α Probability of Compound Events

Standard(s): SDAP 3.1, 3.3 **Grade: 6**

Objective

- Represent all possible outcomes for compound events in an organized way
- Express the theoretical probability of various outcomes
- Represent probabilities as ratios, decimals between 0 and 1, and percentages between 0 and 100

Materials

- 1 activity sheet per student and/or team
- Variety of objects with equally likely event outcomes. For example:
  - Flipping a **coin**
  - Rolling a **die or number cube**
  - Spinning an equally divided **color or number spinner**
  - Picking an equally dispersed **color cube/paper chip out of a paper bag**
- 1 calculator per student pair/group (optional)

Activity

1. Assign two different events from the object assortment to each table/group of students.
2. For each event, ask students to:
   a. Find the number of possible outcomes
   b. Identify and list each possible outcome
   c. Write the probability of each possible outcome as a ratio
3. Recommended group activity. In teams of 3-4 students:
   a. Ask students to use scratch paper and find all of the possible outcome combinations for their two events. Once they reach a consensus, record all combinations onto their team recording sheet in a neat and organized manner.
   b. Find the total number of outcome combinations.
   c. Decide if it's possible that they could have missed a combination(s). Does the organization of their combinations allow them to verify that they found them all? How?
4. If we were to perform a combination of two events, what are all of the possible outcome combinations (e.g. flip a heads and roll a 2)?
   a. Introduce the use of tree diagrams and grids to find all possible combinations.
   Note: It's likely that most student teams used systematic lists in part 3, above.
   b. When using a tree diagram, recommend that students use the event with the least number of outcomes as the "trunk" and the event with the most outcomes as the "branches".
   c. On the grid, students may use abbreviations to preserve space (i.e. H, 2)
5. Use the tree diagram and/or grid to:
   a. Find all of the possible outcome combinations
   b. Find a variety of theoretical probabilities of the teacher's choice – be prepared with 4 event combinations [for example: P (Tails, 5) or P (Heads, even #) or P (Heads)].
   c. Express theoretical probabilities as a ratio, decimal (use calculator) and percent
6. Use objects to perform an experiment, in pairs/groups:
   a. Take turns performing combination of events.
   b. List each result as an ordered pair, for example (H, 2). Each student in the group should record all outcomes, not just their own.
   c. Have students repeat event combinations a total of times equaling the total number of possible outcome combinations (i.e. if they're flipping a coin and rolling the die they should perform the experiment a total of 12 times).
   d. For each theoretical probability that they previously found:
      - Ask students to write the number of times that the event actually happened as a ratio out of the total # times the experiment was performed
      - Have students compare their actual results to the theoretical probabilities
7. Repeat activity with a different combination of events.

Probability of Compound Events

Team: _____

_____

Event		
# of Possible Outcomes		
List Possible Outcomes		
Probability of Each Outcome		

1. If you were to perform a combination of both events, what are all of the possible outcome combinations? Come up with an organized display of your results.

2. How many possible outcome combinations did you find?

3. Is it possible you missed a combination(s)? How does your organization in part 1 help you verify that you found them all?

Probability of Compound Events Name: _____

Event		
# of Possible Outcomes		
List Possible Outcomes		
Probability of Each Outcome		

1. If you were to perform a combination of both events, what are all of the possible outcome combinations? Use a tree diagram and a grid to display your results.

   a) Tree diagram: b) Grid:

2. How many possible outcome combinations were there?

3. Use your tree diagram or grid to find the following probabilities (theoretical):

   a) b)

   c) d)

4. Experiment: Perform a combination of both events a total of _____ times. List your results as ordered pairs:

5. For each part in #3, how close was the actual result to the theoretical probability?

   a) b)

   c) d)

Event		
# of Possible Outcomes		
List Possible Outcomes		
Probability of Each Outcome		

1. If you were to perform a combination of both events, what are all of the possible outcome combinations? Use a tree diagram and a grid to display your results.

   a) Tree diagram: b) Grid:

2. How many possible outcome combinations were there?

3. Use your tree diagram or grid to find the following probabilities (theoretical):

   a) b)

   c) d)

4. Experiment: Perform a combination of both events a total of _____ times. List your results as ordered pairs:

5. For each part in #3, how close was the actual result to the theoretical probability?

   a) b)

   c) d)