



Activity 1 Starter



**A coin and a six-sided die are
thrown at the same time...**

1. How many different ways can they land?
2. What is the probability of getting:
 - a head?
 - a six?
 - both a head **AND** a six?
 - either a head **OR** a six **OR** both?



EXPLORERS ACTIVITY 1 - CAPTAIN'S LOG



Your aim in this mission is to find a safe route through the perilous Twilight Nebula.

You will receive special recognition if you can:

- find a route that will give you at least a 50% chance of survival over 20 attempts.

Getting Started

Click on the patrol ship docked at Explorers Space Station to start (see screen shot A below).

Within your group, discuss the information that appears on screen (see screen shot B below).

Experiment with the activity—in particular, observe what happens if you:

- click on the hexagonal sectors in the main display
- click on the up and down arrows at the bottom of the screen
- click on the 'Add sector' button in the bottom corner.

What do you imagine each section of the screen is meant to show?



The 'Launch ship' button will initially be inactive—it will only become active once:

- you have input your chosen route from start to finish
- your front shield, rear shield and life support power settings add up to 100.

Once clicked, your ship will set off on its voyage through the nebula.

The ship will sustain damage depending on the route that is taken and the threats that arise.

The ship will be destroyed if any of the front shield, rear shield or life support settings reach 0.

Discussion Time

Take some time to discuss this problem with the rest of your group.

- How are you going to approach this problem?
- What information will you need to use?
- What overall strategy are you going to employ?

Write your comments in this space.



Recording Your Results

Before you attempt to launch, make a note of:

- your chosen route from start to finish (on the outline shown below)
- how you have divided your power points (in the table shown below).

Note that you will not be able to change your route or power settings without starting again.

Chosen Route	Chosen Power Settings
	Front Shields
	Rear Shields
	Life Support

When you are ready, click the 'Launch ship' button to proceed.

Once clicked, track the progress of your ship as it passes through the nebula.

The ship will sustain damage depending on the chosen route and the threats that arise.

The ship will be destroyed if the front shields, rear shields or life support systems fall to 0.

Record your results on the separate sheet repeating the process until the table is complete.

Within your group, discuss your results:

- How would you describe your results?
- Can you see any patterns in your results?
- Is it possible to explain your results?

Describe and attempt to explain your results in this space.

Finishing Off

Now, within your group, discuss the following:

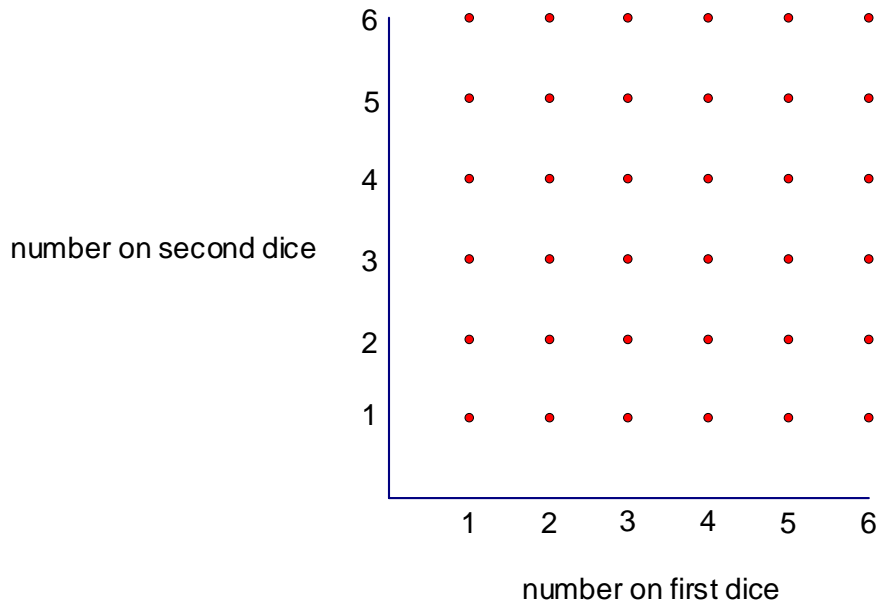
- How satisfied were you with your performance?
- Were the strategies you employed successful?
- How would you do things differently next time?

Write your comments in this space.



1) Two dice are thrown together.

This diagram shows the number of different ways they can land.



How many different ways can the pair of dice land?

Put a loop around all the dots that represent ways of throwing a six on one die or the other (or both)

Draw another loop around the dots that represent a total of 10

What is the probability of throwing:

- a) at least one six?
- b) a total of 10?
- c) both a 6 and a total of 10?
- d) either a 6 or a total of 10 or both?



2) You have a pack of 52 cards.

You pick a card without looking.

What is the probability that you pick:

- a) a king?
- b) a heart?
- c) the king of hearts (how can you check this answer?)
- d) either a king or a heart or both?

3) In a particular area of the Twilight Nebula, the probability of being hit by the different threats is shown in the table

Asteroids	Plasma Rays	Black Holes	Space Pirates
10%	$\frac{2}{15}$	0.4	$\frac{3}{8}$

What is the probability that you will be hit by:

- a) Asteroids and Black Holes?
- b) Plasma Rays and Space Pirates?
- c) Asteroids and Plasma Rays and Space Pirates?
- d) All four threats?

What is the probability that you will not be hit at all?