



# LESSON SCENARIO 11: ROLL THE DICE

Topic: Probability of events

Level: Age 14 -15

Foreknowledge: Basics of statistics

Correlation: games, psychology

Time: 45 minutes



## LEARNING OUTCOMES

- Finding probability
- Visualise probability

## TEACHING METHODS

- VR technology
- Individual work and pair work

## KEY WORDS

- Probability

## RESOURCES

- VR headsets
- Worksheet for student

## INTRODUCTION

### RULES OF CONDUCT WHEN USING VR IN THE CLASSROOM (5 min)

The teacher starts discussion with the students asking them about the use of VR and their expectations in using VR in classroom.

After the discussion the teacher defines the work methods and rules of conduct for students regarding safety precautions for using VR headsets in the classroom and learning in virtual environment:

- listen to the teacher carefully
- remove physical obstacles before using VR
- always work in pair - never alone
- keep the device clean.

### INTRODUCTION TO CONCEPT OF PROBABILITY (5 min)

The chance of winning a lottery is like 1:13 983 816 and the chance to get strike by lightning is like 1:750 000. What do you think is more probable to happen?

To better count what is the chance that something will happen mathematicians introduced the idea of **probability**. When we calculate the probability of certain even, we learn how big or small are our chances for this to actually happen.

Simple probability of event is expressed as a fraction where:

$$\text{Probability} = \frac{\text{Favorable outcomes}}{\text{Total outcomes}}$$

An understanding of probability is important in medicine, law and wider society. Knowledge of how probability works can be very serious but it can also provide answers to some everyday questions.

Imagine:

You have a bag of MMs but you only like the red ones. In the bag there are 120 candies but only 35 are red. When you reach to the bag what are your chances to pick the red one?

Let's see this in a simple exercise with dices.

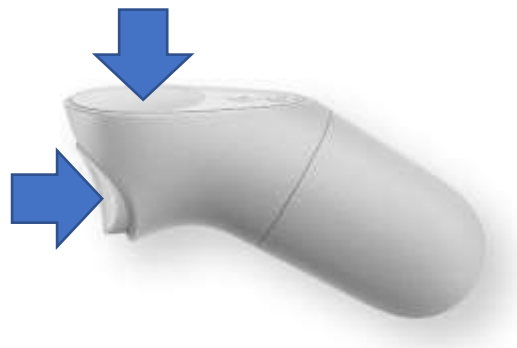
**(5 min) ACTIVITY:**

- the teacher divides the students into pairs - in each pair there is a student A and a student B; student A has a VR headset, and student B assists him.
- student A carefully puts on his VR headset and starts the task in the VR application
- student A finds and selects the Rolling Dice exercise on the exercise shelf
- after completing the task, students A and B change roles

**WORKSHEET FOR STUDENT**


**(15 min):** VR Task


**Task for student A (with the headset):**



By pointing on the polyhedron and holding those buttons student can pick the dice and check if from all sides.


**Student B (who does not have VR headset on)** notes the answers.

RED DICE		
	What are the chances of rolling 3 with red dice?	What are the chances of rolling 6 with red dice?



BLUE DICE		
	What are the chances of rolling 2 with blue dice?	What are the chances of rolling 5 with blue dice?

After that task, the students switch places.

**Student B** who now has VR headset solves the task in the following table:

GREEN DICE		
	What are the chances of rolling 1 with green dice?	What are the chances of rolling 4 with blue dice?

What are the chances for a BLUE dice to win rolling it with a RED dice at the same time?		
		ANSWER

What are the chances for a RED dice to win rolling it with a BLUE dice at the same time?		
		ANSWER

**DISCLAIMER:** After giving all the right answers there is a small surprise at the end of the experience 😊

**After the completion of the task by students, students discuss the next question,**

### **QUESTION**

Teacher wants to pick one student to perform a task on the board. In this class there are 12 boys and 18 girls. What is the probability that the teacher will pick a girl?

### Answers:

$$\text{Probability} = \frac{\text{Favorable outcomes}}{\text{Total outcomes}} = \frac{\text{number of girls in classroom}}{\text{total number of students}} = \frac{18}{30} = \frac{3}{5}$$

- What are the chances of rolling 3 with red dice?  $5/6$
- What are the chances of rolling 6 with red dice?  $1/6$
- What are the chances of rolling 2 with blue dice?  $3/6$
- What are the chances of rolling 5 with blue dice?  $3/6$
- What are the chances of rolling 1 with green dice?  $1/6$
- What are the chances of rolling 4 with blue dice?  $5/6$
- What are the chances for a BLUE dice to win rolling it with a RED dice at the same time?  $5/12$
- What are the chances for a RED dice to win rolling it with a BLUE dice at the same time?
- $7/12$

## EVALUATION

1. I like the way of work in this lesson.	1	2	3	4	5
2. This lesson was interesting.	1	2	3	4	5
3. It is clear what I was supposed to learn in this lesson.	1	2	3	4	5
4. The subject matter was clearly explained.	1	2	3	4	5
5. I have learned the subject matter.	1	2	3	4	5
6. I think I actively participated in this lesson.	1	2	3	4	5
7. I was more active in this lesson than usually.	1	2	3	4	5
8. By being active I contributed to the quality of the lesson.	1	2	3	4	5
9. I was motivated for work in this lesson.	1	2	3	4	5
10. I prefer using VR in lessons.	1	2	3	4	5
11. Name two things you liked in this lesson.					
12. Name two things you didn't like in this lesson.					

## INCLUSIVENESS GUIDENESS

Every student is different and their needs for the material might vary. Below you will find several tips that could make mathematics lesson more inclusive for students who struggle with learning disorders.

- When giving assignments to classroom try to break them into small pieces of information. Avoid the double tasks in the instructions. Remember that in case of operations/exercises with multiple steps, it is critical to help learners decompose the steps.
- You can use checklists for your students to make sure they have done all the steps
- Make sure the font, line spacing, and alignment of your document is accessible for students with learning disorders. It is recommended to use a plain, evenly spaced sans serif font such as Arial and Comic Sans. Others: Verdana, Tahoma, Century Gothic and Trebuchet. Spacing should be 1.5 and try to avoid justification in the text.
- At the end of each activity, take some time to ask the students what they have learnt to acknowledge every step in their learning process
- Make sure that the material the students manipulate is easy enough to grasp
- While using different media (paper, computer and visual aids) choose different background than white which can be too bright for students with learning disorders. The best choice would be cream or soft pastel but try to test different colours to learn more about student's preference.
- To stimulate short and long-term memory prepare for all the students in the classroom an outline describing what they are going to learn on this lesson and finish it with a resume of what has been taught. In this way they will strengthen the ability to remember information.

### EXAMPLE:

#### 1. Start every lesson with a short "CHECK-IN"

- Today, we will study the topic (name of the topic)
- I will tell you about: (name 3 keywords connected with the topic)
- Then I will present exercises: (name the exercises form the student book)
- Then we will do exercises (explain the way student will be working: ex. together with teacher / in pairs /individually)
- Once the exercises will be done [To continue]

#### 2. Then finish lesson with a short "CHECK-OUT"

- During the lesson we learn about (topic of the lesson)

- The most important things were: (name 3 keywords connected with the topic)
- We were able to do... (tell about the work student done during the lesson)
- We will explore the topic next time when we will learn about (name the following topic)

It is a small adjustment that will take 5 min from the lesson but can make a great difference in the way that the material will be remembered. Try to create this as a routine habit.