Name _____   **Date** _____

Teacher Notes

Rationale

Mathematics investigations open students' minds to the possibility of multiple approaches, multiple outcomes and multiple solutions. When linked to the world in which they live, open-ended investigations can help students see the relevance of mathematics within their lives. They also provide wonderful opportunities for differentiation, enabling students to feel confident and successful as they engage with tasks at their own individual level.

Overview

This mathematics investigation requires students to apply their knowledge and understanding of chance and data to a real-world situation.

Objective

To test a statement about chance by conducting a comprehensive experiment.

Duration

Approximately two 60 minute lessons

Prior Learning

Before commencing the investigation, students should be familiar with the following concepts:

• collecting and displaying data using tables and graphs
• comparing and interpreting data sets.

Differentiation: Supporting Students

Less confident students could be supported in their learning by allowing them to conduct the chance experiment in a small group with the support of a teacher or teacher aide. Alternatively, the task could be simplified by reducing the number of rolls to 10 (this will make expressing frequencies as fractions, decimals and percentages easier for students).

Differentiation: Extending Students

More capable students could be challenged to test additional chance statements of their own choosing e.g. *If you shake the dice three times in your hands before rolling it, you have a higher chance of rolling a three.*

Monitoring Student Understanding

Due to the open-ended nature of this investigation, students' responses will vary significantly. For this reason, no answer sheet has been provided. Teachers must therefore check that each student has completed the investigation according to the task requirements.

Maths Investigation -
# Chance & Data

Roll Me A Six!

The Scenario

During a recent game of Snakes and Ladders, you noticed your friend whispering to the dice before each roll. You found this rather strange, so you asked your friend about it. Your friend replied, "If you whisper **Roll me a six!** to the dice before rolling it, you have a higher chance of getting a six. Everyone knows that!"

You have been thinking about this statement and wondering whether your friend is right. You have decided to conduct a detailed chance experiment to see whether whispering to the dice before rolling it increases the chance of getting a six.

The Task

Conduct a chance experiment to test the following statement:

If you whisper **Roll me a six!** to the dice before rolling it, you have a higher chance of getting a six.

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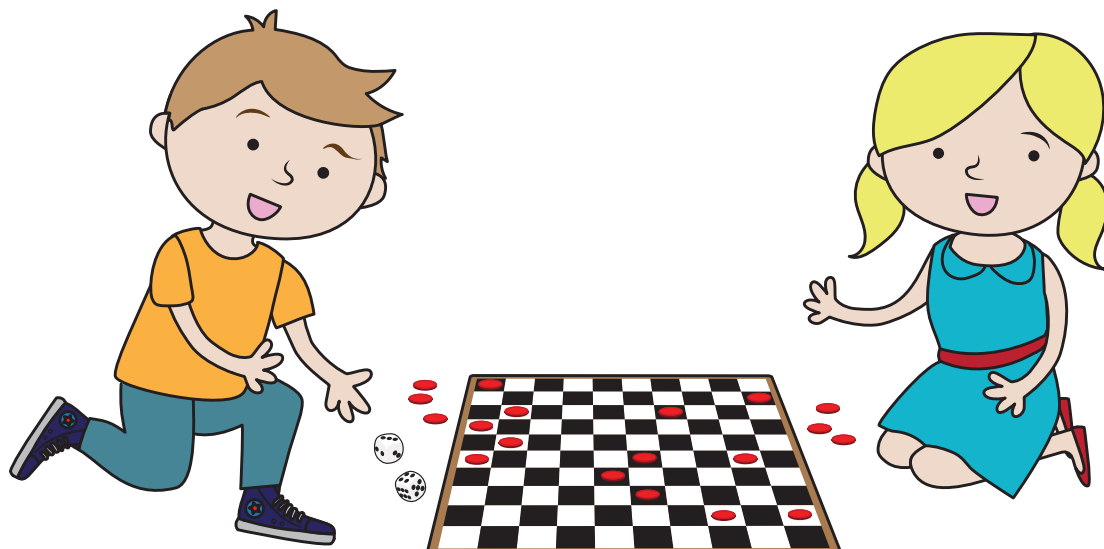
The Procedure

1. Predict what you think will happen during the experiment. Record your ideas on the Making Predictions Worksheet.

2. Conduct the experiment. Roll a dice 20 times, whispering **Roll me a six!** before each roll. Record what happens each time in the table provided on the Conducting the Experiment Worksheet. Then roll the dice 20 more times, without whispering. Record what happens each time in the second table.

3. Use the Recording Results Worksheet to show the frequency that each number was rolled during each part of the experiment as a number, as a fraction, as a decimal and as a percentage.

4. Draw a side-by-side column graph on the Displaying Results Worksheet to display the results of each part of the experiment.

5. Answer the questions on the Discussion and Conclusion Worksheet to compare the results of the experiment with your prediction.

The Materials

- Dice
- Worksheets
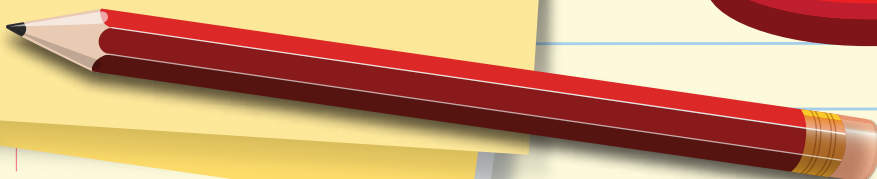
Name _____   **Date** _____

Making Predictions

1. Do you think that the statement you are testing in this experiment is true or false? Give reasons for your answer.

   _____

   _____

   _____

2. Out of 20 rolls, how many sixes do you think you might roll during the first part of the experiment (Whispering to the Dice)? Give reasons for your answer.

   _____

   _____

   _____

3. Out of 20 rolls, how many sixes do you think you might roll during the second part of the experiment (Rolling the Dice Normally)? Give reasons for your answer.

   _____

   _____

   _____

4. What will need to happen in this experiment to prove that the statement is true?

   _____

   _____

   _____

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Conducting the Experiment

Part 1: Whispering to the Dice	
Roll	**Outcome**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Part 2: Rolling the Dice Normally	
Roll	**Outcome**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Name _____   **Date** _____

Recording Results

1. In the table below, record the frequency that each number was rolled for each part of the experiment.

	1	2	3	4	5	6
Part 1 (Whispering to the Dice)						
Part 2 (Rolling the Dice Normally)						

2. In the table below, record the frequency that each number was rolled as a fraction, as a decimal and as a percentage.

Part 1 (Whispering to the Dice)

	1	2	3	4	5	6
Fraction						
Decimal						
Percentage						

Part 2 (Rolling the Dice Normally)

	1	2	3	4	5	6
Fraction						
Decimal						
Percentage						

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Name _____   **Date** _____

Displaying Results

In the box below, draw a side-by side column graph to show the frequency that each number was rolled during each part of the experiment. Don't forget to include:

- an appropriate title
- labels for the x and y axis
- a key.

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Discussion and Conclusion

1. How did the results of Part 1 (Whispering to the Dice) compare with your prediction?

   _____

   _____

2. How did the results of Part 2 (Rolling the Dice Normally) compare with your prediction?

   _____

   _____

3. List any similarities you notice in the results of the two parts of the experiment.

   _____

   _____

4. List any differences you notice in the results of the two parts of the experiment.

   _____

   _____

5. If you whisper *Roll me a six!* to the dice before rolling it, you have a higher chance of getting a six.

   Based on your results, is this a true statement? Why or why not?

   _____

   _____

   _____

Name _____   **Date** _____

Reflection

1. Did you enjoy working on this investigation? Give reasons to explain your answer.

   _____

   _____

2. Were the results of the experiment what you expected? Give reasons to explain your answer.

   _____

   _____

3. What would you say to your friend about whispering to the dice before each roll, now that you have conducted this investigation?

   _____

   _____

   _____

4. What new knowledge and skills did you learn by completing this investigation?

   _____

   _____

   _____

5. Circle the statement that best suits how you feel about conducting chance experiments.

   a) I feel very confident conducting chance experiments.

   b) My understanding of chance experiments is improving.

   c) I still need some help when conducting chance experiments.

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