Unit 4: Probability Models

Learning Targets and Success Criteria:

1. I can determine if two events are disjoint (mutually exclusive).
   > I know I can because:

   o I can decide if the two events can happen simultaneously.
   o I can explain that the events are disjoint because $P(A \cap B) \neq 0$.

2. I can use the addition rule to calculate probabilities.

   > I know I can because:

   o I can determine if I have an "OR" probability.
   o I understand that $\cup$ represents "OR" in math.
   o I can use the formula: $P(A \cup B) = P(A) + P(B)$ for events that are disjoint.
   o I can use the formula: $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ for non-disjoint events.

3. I can use the multiplication rule to calculate probabilities.

   > I know I can because:

   o I can determine if I have an "AND" probability.
   o I can understand that $\cap$ represents ""AND" in math.
   o I can use the formula: $P(A \cap B) = P(A) \cdot P(B)$ FOR INDEPENDENT EVENTS ONLY!!
   o I can use the formula: $P(A \cap B) = P(A) \cdot P(B|A)$ for dependent events.

4. I can calculate conditional probabilities.

   > I know I can because:

   o I can understand that $P(A|B)$ represents the probability of A "given" B has occurred.
   o I can use the formula: $P(A|B) =$

5. I can determine if two events are independent.

   > I know I can because:

   o I can decide if one event will influence or change the probability of the other event.
   o I can show evidence of independence by comparing $P(A)$ to $P(A|B)$. If they are equal, then the two events are independent.

6. I can use diagrams to help calculate probabilities.

   > I know I can because:

   o I can create a Venn Diagram to model probabilities of two events.
   o I can create a Tree Diagram to model probabilities of conditional events.
   o I can use the values from these diagrams to calculate specific probabilities.
   o I can use a two-way (contingency table) to calculate probabilities.

7. I can calculate the expected value (mean) and standard deviation of a random variable.

   > I know I can because:

   o I can define a random variable (X).
   o I can create a probability model for all possible values (x) of the random variable (X).

- o I can use the formula: $E(X) = \mu = \sum x \cdot p(x)$ to calculate expected value.
- o I can use the formula: $SD(X) = \sigma =$ to calculate the standard deviation of a random variable.
- o I can use the calculator to calculate both the expected value and st. dev. of a random variable. (values in L1, probabilities in L2) 1-var-stat L1, frequencies L2.

8. I can calculate expected values and standard deviations of random variables that have been shifted, scaled, combined, or subtracted.

       I know I can because:

- o I can understand the expected value (mean) gets the shift, but the standard deviation DOES NOT GET SHIFTED!!!
- o I can understand that expected values and standard deviations both get the scale.
- o I can understand that expected values can be added or subtracted. $E(X+Y) = X + Y$ and $E(X - Y) = X - Y$
- o I can understand that standard deviations are ALWAYS squared, added, and square rooted no matter if you are finding the standard deviation for the sum or difference of two random variables! $SD(X \pm Y) =$ where X and Y are the standard deviations for the random variables.
- o I can use a normal model to find the probabilities of sums and differences of random variables.

9. I can calculate probabilities using Geometric and Binomial probability distributions.

       I know I can because:

- o I can determine if I am finding the probability of the 1st success (geometric) or the probability of a certain number of successes out of a certain number of trials (binomial).
- o I can determine the values of p (probability of success) and q (probability of failure).
- o I can determine n (number of trials…only in binomial situations)
- o I can use the formula: $P(X = x) = q^{x-1} \cdot p$ to calculate geometric probabilities where X = the first success.
- o I can use the formula: $P(X = x) = {}_nC_x \cdot p^x \cdot q^{n-x}$ to calculate binomial probabilities where X = total number of successes.
- o I can calculate cumulative probabilities using the formulas for geometric and binomial probability.
- o I can use a normal model to estimate cumulative binomial probabilities.

Day 1
Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: **#1, 2, 3 (see above)**

Activator

AP Exam MC Practice Question

Direct Instruction, Guided Practice, Practice/Differentiation:

Ch. 14 Notes
Law of Averages discussion

Summarizers:

Selected Problems from Handout

Homework:
P. 338-339 #'s 1-17 odd
Day 2

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #1, 2, 3 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, **Guided Practice**, **Practice/Differentiation:**
Thumbtack Task
Probability guided practice (cars)

Summarizers:

Selected Problems from Handout

Homework:
P. 338-339 #'s 18-25 all

Day 2a

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #1, 2, 3 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, **Guided Practice**, **Practice/Differentiation:**

Practice (History exam, M&Ms, & spinner)

Summarizers:

Selected Problems from Handout

Homework:
P. 338-339 #'s 27-43

Day 3

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #1-6 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, **Guided Practice**, **Practice/Differentiation**:

Ch. 15 Notes

Summarizers:

Selected Problems from Handout

Homework:
P. 361 #'s 1-19 odd

Day 3b

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #1-6 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, **Guided Practice**, **Practice/Differentiation**:
Guided Practice (Cards, Blue jeans, tree diagram)

Summarizers:

Selected Problems from Handout

Homework:
P. 361 #'s 2-18 even

Day 4/5/5b

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 1-6 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, **Guided Practice**, **Practice/Differentiation**:
Ch. 15 WS's (cars & CD players)
Probability WS's 1 & 2 (Quiz Practice)

Summarizers:

Selected Problems from Handout

Homework:
Study for CH. 14 & 15 Quiz

Day 5c

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 1-6 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, Guided Practice, Practice/Differentiation:
CH. 14 & 15 Quiz

Summarizers:

Selected Problems from Handout

Homework:
none

Day 6

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 7,8 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, Guided Practice, Practice/Differentiation:
Greedy Pig Game
Start Ch. 16 Notes

Summarizers:

Selected Problems from Handout

Homework:
none

Day 6b

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 7,8 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, Guided Practice, Practice/Differentiation:

FInish ch. 16 notes

Summarizers:

Selected Problems from Handout

Homework:
P. 383 #'s 1-15 odd

Day 7b

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 7,8 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, Guided Practice, Practice/Differentiation:

Ch. 16 practice WS's (I do fast food, they do rest)

Summarizers:

Selected Problems from Handout

Homework:
FInish packet for HW

Day 7

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 7,8 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, **Guided Practice**, **Practice/Differentiation**:

Normal Model Examples Notes
P. 384 #'37 a-c IN CLASS GUIDED

Summarizers:

Selected Problems from Handout

Homework:
P. 384 #'s 39 & 41

Day 7c

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 7,8 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, **Guided Practice**, **Practice/Differentiation**:

P. 384 #'s 2,8,10,30,38 (turn in)

Summarizers:

Selected Problems from Handout

Homework:
none

Day 9 (2 days)

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 9 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, **Guided Practice**, **Practice/Differentiation**:

Ch. 17 Notes

Greater than or equal to example & p. 402 #'s 9, 17

Summarizers:

Selected Problems from Handout

Homework:
P. 401 #'s 10, 12, 16, 18

Day 9a

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 9 (see above)

Activator

AP Exam MC Practice Question

Direct Instruction, Guided Practice, Practice/Differentiation:

Finish Notes (Normal Model)

Summarizers:

Selected Problems from Handout

Homework:
P. 401 #'s 26, 30

Day 10

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 9(see above)

Activator

Review Question

Direct Instruction, Guided Practice, Practice/Differentiation:

Ch. 17 WS's (I do 1st, they finish)

Summarizers:

Selected Problems from Handout

Homework:
Finish WS packet

Day 10a

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 7-9 (see above)

Activator

Review Question

Direct Instruction, Guided Practice, Practice/Differentiation:

2 Approaches WS
Probability WS

Summarizers:

Selected Problems from Handout

Homework:
Finish WS

Day 10b & 10c

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 7-9 (see above)

Activator

Review Question

Direct Instruction, Guided Practice, Practice/Differentiation:

Quiz Practice: Unit 4 Review ch. 16 & 17

Summarizers:

Selected Problems from Handout

Homework:
STUDY FOR CH. 16 & 17 QUIZ

Day 10d/11/12

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 1-9 (see above)

Activator

Review Question

Direct Instruction, Guided Practice, Practice/Differentiation:

Quiz
Unit 4 Probability Test Reviews

Summarizers:

Selected Problems from Handout

Homework:
COMPLETE REVIEWS AND STUDY FOR TEST!!!!

Day 13 & 14

Standard: Collecting Data (12% - 15% of AP Exam)

Learning Target(s) & Success Criteria: #'s 1-9 (see above)

Activator

Review Question

Direct Instruction, Guided Practice, Practice/Differentiation:

Test Day 1: 10MCQ & 2 FRQs
Test Day 2: 3 FRQs

Summarizers:

Selected Problems from Handout

Homework:
None