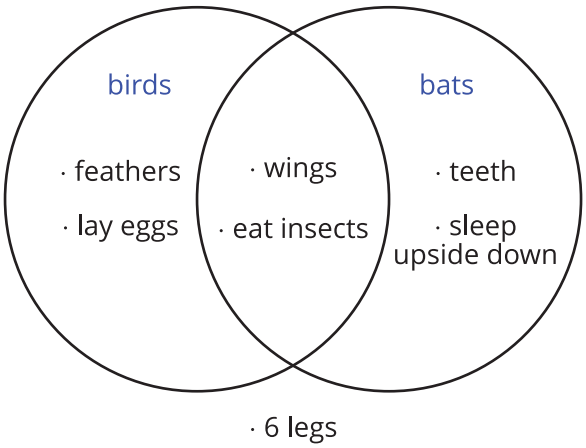
Unit 8, Lesson 5

Combining Events

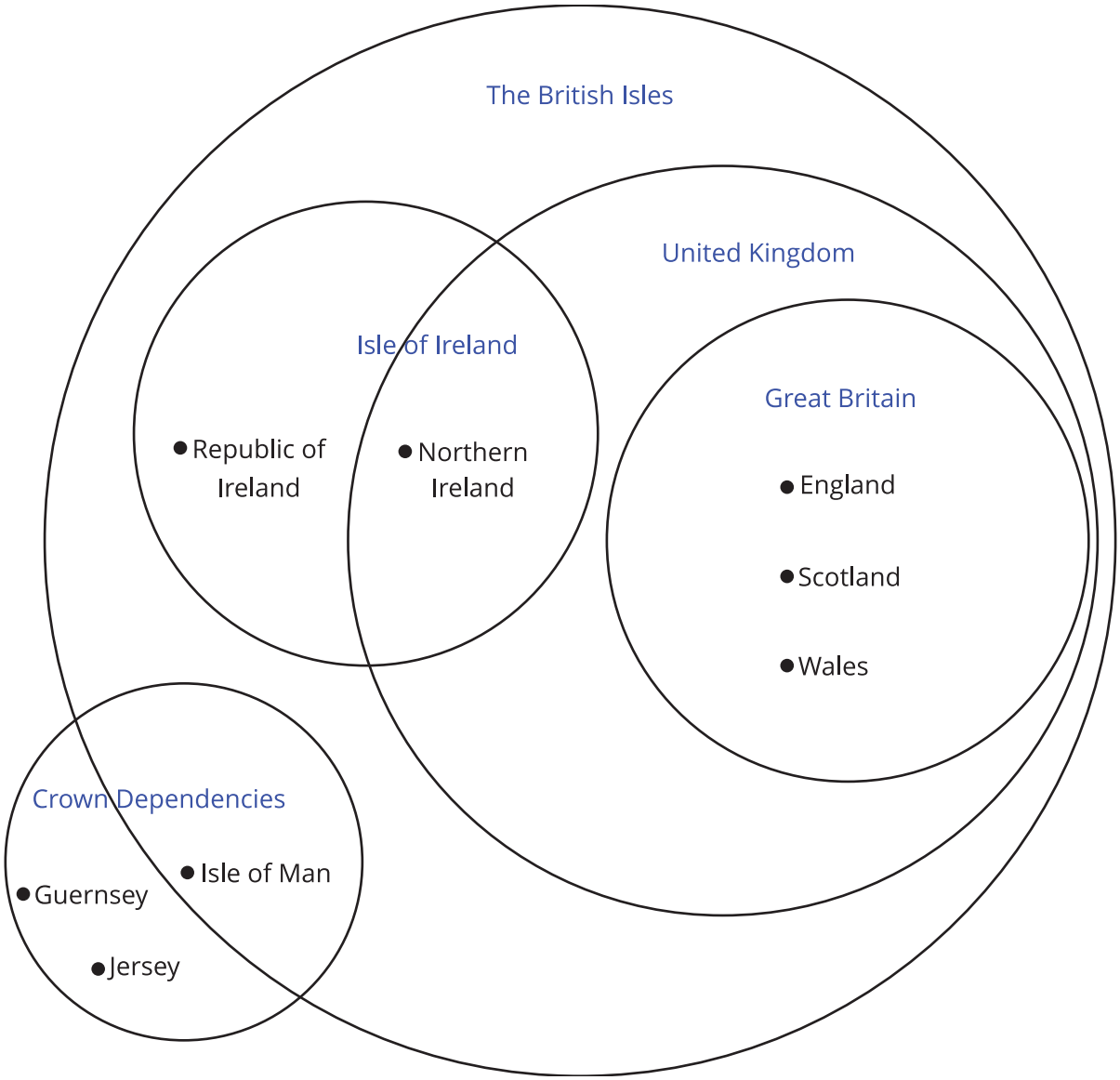
Let's look at ways to describe events composed of other events.

5.1 Notice and Wonder: Birds and Bats

What do you notice? What do you wonder?



5.2 Eventful Islands



The small dots next to the names indicate that the name listed in the diagram is a country.

1. Based on the categories in the Venn diagram, describe Northern Ireland in a way that will not include any other countries.

2. Based on the categories in the Venn diagram, describe the Republic of Ireland in a way that will not include any other countries.

3. How many countries displayed are not part of The British Isles?

4. How many countries displayed are part of the United Kingdom?

5. How many countries displayed are part of the Isle of Ireland?

6. How many places displayed are part of the United Kingdom and are Crown Dependencies?

7. How many places displayed are part of the United Kingdom or the Isle of Ireland?

8. If one of the crown dependencies (there are 3) is chosen at random, what is the probability that it is part of The British Isles?

9. Northern Ireland, England, Scotland and Wales are all part of the United Kingdom. If one of them is selected at random, what is the probability that it is also considered part of Great Britain?

10. Given that the Republic of Ireland, Northern Ireland, England, Scotland, Wales, and the Isle of Man are all part of The British Isles, what is the probability that one of them selected at random is part of the Isle of Ireland?

5.3 Info Gap: College and Career Planning

Your teacher will give you either a problem card, or a data card. Do not show or read your card to your partner.

If your teacher gives you the problem card:

1. Silently read your card and think about what information you need to answer the question.
2. Ask your partner for the specific information that you need. “Can you tell me _____?”
3. Explain to your partner how you are using the information to solve the problem. “I need to know _____ because _____.” Continue to ask questions until you have enough information to solve the problem.
4. Once you have enough information, share the problem card with your partner, and solve the problem independently.
5. Read the data card, and discuss your reasoning.

If your teacher gives you the data card:

1. Silently read your card. Wait for your partner to ask for information.
2. Before telling your partner any information, ask, “Why do you need to know _____?”
3. Listen to your partner’s reasoning and ask clarifying questions. Only give information that is on your card. Do not figure out anything for your partner!
   These steps may be repeated.
4. Once your partner has enough information to solve the problem, read the problem card, and solve the problem independently.
5. Share the data card, and discuss your reasoning.

5.4 Number Cube Descriptions

1. Roll two standard number cubes 20 times. Record your results in the space provided here, and keep track of which number is rolled first.

2. Use your results to complete the “percentage of your rolls” column in the table. ("Doubles" means that both numbers rolled are the same.)

event	number of possible outcomes	percentage of your rolls	actual probability
first cube is 6	6		$\frac{6}{36}$, 16.7%
4 and a 6 in either order			
doubles			
doubles and the first cube is a 6			
doubles or the first cube is a 6			
first cube is not a 6			
doubles and the first cube is not a 6			
not doubles			

3. Compare the actual probabilities to the percentages from your group.

4. Why is the actual probability different from the percentage of rolls you made for each event?

Are you ready for more?

1. Roll three standard number cubes as many times as you can with the time remaining. Record your results, and keep track of the order.

2. Complete the table. ("Triples" means that all three numbers rolled are the same.)

event	number of possible outcomes	percentage of your rolls	actual probability
first cube is 6			
4, 5, and 6 in any order			
triples			

3. Compare your percentages to the actual probabilities.

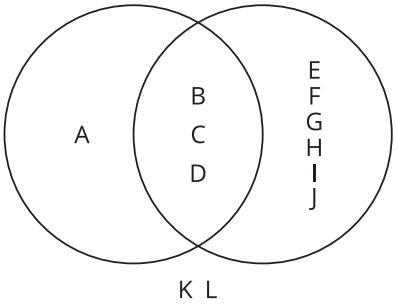
4. If you rolled 500 more times, do you think that the difference between the actual probability and the percentage of rolls you made for each event would increase or decrease? Explain your reasoning.

5. Describe a method for recording the 216 outcomes in the sample space. Do not actually record all 216 outcomes.

Lesson 5 Summary

In many cases, it is useful to talk about the important outcomes in a sample space by naming characteristics that the outcomes share or characteristics that are not in the outcomes.

For example, consider a group of 12 first-year students in college and their choices of science courses.



The circle on the left represents the students taking a chemistry class and the circle on the right represents the students taking a biology class. The region where the circles overlap represents the students taking both a chemistry class and a biology class. The students who are not included in either circle are not taking chemistry or biology.

We can describe some of the groups of students based on the characteristics they share or lack. For example:

- Students A, B, C, and D are taking a chemistry course.
- Students A, K, and L are not taking a biology course.
- Students B, C, and D are taking a chemistry course and taking a biology course.
- Students E, F, G, H, I, and J are taking a biology course and are not taking a chemistry course.
- Students A, B, C, D, E, F, G, H, I, and J are taking a chemistry course or are taking a biology course.

While listing the individual students in this situation is not too difficult, many sample spaces are very large and it can be easier to name events based on characteristics rather than listing all the outcomes in the event.