Do Now

- Place your homework on your desk

1. What is the experimental probability a quarterback will complete his next pass if he has completed 30 of his last 40 passes?

2. What is the experimental probability a quarterback will complete his next pass if he has completed 36 of his last 45 passes?

Work **silently** and independently

Homework Check (out of 10)

1. 30%
2. 25%
3. 15%
4. 6 cars

Explain how you could simulate each situation. Then use your simulation to find each experimental probability.

5. A quiz consists of 12 true-or-false questions. If you guess the answers at random, what is the probability of getting at least 8 correct answers?

   Answers may vary. Sample: Use a coin and allow heads to represent a correct answer and tails to represent an incorrect answer. Flip the coin 12 times to represent the quiz, and record the number of correct answers. Represent the quiz 20 times, and record the number of times there are at least 8 correct answers. The probability is about 20%.

6. There are 15 multiple-choice questions on a test. Each question has four answer choices, and only one choice is correct. What is the probability of passing the test by guessing at least 7 of the 15 answers correctly?

   Answers may vary. Sample: Pick at random from four numbers, and select one of them to represent a correct answer. Pick 15 times to represent one test, and represent the test 20 times. The probability is about 5%.

Homework Check (out of 10)

1. A basketball player attempted 24 shots and made 13. Find the experimental probability that the player will make the next shot she attempts. ≈ 0.54 or 54%

2. A baseball player attempted to steal a base 70 times and was successful 47 times. Find the experimental probability that the player will be successful on his next attempt to steal a base. ≈ 0.67, or 67%

Graphing Calculator **For Exercises 3–4, define a simulation by telling how you represent correct answers, incorrect answers, and the quiz. Use your simulation to find each experimental probability.**

3. If you guess the answers at random, what is the probability of getting at least three correct answers on a four-question true-or-false quiz?
Answers may vary. Sample: Let "1" be a correct answer. Let "2" be an incorrect answer. Generate 16 sets of 4 random 1's and 2's; $\frac{5}{16} = 0.3125 \approx 0.31$, or 31%.

4. A five-question multiple-choice quiz has four choices for each answer. If you guess the answers at random, what is the probability of getting at least four correct answers? Answers may vary. Sample: Let "1" be a correct answer. Let "2", "3", and "4" be incorrect answers. Generate 64 sets of 5 random 1's, 2's, 3's, and 4's; $\frac{1}{64} = 0.015625 \approx 0.02$, or 2%.

Objective

- SWBAT find experimental probability using a simulation and compare it to theoretical probability
- SWBAT research sabermetrics and create their own sports team based on statistical data

Silently copy into your notes

Key Terms

- Sample space: the set of all possible outcomes to an experiment
- Equally likely outcomes: when each outcome in a sample space as the same chance of occurring

theoretical probability of event A is $P(A) = \frac{m}{n}$

Silently copy into your notes

Example 1: Find theoretical probability

What is the theoretical probability of each event?

A getting a 5 on one roll of a standard number cube

B getting a sum of 5 on one roll of two standard number cubes

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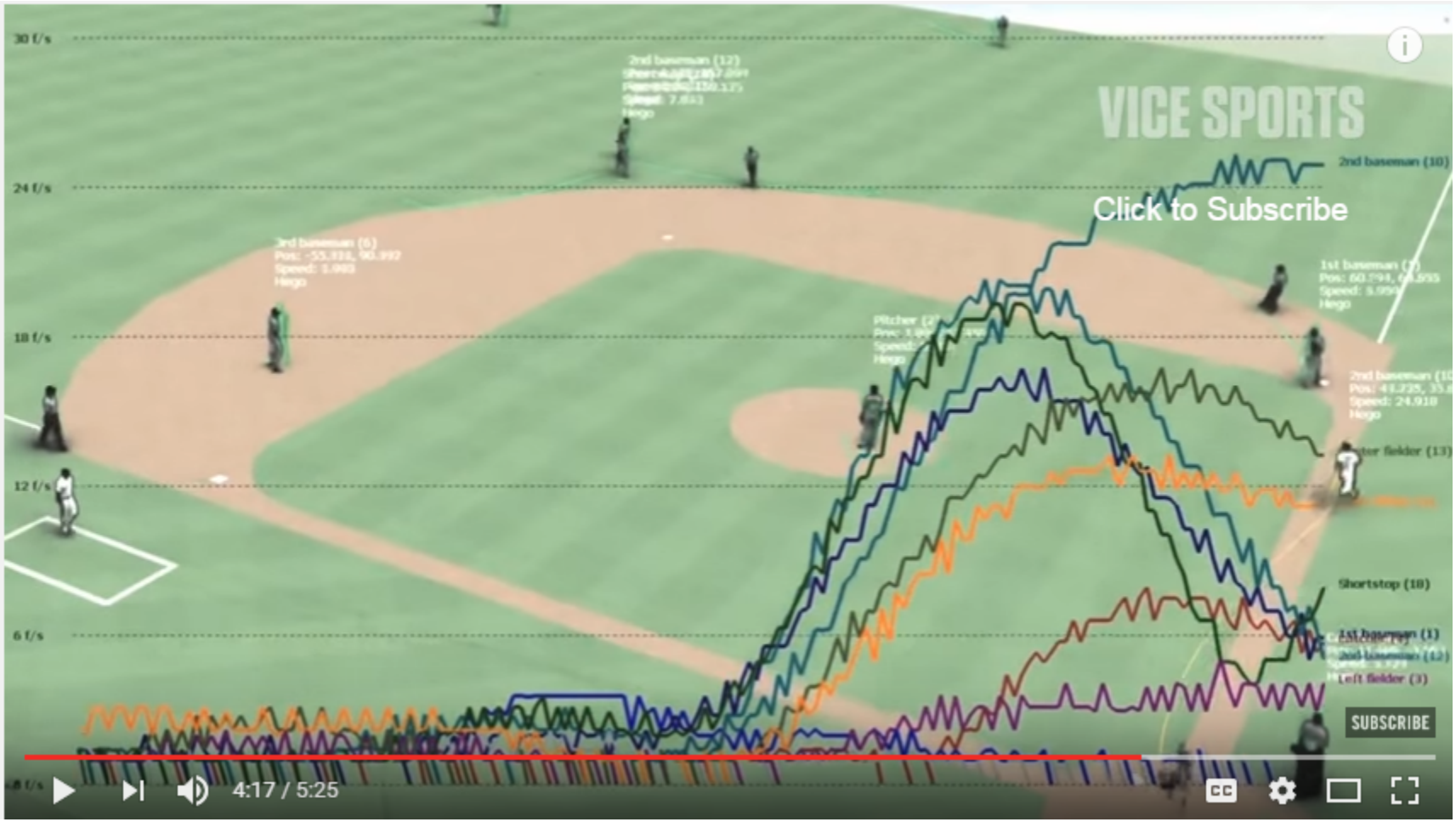
You Try 1: Find theoretical probability

a. What is the theoretical probability of getting a sum that is an odd number on one roll of two standard number cubes?

b. **Reasoning** Without calculating the probability, is it more likely to get an even or odd number on one roll of a standard number cube? Explain.

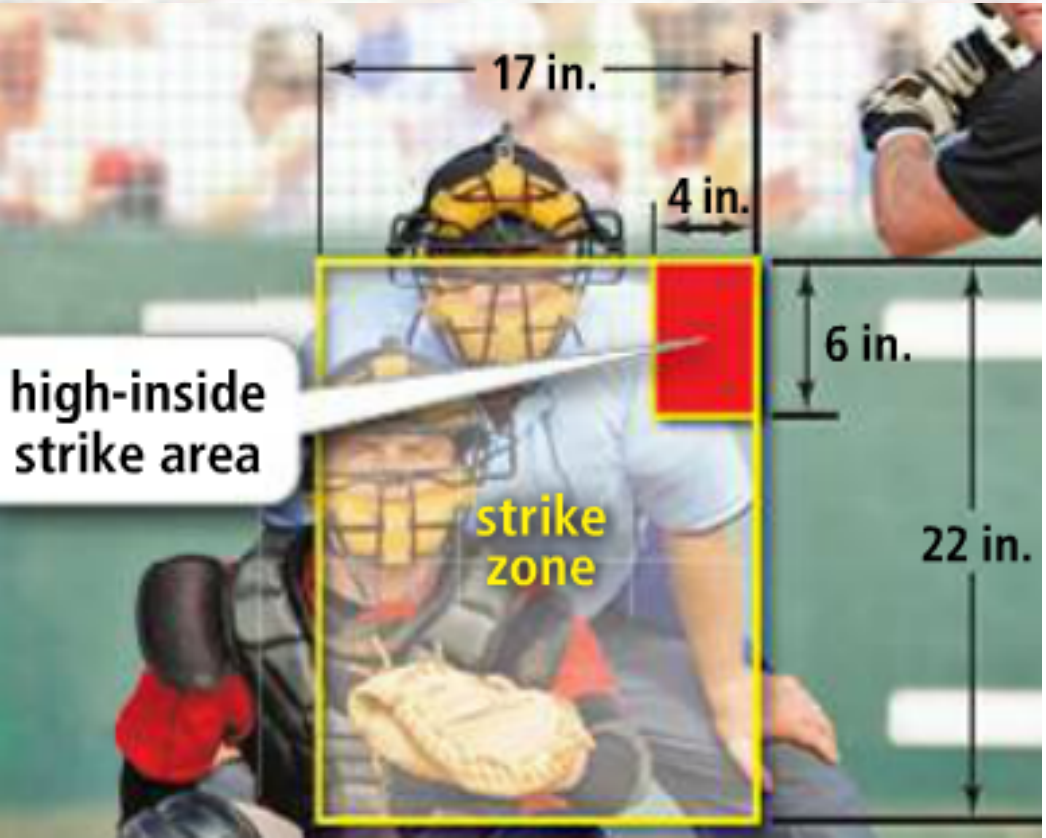
Work quietly with your desk partner

Statistics in sports!



Example 2: Find theoretical probability for geometry

Geometry A batter's strike zone depends on the height and stance of the batter. What is the geometric probability that a baseball thrown at random within the batter's strike zone, as shown in the figure below, will be a high-inside strike (one of the hardest pitches to hit)?



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You Try 2: Find theoretical probability for geometry

Suppose a batter's strike zone is 15 in.-by-20 in. and the high-inside strike zone is 3 in.-by-5 in. What is the probability that a baseball thrown at random within the strike zone will be a high-inside strike?

Work quietly with your desk partner

Let's do an experiment!

- Work with the partner next to your assigned seat
- Google "flip a coin" on your phone
- Press "Flip it" at the same time as your partner
- Repeat 20 times and record your results in the space below by checking off the appropriate box
- Use your results to calculate the experimental probabilities of each coin combination. (Hint: count number of checks for a single outcome and divide by 20 trials)

Work quietly with your desk partner

Part 2: Theoretical Probability

- Calculate the theoretical probabilities of each coin combination

Theoretical Probabilities:

Both Heads	One Heads, One Tail	Both Tails
/	/	/

Part 3: Compare/Contrast

- Write a paragraph comparing and contrasting your results from Parts 1 and 2. Was there any difference in your results? Explain. Which type of probability might be more useful? When? What are the advantages and disadvantages of calculating these different types of probabilities?

Work quietly with your desk partner