

Important Concepts . . .

# Preview Review



**Mathematics   Grade 4   *TEACHER KEY***

***W2 - Lesson 5: Exploring Outcomes***

## Important Concepts of Grade 4 Mathematics

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## Materials Required

Mathematics Grade 4

Version 5

Preview/Review W2 - Lesson 5 TEACHER KEY

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# Preview/Review Concepts for Grade Four Mathematics

## *TEACHER KEY*



***W2 - Lesson 5:  
Exploring Outcomes***

# OBJECTIVES

By the end of this lesson, you should

- identify outcomes as
  - possible or impossible
  - certain or uncertain
  - likely or unlikely
- design a spinner based on probability concepts
- identify specific outcomes in terms of a fraction of the total outcomes

## GLOSSARY

**chance** - how likely it is that an event will happen. For example, there is an even chance (1 chance in 2) that a coin will turn up “heads” when it is tossed.

**outcome** - the result you get when you perform an action. For example, when you throw a die, six outcomes are possible (1, 2, 3, 4, 5, or 6).

**probability** - the mathematical word for *chance*. About 9 out of 10 people are right-handed, so the probability that the next person you meet will be right-handed is 9/10.

**tally** - a quick way of recording results or outcomes by using simple ticks called tally marks

## W1 - Lesson 5: Exploring Outcomes

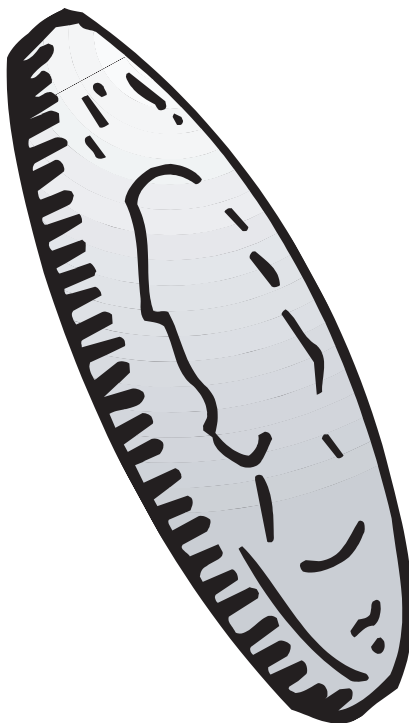
### A. Probability and Chance

**Probability** is the study of **chance** events. It is about making predictions about whether a certain outcome will happen. Probability helps you decide if something is

- likely or unlikely to happen
- certain or uncertain
- possible or totally impossible

An easy way to explore probability is to toss a coin quite a few times and to see what the outcomes are.

Every coin has 2 sides. The side with the face of the Queen is called the "heads" side. The other side has a picture on it, such as a leaf, a beaver, or a caribou. That side is called "tails".



## B. Exploring Probability Using Coins

Some people flip or toss coins to help them make decisions. What do you think is likely to happen if you toss a coin many times? Try this experiment to find out.

Toss a coin 50 times. On the chart below, record how many times the coin lands on each side by using **tally marks**. Also record the number of times that the coin lands on its edge.



Heads	Tails	On the Edge

*Answers will*

1. a. How many times did the coin land on its "tails" side? *vary.*

*Answers will*

- b. How many times did the coin land on its "heads" side? *vary.*

*Zero is the most*

- c. How many times did the coin land on its edge? *probable answer.*

***For 1.a and 1.b , draw the students' attention to the fact that the number of heads and tails is equal or about equal. That is, there should be just as many "heads" outcomes as "tails" outcomes.***

Think about the 50 **outcomes** you just observed. Answer the following questions.

2. a. Is it possible or impossible for a coin to land on its "tails" side?

***Possible***

---

- b. Is it possible or impossible for a coin to land on its "heads" side?

***Possible***

---

- c. Is it possible or impossible for a coin to land on its edge?

***Impossible. (Some students may argue that there is a slight possibility the coin may land on its edge. Accept this.)***

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3. a. Is it certain or uncertain that a coin will land on its "tails" side?

***Uncertain***

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- b. Is it certain or uncertain that a coin will land on its "heads" side?

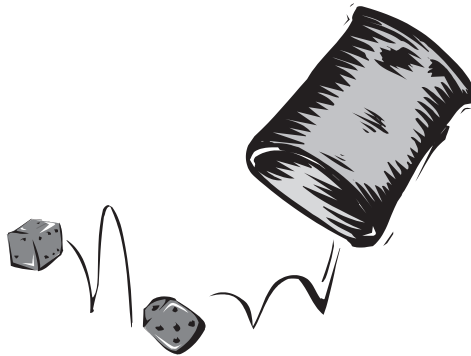
***Uncertain***

---

- c. Is it certain or uncertain that a coin will land on its edge?

***Uncertain***

---



4. a. Is it likely or unlikely that a coin will land on its "tails" side?

*Likely*

---

- b. Is it likely or unlikely that a coin will land on its "heads" side?

*Likely*

---

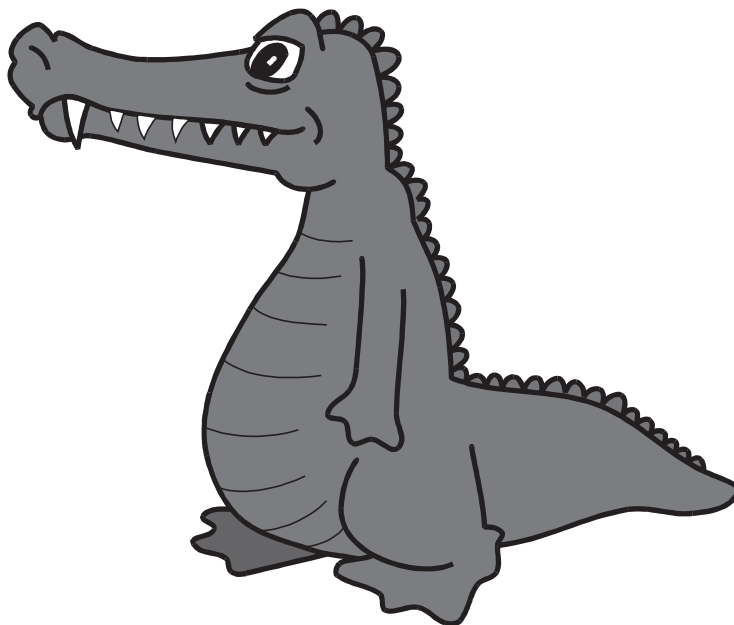
- c. Is it likely or unlikely that a coin will land on its edge?

*Unlikely*

---

You found out that it was possible for the coin to land on either the "heads" or "tails" side. You probably saw that it was likely to land on either side. The outcome of each toss was uncertain.

The coin probably did not land on its edge even once. It is almost impossible for a coin to land on its edge, so it is very unlikely for that outcome to happen.

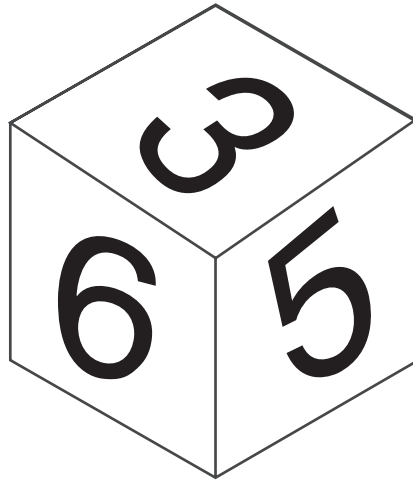


***(For 4.a and 4.b students may choose heads (or tails) as being more likely if their experiment with 50 tosses indicated that heads (or tails) occurred more often. Suggest to the students that if they repeated the experiment several more times, the number of heads and tails would tend to be equal.)***



## C. Exploring Probability Using Coins and Dice

Let's explore probability further using a die or a number cube numbered from 1 to 6.



1. What number is showing on the top of the die? 3
2. There are other numbers that could show up on top after the number cube or die is rolled. These other numbers showing up are called other possibilities or **outcomes**. What other outcomes besides 3 could you roll with the die?



1

2

4

5

6

3. Use the words **possible**, **impossible**, **certain**, **uncertain**, **likely**, or **unlikely** to describe the chance of the following outcomes.

- a. the number 7 will be rolled *Impossible*
- b. an odd number will be rolled *Possible*
- c. an even number will be rolled *Possible*
- d. the number 6 will be rolled 4 times in a row *Unlikely*
- e. a number between 1 and 6 will be rolled *Certain*
- f. the number rolled will be less than 6 *Likely*



## D. Predicting Outcomes Using a Spinner

You will need a spinner for the following exercises.

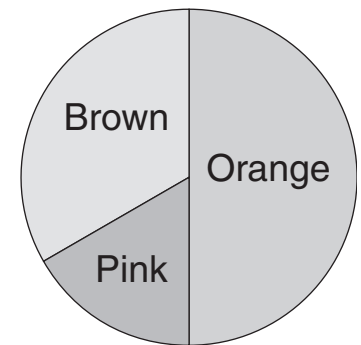
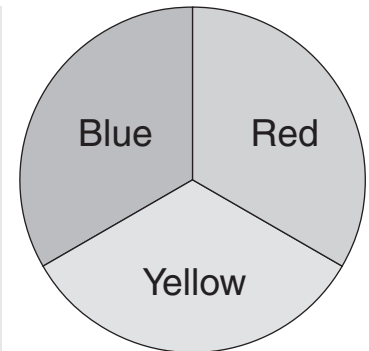
Use the spinner cut-out and the instructions at the back of this lesson to construct a spinner with the numbers 1 to 6 on it.

1. Spin the wheel of your spinner.  
What number did the arrow point to? *Answers will vary.*
2. List all the other possible outcomes that the arrow can point to.  
*The numbers 1, 2, 3, 4, 5, 6, minus whatever number*  
*is indicated in Question #1.*
3. Use the words **possible**, **impossible**, **certain**, **uncertain**, **likely**, or **unlikely** to describe the chance of the following outcomes happening.
  - a. the arrow point will to a 5 *Possible*
  - b. the arrow will point to an odd number *Possible*
  - c. the arrow will point to a number greater than 2 *Likely*
  - d. the arrow will point to the 5 three times in a row *Unlikely*
  - e. the arrow will point to a number less than 7 *Certain*
  - f. the arrow will point to a number 7 or greater *Impossible*

Instead of numbers, we can put colours on a spinner. If we make all the colours on the spinner equal in size, the chance of the spinner pointing to any colour is the same for each colour.

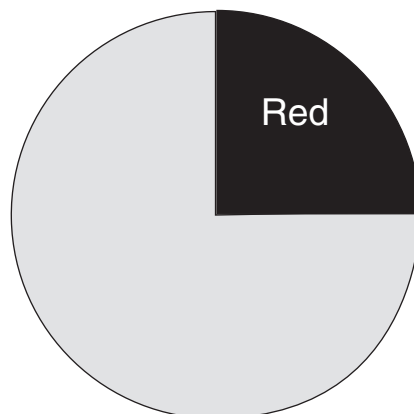
For example, the chance of the spinner pointing to each colour in this spinner is 1 in 3 chances. In other words, if you spin the spinner 100 times you will likely get the colour red about 33 times, blue about 33 times, and yellow about 33 times.

If you spin a 3-colour spinner 100 times and it points to orange 50 times, more of the spinner must be shaded orange. Because 50 is half of 100, half of the spinner must be shaded orange.



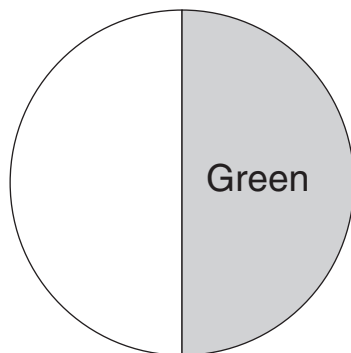
4. Colour or label the colours on each spinner below to show the outcomes described. **Each spinner must have the colours red, green, and yellow on it.**

- a. In 100 spins, the arrow will point to the colour red about 25 times.



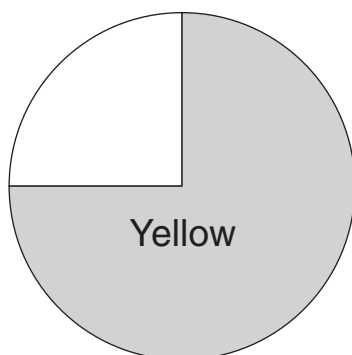
***One fourth of the spinner should be coloured red.***

- b. In 100 spins the arrow will point to the colour green about 50 times.



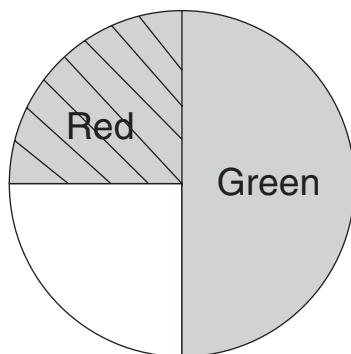
***One half of the spinner should be coloured green.***

- c. In 100 spins the arrow will point to the colour yellow about 75 times.



***Three quarters of the spinner should be coloured yellow.***

- d. In 100 spins the arrow will point to the colour green about 50 times and to the colour red about 25 times.

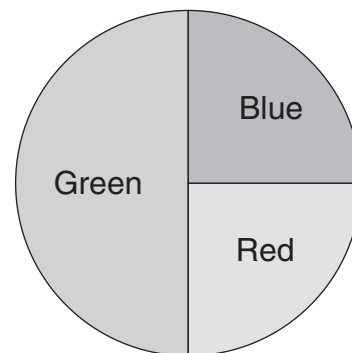


***One half of the spinner should be green. One quarter of the spinner should be red.***

## E. Fractions and Probability

The spinners you used during the last activity were divided into several parts. The different parts of each spinner are a fraction of the whole of that spinner.

Look at this spinner. It is divided into green, blue, and red sections.



The green section covers  $\frac{1}{2}$  of the spinner. The probability of the arrow

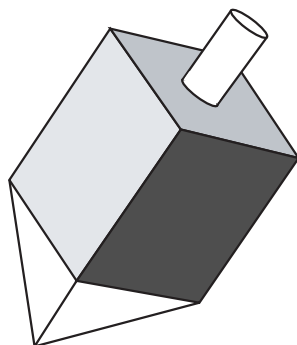
pointing to green is **one chance out of two**, or  $\frac{1}{2}$ .

The probability of spinning blue is **one chance out of four**, or  $\frac{1}{4}$ . The

probability of spinning red is also **one chance out of four**, or  $\frac{1}{4}$ . Each of

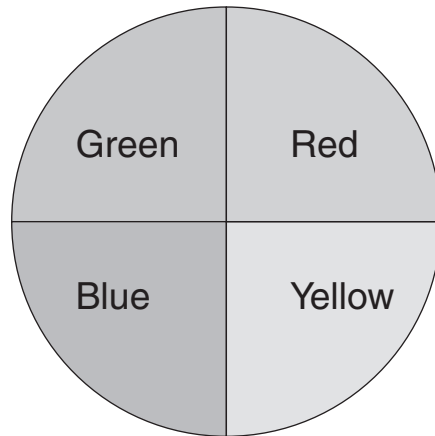
these two colours covers  $\frac{1}{4}$  of the spinner.

There is a greater chance the arrow will point to green than to either blue or red. It is twice as likely that the arrow will point to green than to either blue or red.



This is a picture of a dreidel, a Jewish spin top. The probability of the top stopping with a certain side facing up is one chance out of four. Do you know why?

Look at the spinner below. It is divided into four equal sections. Each section is a fraction of the whole spinner. Each section is a different colour.



1. There are four possible outcomes for the arrow to stop on. What are they?

a. Green      b. Red

c. Blue      d. Yellow

2. What is the probability of the arrow stopping on any one of the colours? Write it in two different ways. One way should be a fraction.

$\frac{1}{4}$  or 1 in 4 chances

3. What is the probability of the arrow pointing to either the blue or the yellow section. Write your answer in two different ways. One should be a fraction.

**$\frac{1}{2}$  or 1 in 2 chances**

4. Is the chance of the arrow pointing to the red section greater than the chance of pointing to the green section? Explain your answer.

---

***No. Both red and green are  $\frac{1}{4}$  of the circle. Therefore, there is a 1 in 4 chance of the spinner pointing to red or pointing to green.***

---

5. What is the probability of the arrow pointing to the red, green or the blue section during a spin? Write your answer in two different ways. Use a fraction for one way. Explain your answer.

***$\frac{3}{4}$  or 3 in 4 chances***

***Because red, green, and blue together cover  $\frac{3}{4}$  of the circle, the chance of the spinner pointing to one of three colours is 3 in 4.***

6. When using a die or number cube, what is the probability of rolling each number? Write your answer in two different ways.

***$\frac{1}{6}$  or 1 in 6 chances***

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7. When using a die, what is the probability of 1, 4, or 6 coming up for any throw? Write your answer in two different ways. Explain your answer.

***$\frac{3}{6}$  or 3 in 6 chances (Students may notice that this is half of a***

***spinner divided into 6 equal sections, so  $\frac{3}{6}$  is the same as  $\frac{1}{2}$  or 1 in 2 chances.)***



## ***Congratulations!***

You have completed the work for W2 - Lessons 1 to 5 of the Preview/Review course for Math 4.

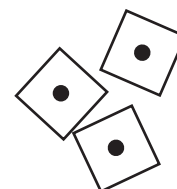
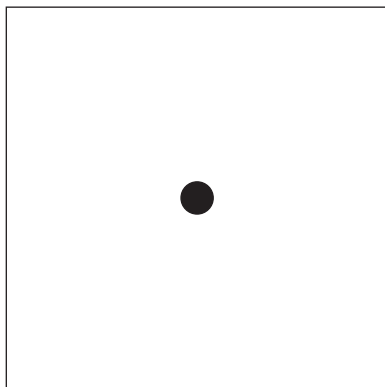
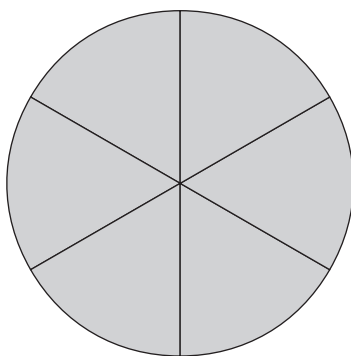
Now, it's time to check up on what you have learned. Today, you will write a quiz that reviews the concepts covered in W2 - Lessons 1 to 5.

Before you do the quiz, you may want to go back and look over the work you just completed.

Tell your teacher when you are ready to begin writing this quiz. Good luck!

## Directions For Making a Spinner

- Cut out the circle, the large square, and the three small squares. Glue or tape them to a posterboard or manilla tag backing. (Perhaps your teacher will photocopy these on heavy paper.)



- Bend up the outside end of a paper clip so that it points straight up when you lay it flat on your desk.
- Use a small nail or pin (or the paper clip wire) to poke holes through the middle of the large square and the three small squares (the washers).
- Poke the straight end of the paper clip through the hole in the large square. Tape the paper clip to the bottom of the square so it does not move.
- Put the three small squares on the straight end of the paper clip.
- Put the circle on the straight end of the paper clip.
- Wrap the straight end of the paper clip with tape or a band-aid so that it is not so sharp.
- Use your finger to spin the wheel. The arrow shows you what number to read.

