

## **Investigation 2 Check Up Topics**

1. Understand the following terms. Be able to decide of a situation is:
  - a. Possible
  - b. Probable
  - c. Equally Likely
  - d. Not Equally Likely
2. Understand that the sum of the probability that an event will happen and the probability that an event will not happen is 1.
3. Understand that experimental probability is the ratio of favorable outcomes to total trials.
4. Understand that theoretical probability is the ratio of the number of ways an event can happen to the total amount of outcomes.
5. Understand that probability is expressed as a number 0 to 1:
  - a. If  $P=0$ , the event is impossible.
  - b. If  $P=1$ , the event will definitely happen.
  - c. If  $0 < P < 1$  (probability is between 0 and 1), the event may or may not happen.
6. Calculate experimental and theoretical probability from a set of data.
7. Compare and contrast experimental and theoretical probabilities.

## Investigation 2 Check Up Review

I rolled a fair 6-sided number cube and tossed a coin 12 times and recorded the results in the following table:

| Trial # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------|---|---|---|---|---|---|---|---|---|----|----|----|
| Number  | 4 | 1 | 5 | 1 | 2 | 4 | 2 | 2 | 5 | 2  | 4  | 3  |
| Coin    | H | H | T | T | T | T | T | H | H | T  | H  | T  |

1. Are all outcomes **equally likely**? Explain.

*Yes. All numbers on a fair die are equally likely, and heads or tails is equally likely on a fair coin. There is only one way to get a 5 and heads, only one way to get a 3 and tails, etc... All outcomes have the same theoretical probability.*

2. Is it **possible** to roll 12 sixes in a row? Explain.

*It is possible since all numbers 1-6 have an equal chance of being rolled. Each time the die is rolled, there is a  $\frac{1}{6}$  probability that a 6 will be rolled.*

3. Is it **probable** to roll 12 sixes in a row? Explain.

*It is not probable to roll 12 sixes in a row. Each roll only has a  $\frac{1}{6}$  chance of being a 6. Getting 12 straight 6s would be unlikely, but it is possible.*

4. What is the **experimental** probability of getting a 4 and heads?

*This occurred twice out of 12 trials, so  $P(4 \& H) = \frac{2}{12}$*

5. What is the **theoretical** probability of getting a 4 and heads?

6. Compare your experimental and theoretical probabilities.

*The experimental probability was 2/12 but the theoretical probability was 1/12. I would most likely get a four and heads once every twelve rolls, but this happened twice during my trial.*

7. What could be done to make this a more accurate experiment?

*Increase the number of trials. 12 trials is not enough to get accurate data.*

8. What is the theoretical probability of **NOT** getting a 4 and heads?

$$\frac{12}{12} - \frac{1}{12} = \frac{11}{12} \quad P(\text{NOT } 4 \ \& \ H) = \frac{11}{12}$$

9. What is the theoretical probability of rolling a 7?

*This is impossible so  $P(7) = 0$*

10. What is the theoretical probability of rolling a number less than 7?

*This will definitely happen, so  $P(\text{number} < 7) = 1$*

11. If the probability that an event will not occur is  $\frac{4}{5}$ , then the probability that an event will occur is  $\frac{1}{5}$  because the sum of the two probabilities is 1.