

---

---

---

---

---

---

### Focus on Math

- ❖ Students have learned to write a statistical question.
- ❖ Students can describe the shape, center and spread of a distribution.

---

---

---

---

---

---

---

---

### By Chance or Statistically Significant



How much higher will my score be if I have a calculator to use?

Alternating seats can use a calculator for this quiz.

---

---

---

---

---

---

---

---

1.  $5 + 7$
2.  $2345678910 * 22345678910$
3.  $12 - 5$
4.  $983^{43120}$
5.  $4 * 3$
6.  $\text{Log}_{23409} 905748920$
7.  $34^0$
8.  $950303481535790872305!$
9.  $5 + 7$
10.  $15 / 0$

---

---

---

---

---

---

---

---

## Data to support.

- ❖ How much higher will my score be if I have a calculator to use?

---

---

---

---

---

---

---

---

### Meaningful Words

Two lists of 20 three-letter "words". One list contained meaningful words (e.g., CAT, DOG), whereas the other list contained nonsense words (e.g., ATC, ODG). A ninth-grade class of thirty students was randomly divided into two groups of fifteen students. One group was asked to memorize the list of meaningful words; the other group was asked to memorize the list of nonsense words. The number of words correctly recalled by each student was tabulated.

	Meaning	Nonsense
1	12	4
2	15	6
3	12	6
4	12	5
5	10	7
6	3	5
7	7	4
8	11	7
9	9	9
10	14	10
11	9	4
12	10	8
13	9	7
14	5	3
15	13	2

Source: Focus in High School Mathematics: Reasoning and Sense Making. Reston, Va.: NCTM, 2009.

---

---

---

---

---

---

---

---

### Smell Test for Nonsmokers

Researchers at the Smell & Taste Foundation randomly assigned volunteers to wear an unscented mask or to wear a floral-scented mask. The subjects then completed two pencil-and-paper mazes. The time (in seconds) to complete the two mazes was recorded. Data were recorded separately for smokers and nonsmokers because smoking affects the sense of smell. The result for 13 nonsmokers on their first attempt are given in the table.

	Unscented Masks (secs)	Scented Mask (secs)
1	38.4	38.0
2	72.5	35.0
3	82.8	60.1
4	50.4	44.3
5	32.8	47.9
6	40.9	46.2
7	56.3	

---

---

---

---

---

---

---

---

Math Test Performance

In a science project, a student wanted to determine whether 6th-graders did better when they took a math test in silence or when Mozart was being played. Twenty-six students were randomly divided into the two treatment groups. Part of the student's results are in the table.

	Mozart (% correct)	Silence (% correct)
1	65	44
2	80	70
3	72	68
4	68	58
5	38	58
6	58	47
7	45	54
8	42	44
9	58	61
10	81	61
11	40	9
12	41	52
13	27	30

---

---

---

---

---

---

---

---

---

---

## Core Math Tools

NCTM link

---

---

---

---

---

---

---

---

---

---

Meaningful Words

Math Test Performance

Smell Test for Nonsmokers

---

---

---

---

---

---

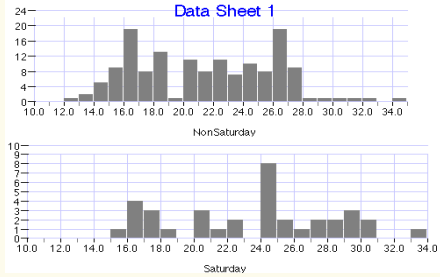
---

---

---

---

Did Saturday Math ACT Practice make a difference on my student's score?



---

---

---

---

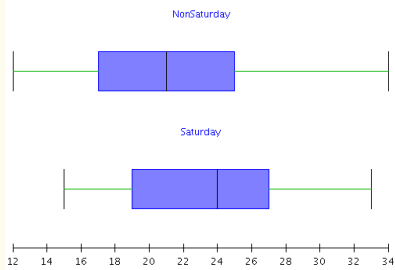
---

---

---

---

Data Sheet 1



---

---

---

---

---

---

---

---

Assume it does not make a difference, then what would you expect the difference in means to be?

---

---

---

---

---

---

---

---

### CCSS Mathematical Practices

- ❖ Make sense of problems and persevere in solving them
- ❖ Reason abstractly and quantitatively
- ❖ Construct viable arguments and critique the reasoning of others
- ❖ Model with mathematics
- ❖ Use appropriate tools strategically
- ❖ Attend to precision
- ❖ Look for and make use of structure
- ❖ Look for and express regularity in repeated reasoning

---

---

---

---

---

---

---

Evaluate this presentation  
(#372 Walz)

By Chance  
or Statistically Significant?

---

---

---

---

---

---

---