STORAGE AND DRYING DECISIONS

Performance Standard 10B.H

Design a question to solve a real-world problem, and then design a study to help them answer the question:

- *Mathematical knowledge*: know how to formulate questions, design studies and collect, analyze and report data findings.
- *Strategic knowledge*: use appropriate strategies to ask research questions, choose a sample, collect and analyze data and make recommendations based on data.
- *Explanation*: explain completely and clearly what was done and why it was done.

Procedures

1. ***In order to formulate questions, design data collection methods, gather and analyze data and communicate findings (10B),*** provide students with sufficient learning opportunities to develop the following skills:
   - Formulate questions, design a study to answer the question and collect data.
   - Analyze potential methods of collecting information and decide which methods would produce the most reliable and accurate data. Note: In order to complete the task successfully, students should have prior experience with sampling.

   Students studying agricultural science, agribusiness operations and/or agribusiness management will need to understand and be able to solve real-world problems in the agricultural industry. Gathering data, analyzing that data and making decisions from the data are critical skills that can mean the difference between success and failure.
2. Provide each student a copy of the "Storage and Drying Decisions" task sheet and the rubric. Have students review and discuss the task to be completed and how the rubric will be used to evaluate it.
3. Have the students work individually to solve the problem. Do not help the students or guide their thinking as they solve the following problem:

   George Petino, a farm manager has decided to look into building enough grain bins to hold all the grain, both corn and soybeans (50/50), that is raised on the 3300-acre farm that he manages. He also wants to put in a grain drying system for drying the corn. All grain is currently being stored and the corn dried at the local elevator. He will have to convince Janet Plumber, the landowner, that spending the money for this set-up will save her money in the future. Cost of drying and storing commercially, grain bin sizes and cost per bushel and types/costs of drying systems all need to be investigated, as well as the location of this new money saving system. George has asked for help designing a study that will provide him with the information needed to make an informed presentation to Ms. Plumber. Your job is to develop a plan for a study to help him decide what sizes of bins to erect, the type of grain drying system to purchase and the cost effectiveness of the change. Your written plan should include information on the questions being addressed; the method(s) of data collection, sampling techniques and planned data analysis; and justification for using the methods and techniques you suggest.
4. Evaluate each student's work using the rubric and its guide to determine the performance level. Give each student a score in each of the three categories. The students need to decide first what information will help them make the decision. Then they must determine how to best gather that information. They should consider various data collection methods, select the one they believe is best and justify their decision.
   - 4 = provided a complete and concise description for the data that should be collected, methods to use for collection and a description of how that data will be used in the decision-making process. Another individual could implement their plan with little difficulty. Their rationale should also be complete and represent excellent understanding of the statistical processes and their application.
   - 3 = had the right ideas but will not have all the details worked out. They will present a fairly good case for the data they want to gather and why it would be useful, but they do not include enough detail for another person to actually do the data gathering and data analysis.
   - 2 = generally produced a plan that is sketchy and incomplete. They may have some good ideas, but they do not justify their procedures well and generally lack enough detail about what they will actually do to collect the data and analyze it to allow another person to understand their intent.
   - 1 = had little understanding of what data needed to be collected or how to go about collecting it.

Examples of Student Work

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

Time Requirements

- 20 - 30 minutes
- If you want students to follow through with actually completing the study, a much longer time period will be needed.

Resources

- Copies of the "Storage and Drying Decision" task sheet
- Mathematics Rubric

NAME _____ DATE _____

STORAGE AND DRYING DECISION

Student Task Sheet

George Petino, a farm manager has decided to look into building enough grain bins to hold all the grain, both corn and soybeans (50/50), that is raised on the 3300-acre farm that he manages. He also wants to put in a grain drying system for drying the corn. All grain is currently being stored and the corn dried at the local elevator. He will have to convince Janet Plumber, the landowner, that spending the money for this set-up will save her money in the future. Cost of drying and storing commercially, grain bin sizes and cost per bushel and types/costs of drying systems all need to be investigated, as well as the location of this new money saving system. George has asked for help designing a study that will provide him with the information needed to make an informed presentation to Ms. Plumber.

Your job is to develop a plan for a study to help him decide what sizes of bins to erect, the type of grain drying system to purchase and the cost effectiveness of the change. Your written plan should include information on the questions being addressed; the method(s) of data collection, sampling techniques and planned data analysis; and justification for using the methods and techniques you suggest.

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			