Labyrinths & Legends

By Ryan Cooper

A tabletop role playing game themed inquiry task for probability.

Labyrinths & Legends

Your friends have invited you join their tabletop role playing game (RPG) campaign: *Labyrinths & Legends*. RPGs involve creating a character and embarking on an adventure where you make decisions and roll dice to determine their outcomes. You have never played *Labyrinths & Legends* before*,* but fear not, brave adventurer, for your knowledge of chance and probability will guide you through the trials ahead.

Your task is to apply your knowledge of probability to practice your skills, then design a character that will survive the practice game. You will create a digital report that documents your working, reasoning, and evidence of your design process.

Take photos or scan any working that you have done on paper, compile your digital document with a cover sheet and submit it to OneDrive.

Question 1

Not all dice in RPGs have 6 sides. The game will tell you how many of each dice to roll. For example, roll 1d8 means 'roll one eight-sided die' and roll 2d6 means 'roll two six-sided die'.

Does rolling 1d12 result in different probabilities to rolling 2d6? Draw a table to represent the sample spaces for each experiment.
   a) Determine the probability of rolling a total value of 6 in each experiment.
   b) Determine the probability of rolling a total value of at least 9 in each experiment.
   c) Why do you think an RPG would require you to roll 2d6 as opposed to 1d12?

Question 2

To decide who gets to attack first in a battle, participants roll a die. Whoever rolls the highest value wins initiative.

Draw a probability tree representing your chance of winning initiative, losing, or drawing, depending on the value of a 1d6 roll.
   a) Determine the probability of you rolling the highest value.
   b) Determine the probability of you losing if you roll a 3 or less.

Question 3

Sometimes adventurers can be rewarded with treasure. When collecting treasure, you take it in turns with the other plays to choose a piece of treasure from a treasure chest.

You and two other adventurers find a treasure chest containing:

> 2 x Secretly cursed coin
> 5 x Gold coin
> 1 x Secretly cursed sword
> 2 x Daggers

Draw a Venn diagram to represent the sample space of the treasure chest grouped by whether a piece of treasure is a coin, a weapon or secretly cursed.

   a) Determine the probability of you choosing a secretly cursed item.
   b) One of your party members took a gold coin before you had a chance to take an item. Draw a Venn diagram to represent the new sample space and determine the probability of you choosing a secretly cursed item. Use a conditional statement to describe the situation.
   c) Phew! You chose a gold coin that isn't secretly cursed. Draw a Venn diagram to represent the new sample space and determine the probability of the next player choosing a secretly cursed coin. Use a conditional statement to describe the situation.

Question 4

Escape the dungeon alive!

Design a character that you think would have the best chance of escaping the dungeon. Use the character sheet in the appendix as a template when designing your character. Your character will face many trials, but if their HP reaches 0 then they have failed to escape the dungeon alive.

It is suggested that you follow the following design process:

i)	Read through *How To Play* and *The Campaign* and investigate the probability situations you will encounter.
	Document your findings and discuss each probability situation.
	Assign your character statistics to build a character based on your observations and justifying your reasoning. Discuss your decisions with your peers and teacher.
ii)	Play through the campaign using your character. (Get a friend to play as the monsters or roll the dice yourself)
	Keep a record of your dice rolls and outcomes in a spreadsheet.
	Did you escape the dungeon? Discuss whether each encounter had expected or unexpected outcomes and explain why you think that was.
iii)	Make changes to your character based on your observations. Explain why you made these changes and discuss them with your peers and teacher.
	Play through the campaign again and record your results in a spreadsheet.
	Use the spreadsheet to compare the data from your second playthrough with your first playthrough. Were your changes effective? Create visual representations of your data and explain how.

How To Play:

Stat Checks

When the game asks you to "roll a statistic check > *n*", you need to roll the dice that it asks you to, then add the value of your statistic to the value of your dice roll. If this value is greater than *n*, then you have won the check.

For example: *Roll a 1d6 dexterity check > 9* means that you roll 1d6, add your dexterity stat to that value, and if the total is greater than 9 you have won the check.

Combat

Every time you face a new enemy, you and your enemy must roll for initiative. You each roll 1d20 and whoever rolls the highest gets to attack first. If you roll the same amount, roll again.

In combat, the participant's weapon tells you which dice to roll. Roll the weapon dice, then add their attack statistic to the value of the dice. This total value is then subtracted from the HP value of whoever is being attacked.

Each combat participant takes turns in attacking until one of the participants' HP reaches 0.

Refer to the *Monster Manual* for information on monsters you will encounter.

The Troll Toll

A troll stands by the entrance to the hallway. You can smell its stink from across the room, and it only gets worse as you edge closer with your weapon drawn. Known for being slow-witted, the troll has not noticed you yet, and it is busy sharpening its axe and singing to itself.

Options:

a) To sneak past, roll a Dexterity check > 7. If you fail, fight the troll.
b) To convince the troll to let you pass, roll a Charisma check > 6. If you fail, fight the troll.
c) Fight the troll

Open Sesame

There is a large stone door at the end of the hallway. You see a goblin pressing its hand on glowing symbols around the edge of the door. It looks like it is trying to press them in a sequence, but every time the goblin gets the sequence wrong the symbols flash brightly and burns their hand. Eventually the goblin gets the sequence right and the door opens, allowing it to slip through before the door slams closed again.

Options:

a) Guess the sequence by rolling 3 even numbers in a row. Every time you roll an odd number, lose 1HP.
b) To find out the sequence by looking at the goblin's hand prints, roll an Intelligence check > 8. You can only try this once.
c) To force the door open, roll a Strength check > 8. You will lose 2HP if you succeed.

Rumble In the Dungeon

You step into the chamber and the heavy door slams shut behind you and the torches on the wall flicker out. Wicked laughter echoes from the darkness at the other end of the chamber. You try to sneak out the way you came in, but the door won't budge. As you turn back around, another eruption of laughter, and you realise they only way to escape is to fight your way out.

As your eyes adjust to the light, you can make out the shadows of six looming figures of various sizes. A hideous voices call out, "You're the one that's been causing all the trouble in my dungeon? It won't take all of us to take care of you, worm!"

You have no option! Out of the 6 enemies in the chamber, you will have to defeat 3 to escape.

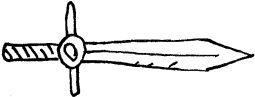| Roll 1: Goblin	Roll 3: Troll	Roll 5: Troll
Roll 2: Goblin	Roll 4: Troll	Roll 6: Orc

- Roll 1d6 to choose a monster, and remove the monster from the set
- After each fight, roll again to choose another monster. (If you roll a monster that you have already fought, roll again)
- Before each fight, you can roll a Charisma check. If you roll > 8, you intimidate all the remaining monsters into fleeing and you are free!

Appendix: Character Sheet Template and Monster Manual

	Dexterity
	Strength
	Charisma
	Intelligence

Weapon

NAME:

Health (HP) : 20

(Draw your character here)

You have 8 points to assign to your stats. Each stat cannot have a value greater than 4.

Choose one weapon:

Sword	Magic Staff	Twin Axes	Magic Gloves
Attack with 1d6 Strength Attack Stat	Attack with 1d4 Intelligence Attack Stat	Attack with 2d3 Strength Attack Stat	Attack with 2d2 Intelligence Attack Stat

Monster Manual

Goblin	Troll	Orc
Attack with 1d3 HP: 4	Attack with 1d4 HP: 8	Attacks with 1d6 HP: 12