



# Engaging Students with Great Questions, Fun Simulations, and Free Technology

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# Speaker introductions

## True or False?

- ▶ has a bilingual father.
- ▶ has officiated 11 weddings.
- ▶ once shipped his car to Iceland.
- ▶ has been to Russia and the Ukraine on two separate occasions.
- ▶ has been to over 100 Phish concerts
- ▶ taught himself to program BASIC on a Commodore 64. For fun.
- ▶ shook hands with President Obama
- ▶ ran a marathon in October.
- ▶ has eaten cow tongue.
- ▶ was a free-and-reduced lunch kid.
- ▶ had a great grandmother that lived to 101 years old.
- ▶ Makes snow at home with his homemade snowmaking machine.

# Why should we teach statistics?

“Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write.”

-H.G. Wells

“That day is upon us.”

-Doug Tyson



# Statistical literacy

“Even if you believe that every student can’t learn statistics, I believe school policy should operate as if they can.”

- Zalman Usiskin,  
ICOTS9



# Learning targets

- **Target 1:** I can simulate a random process using physical manipulatives.
- **Target 2:** I can simulate a random process using technology.
- **Target 3:** I can make a decision from a simulation about the evidence against a null hypothesis.



# My pedagogical approach

When you look around a classroom, the people who are talking the most, thinking the most, and the writing the most are the ones who are learning the most.



# Simulation #1: Smelling Parkinson's Disease





# Notes

- Simulation gives an alternative way to make a decision.
- This is truly binomial, unless ...
- What are we inferring here? (Don't get fooled by the word "experiment.")
- Review version (For AP Stats)  
Get them to use technology to do a test quickly, then note the violation of conditions!





# Simulation #2: Flipping and Spinning (Pennies)



# Notes

- Pennies from early 1960s work well
- Student pairs (some can't “spin”)
- We can't be *certain* about our decision unless we flip/spin forever.
- Can be simulated in SPA Applets  
[www.stapplet.com/SPA](http://www.stapplet.com/SPA)
- Can create a confidence interval by inverting the test (with technology)



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# Contact us

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