

COLD ENOUGH?

Performance Standard (10B/10D).D

Read and record outside air temperature each day (at the same time, from the same source, ie. radio, television, school thermometer, etc), display the data showing the differences in daily temperatures, and compare the “real” data with their original predictions and make predictions about outside play time (or days where the temperature was above 20 degrees) for the following month.

- *Mathematical knowledge:* Read and record temperatures and display the data;
- *Strategic knowledge:* Represent data on appropriate graph; and
- *Explanation:* Explain completely what was done and why it was done.

Procedures

1. ***In order to construct, read, and interpret tables, graphs, and charts to organize, represent data (10A), determine the probability and odds of events using fundamental counting principles, and analyze problem situations and make predictions about results (10C),*** students should experience sufficient learning opportunities to develop the following:
 - Collect data using observations and experiments.
 - Propose a further investigation to verify or refute a prediction.
 - List all possible outcomes of a single event and tell whether an outcome is certain, impossible, likely or unlikely.
 - Describe the probability of an event using terminology such as “5 chances out of 8.”
2. Before beginning this assessment, be sure students are familiar with the following terms:
 - Likely, unlikely, impossible, _____ chances out of _____, probability
 - Distribute one Student recording sheet to each child.
 - Assign a student(s) to be responsible for finding the outside temperature each day. This should be done at the same time each day and from the same source.
 - Discuss the “memo” which appears on the top of the Student Recording sheet.
 - “For safety reasons, students will not be allowed to have outdoor recess if the air temperature is below _____ degrees.”
Alternative scenario: “Students, please predict how many school days in the month of January the outside temperature will dip below 20 degrees.”
3. Explain to students that they will be predicting how likely it is that they will be allowed to play outside a majority of days during the month of January or how many school days the outside temperature will dip below 20 degrees.
4. Make children understand that they will also be predicting the exact number of school days in January that they will be allowed to play outside. (i.e. We will be able to play outside 10 out of 15 days in January. Or: I think the outside temperature will dip below 20 degrees 10 out of 15 days in January.) Record student predictions for later reference.
5. After a student has recorded the exact temperature in a common place each day, students will be instructed to display the information in graph form. The type of graph used to show the temperature should be selected by the individual student.
6. At the end of the month, students will be instructed to compare the actual data with the prediction that was made.
7. After the comparison is made, students will make a similar prediction for the month of February. This prediction will be based on the information recorded for the month of January.
8. Evaluate student work using all three sections of the Student Friendly rubric.
 - a. **Math Knowledge:** Does the student use terms correctly? Is data recorded correctly? Are final comparisons and future predictions reasonable?
 - b. **Strategic Knowledge:** Are initial predictions reasonable? Is the graph representing gathered data appropriate?
 - c. **Explanation:** Is the written explanation complete and accurate? Does the written explanation describe what was done and why it is correct?

Examples of Student Work not available

Time Requirements

- Five to ten minutes each school day in January

Resources

- A way for one student to obtain outside air temperature each day
- One sheet of graph paper per child
- Copies of the “Cold Enough?” recording sheet
- Mathematics Rubric

NAME _____ DATE _____

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Student Recording Sheet

Memo: *For safety reasons, students will not be allowed to play outside during recess time if the air temperature is less than _____ degrees.*

Or: *We want to know how many school days in January the outside temperature will dip below 20 degrees Fahrenheit.*

Part A:

1. If there are fifteen school days in the month of January, how many days do you think students will be allowed outside for recess? Or: If there are fifteen school days in the month of January, how many days do you think the outside temperature will be below 20 degrees?
2. How would you describe the probability of students being allowed to play outside for recess in January? Or: How would you describe the probability of the outside temperature dipping below 20 degrees?

Part B:

1. With your classmates decide upon a way to determine the outside temperature each school day during the month of January. The temperature should be determined at the same time each day. The temperature should come from the same source each day.
2. Record the data each day. Display the data in some form of graph or chart. Use graph paper for this part of the activity.
3. At the end of the month, compare (in writing), the actual outcome of data with your predicted outcomes.

4. What do you feel made your predictions correct or incorrect? _____

5. Based on January actual temperatures, what do you think the chances will be for having outside recess during the month of February? Or: Based on the actual January temperatures, what do you think the chances will be for the outside temperature to be below 20 degrees during the month of February. Defend your prediction in writing.

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Answer Key

Part A:

1. The answer should include an exact number of days.
2. The answer should include the use of some of the probability terminology (i.e. likely, unlikely, etc.) *For example, I think it is likely that we will not be allowed for recess 7 out of the 15 days, or I think it is likely that the outside temperature will fall below 20 degrees is unlikely to be 15 out of 15 days.*

Part B:

1. The class should have a discussion involving how the temperature will be determined, when it will be determined, and how it will be displayed for everyone in the class to see.
2. One way to record the actual is through a line graph. If this is used, be sure that all labels are accurate.
3. The comparison should include a statement about prediction accuracy. *For example, I correctly predicted that we would have outside recess 7 out of 15 school days in January. Or: My prediction was incorrect because the outside temperature did not fall below 20 degrees 15 out of 15 days in January..*
4. The written explanation should include why the prediction was right or wrong. *For example, I know my recess prediction was right because my graph shows that the outside temperature was about _____ degrees 7 out of 15 days so we could have outside recess., Or: I know my temperature prediction was wrong because my graph shows that the outside temperature did not fall below 20 degrees 15 out of 15 days in January.*
5. The written explanation should include how predications were made and why they are expected to be correct. *For example, I think that outside temperatures in February will be warmer than they were in January, so, I think it is likely we will have outside recess 12 out of 15 school days. Or: I think that outside temperatures in February will be warmer than they were in January, so I think it is likely the outside temperature will fall below 20 degrees 10 out of 15 school days in February.*