



PROBABILITY WITH PURPOSE



Doug Tyson



Learning targets

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



Why should we teach probability and 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



The absolute worst

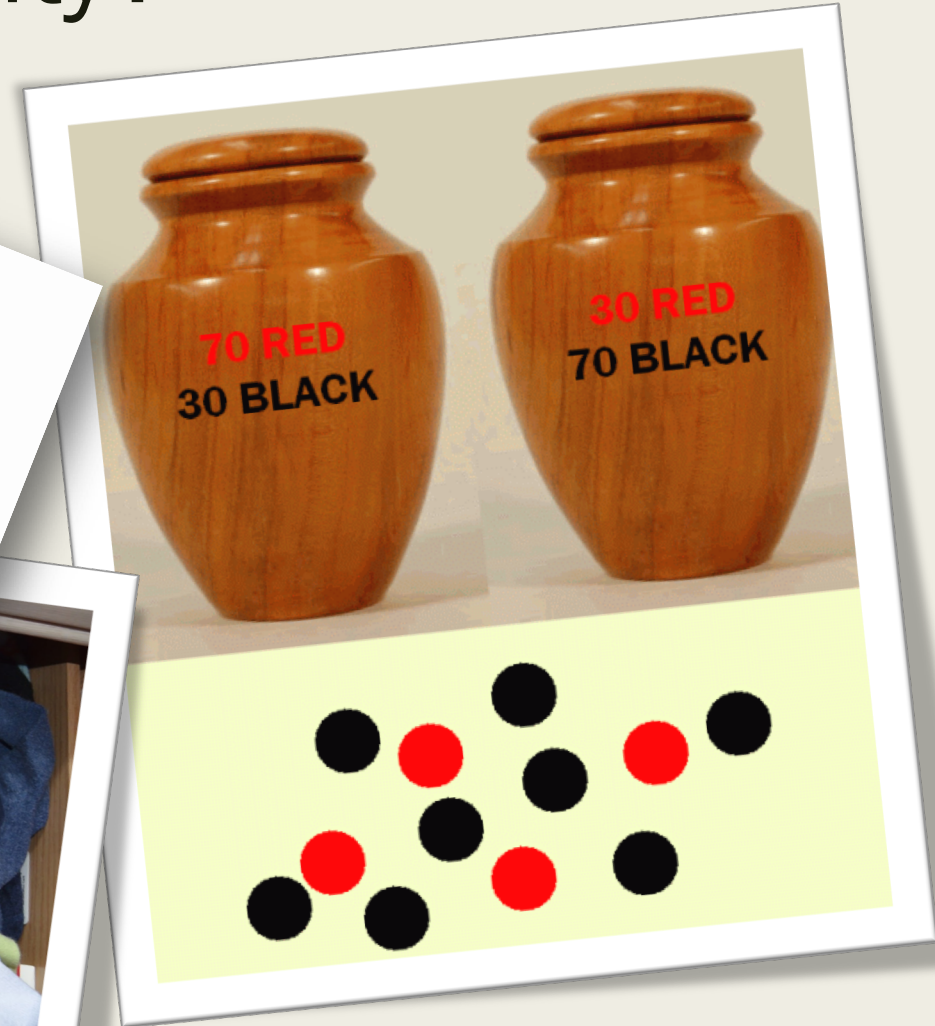
Think of the worst way
to teach probability...



How did we learn probability?

- Balls in urns
- Socks in drawers
- Formulas

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$
$$P(B|A) = P(A \cap B) / P(A)$$
$$P(A|B) = P(A \cap B) / P(B)$$
$$P(A \cap B) = P(B|A) P(A) = P(A|B) P(B)$$

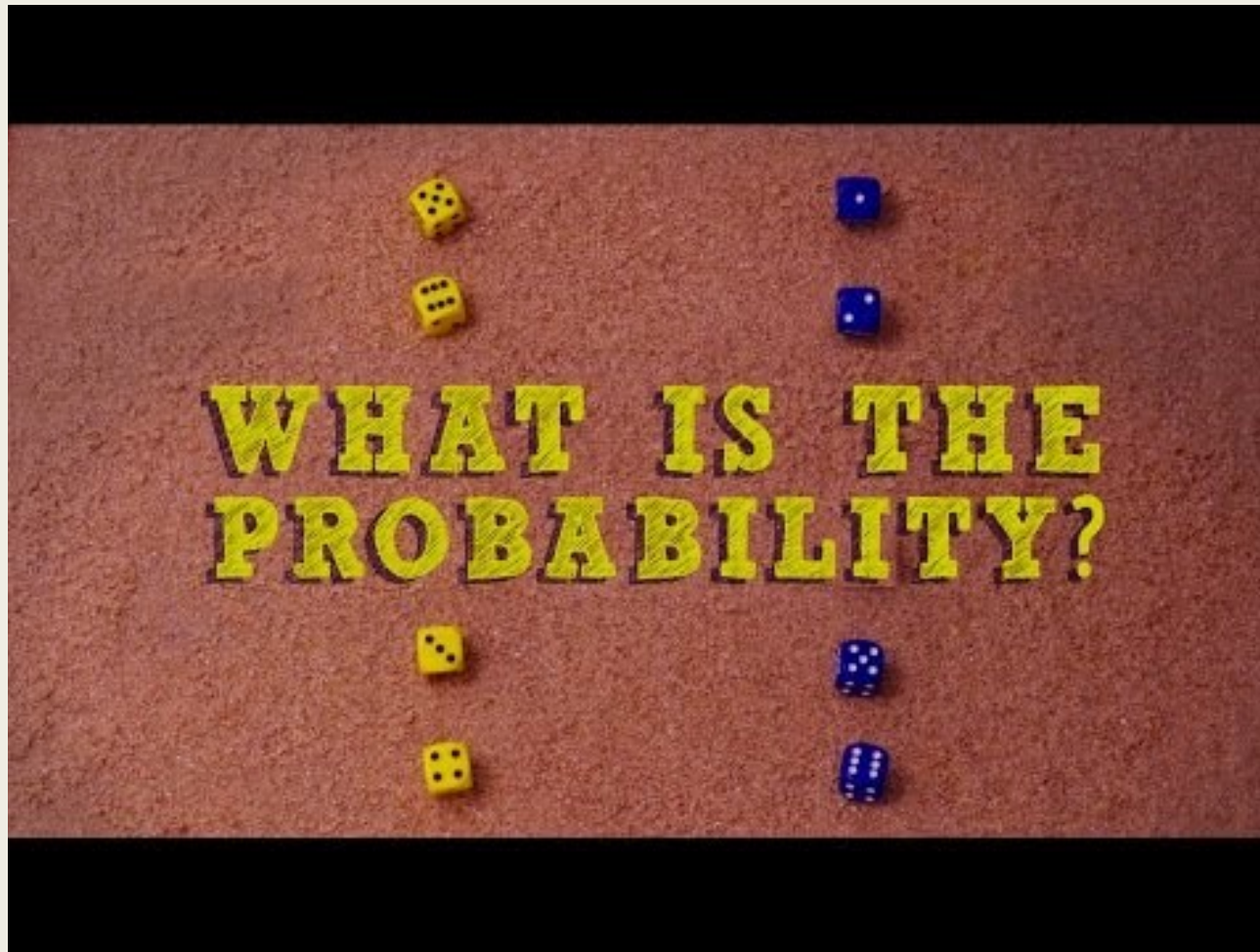


My pedagogical approach

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.



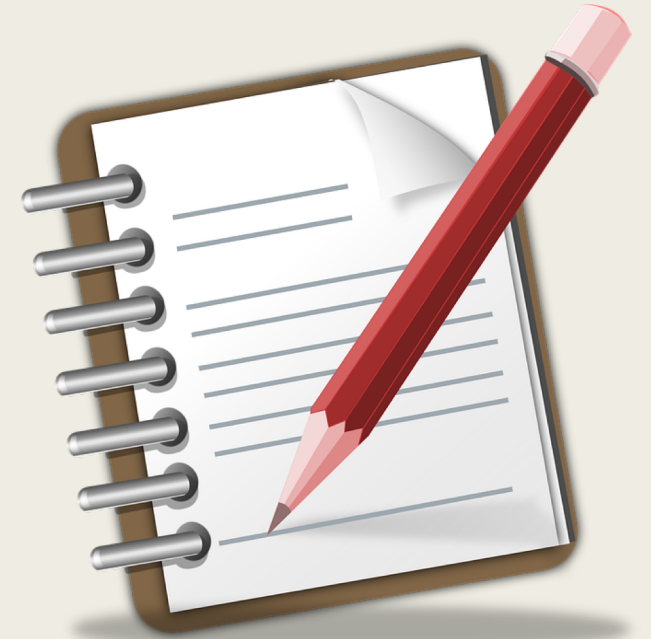
Activity 1 - The Last Banana



<https://www.youtube.com/watch?v=Kgudt4PXs28>

Notes

- This is clearly a demon cat. If I was on the island with that cat, I know who would be eating the last banana...
- Move from physical to electronic simulations
- Foam dice are less noisy!

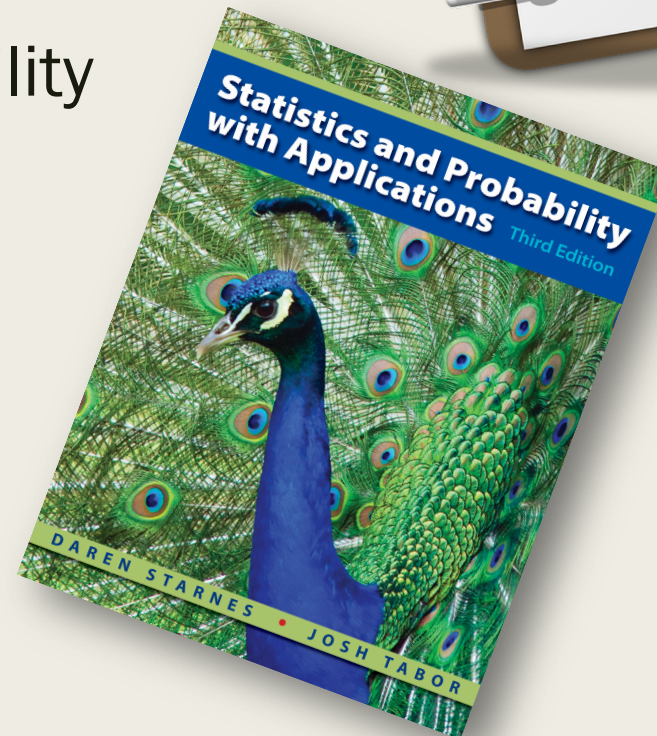
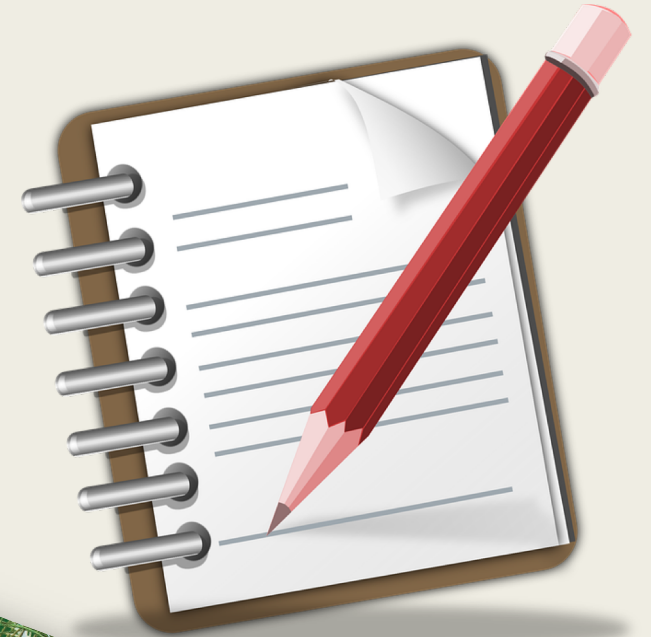


Activity 2 – Smelling Parkinson's Disease



Notes

- BE SENSITIVE! There are millions of people diagnosed and dealing with Parkinson's. Some of them will have children in your class.
- Applet from Statistics and Probability with Applications – FREE at stapplet.com
- Be ready for lots of follow-up questions from students. (How wonderful!)



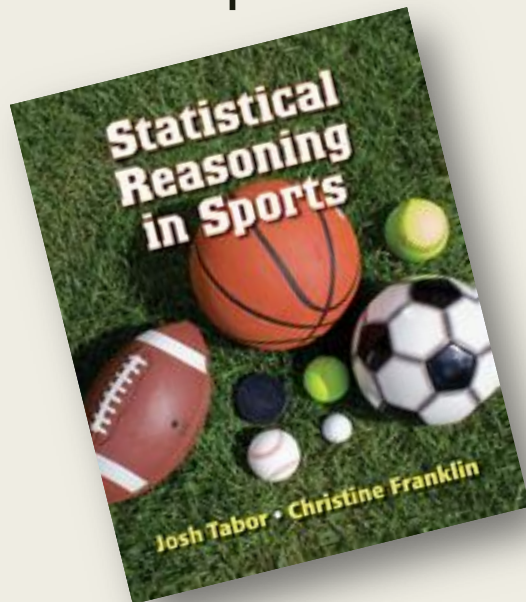
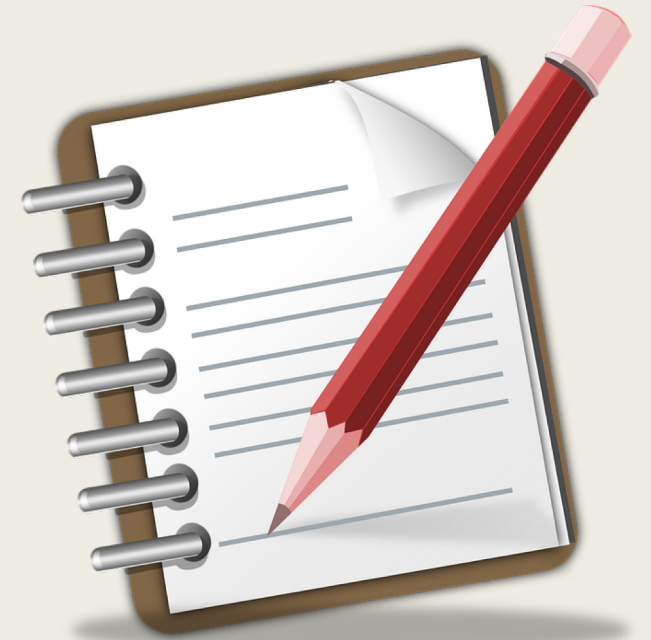
Activity 3 - Is LEBRON STREAKY?



https://www.youtube.com/watch?v=Yy6OD7_Fv0c

Notes

- This is a simulation of a “runs test”
- It’s statistical inference in a fun context
- Idea from Statistical Reasoning in Sports
- A spinner template is included



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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



Contact me

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