WILL MALE VS. FEMALE OFFSPRING BE 50-50?

Performance Standard 10C.H

Understand the difference between the outcome of actual breeding data and the outcome that they expected:

- *Mathematical knowledge*: analyze outcome of probability experiment and compare theoretic and empirical results.
- *Strategic knowledge*: solve problem using systematic process.
- *Explanation*: explain completely what was done and why it was done.

Procedures

1. ***In order to determine, describe and apply probabilities of events (10C),*** provide students with sufficient learning opportunities to develop the following:
   - Discuss the difference in empirical and theoretical probability.

   Gender is an important concern in a beef production program. Some producers may desire certain outcomes (more female calves) vs. expected outcomes. Without any intervention, producers can expect closer to a 50-50 birth distribution. There are interventions producers may do to get closer to those desired outcomes such as purchasing semen that has been sex-typed.
2. Provide students with the assessment task worksheet. Have students work individually.

   Sarah recorded data from her Supervised Agricultural Experience (SAE) project showing the number of male offspring vs. female offspring from her beef cattle project. She was surprised that there were 35 male offspring and 25 female offspring. She believed there should be 30 of each knowing that there is a 50% chance for each gender. What would you say to Sarah? How would you explain what happened with her project in terms of empirical and theoretical probability?
3. Use the standard scoring rubric. Give each student a score in each of the three categories. A score of 4 indicates a complete description of the differences in empirical and experimental probability using correct terminology. A 3 represents nearly complete discussion that demonstrates the correct ideas, but they may not have communicated them clearly. A 2 indicates that students have some idea about how to answer the question but miss important points that affect their answers. A 1 generally shows little understanding in their discussion but at least shows some understanding of probability. A score of 0 generally reflects no understanding of probability.
4. Computation is not really a component of this task.
5. Solution should demonstrate clear understanding of theoretical and empirical probability results. Students may use charts to clarify their explanation.

Examples of Student Work

- **Meets**
- **Exceeds**

Time Requirements

- One class period

Resources

- Copies of the "Will Male vs. Female Offspring Be 50-50?" task sheet
- Writing utensil
- Mathematics Rubric

NAME _____ DATE _____

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Student Task Sheet

Sarah recorded data from her Supervised Agricultural Experience (SAE) project showing the number of male offspring vs. female offspring from her beef cattle project. She was surprised that there were 35 male offspring and 25 female offspring. She believed there should be 30 of each knowing that there is a 50% chance for each gender.

What would you say to Sarah? How would you explain what happened with her project in terms of empirical and theoretical probability?

MATHEMATICS RUBRIC

NAME _____ **DATE** _____

- Exceeds standard (must receive a 4 in each area)
- Meets standard (must receive all 3's or a combination of 3's and 4's)
- Approaches standard (must receive all 2's or any combination which may include a 3 or a 4)
- Begins standard (has no 3's or 4's but not all 1's)
- Absent (has all 1's and 0's)

	Mathematical Knowledge	**Strategic Knowledge**	**Explanation**
4	• Wrote the right answer. • Used math words correctly to show understanding of how math works. • Worked it out with no mistakes. • Used the right math words and labeled the answers.	• Identified all the important parts of the problem, and knew how they went together. • Showed all the steps used to solve the problem.	• Wrote what was done and why it was done. • If a drawing was used, all of it was explained in writing.
3	• Knew how to do the problem, but made small mistakes.	• Identified most of the important parts of the problem. • Showed most of the steps used to solve the problem.	• Wrote mostly about what was done. • Wrote a little about why it was done. • If a drawing was used most of it was explained in writing.
2	• Understood a little, but made a lot of big mistakes.	• Identified some of the important parts of the problem. • Showed some of the steps used to solve the problem.	• Wrote some about what was done or why it was done but not both. • If a drawing was used, some of it was explained in writing.
1	• Tried to do the problem, but didn't understand it.	• Identified almost no important parts of the problem. • Showed almost none of the steps used to solve the problem.	• Wrote or drew something that didn't go with the answer. • Wrote an answer that was not clear.
0	• No answer attempted.	• No strategy shown.	• No written explanation.
Score			