 Probability

It should be noted that students may need to be introduced or (hopefully only) reintroduced to Playing Cards, Dice, Board Games, Raffles, and Sporting Draws as some students may be very unfamiliar with the terms involved in these leisure pursuits . Although students should have seen them previously in Primary and Junior High School, cultural and geographic backgrounds may mean some students have a limited understanding of some well used scenarios.

Scope and sequence note

As probability is a small stand-alone topic it lends itself to being placed anywhere within the HSC year of the course.

Scope and Sequence note for schools teaching Extension 1 and Extension 2 as add on to Mathematics (2U), not as stand-alone classes: As permutations and combinations and further probability (Extension 1) and harder 3 Unit (Extension 2) rely on a knowledge of probability it will be necessary to manoeuvre probability to the early part of the HSC year to allow students to have completed the Mathematics (2U) content before encountering it in Extension 1 and 2.

Resources

[AMSI website](http://www.amsi.org.au/ESA_Senior_Years/SeniorTopic4/4_md/SeniorTopic4a.html) – Supporting Australian Mathematics Project (A guide for teachers of year 11 and 12) has a good comprehensive overview of probability.

| Content | Teaching Strategies and Activities | Resources |
| --- | --- | --- |
| Random experiments, equally likely outcomes. | Discussion of everyday events and probability misconceptions is a good starting point for this topic.  [ABC Splash resource – Random experiments: Random or not](http://splash.abc.net.au/res/i/L3661/index.html) | Although this is a primary teaching resource, this [Centre for Innovation in Mathematics Teaching booklet](http://www.cimt.plymouth.ac.uk/resources/help/h10prob2.pdf) has a good list of misconceptions and an activity to use |
| Sample spaces and event spaces. | Encountering a large variety of types of events and sample spaces at this point is encouraged as the syllabus does include  “Students should be familiar with the common terms used in popular activities and games, hence examples should be given in pastimes such as playing cards, Monopoly and backgammon as well as in gaming activities such as lotteries and raffles, the tossing of coins and the throwing of dice.” | [Playing card probabilities](http://www.pearsonplaces.com.au/Portals/0/studentlounge/NewSignMaths9_3e/4_pack.html) |
| Venn diagrams, mutually exclusive and non-mutually exclusive events. | Although Venn Diagrams were not in the stage 4 and stage 5 syllabuses until the recent syllabus change, most students have either encountered them in other subjects, in Stage 3 or have been shown them as an enrichment activity in their junior maths lessons.  Students should be introduced or reintroduced to Venn Diagrams using the “*popular activities and games”* they are to be familiar with (see previous point). | Mutually exclusive events - [Maths is fun covers Venn diagrams and “And and or”](https://www.mathsisfun.com/data/probability-events-mutually-exclusive.html) |
| Probability of ‘or’ and ‘and’ events. | Notation: The Mathematics (2U) syllabus uses set notation to describe some concepts, however this notation has not been used in recent HSC exams.  Students should be familiar with the notation  of complementary events  i.e.  although again not used within questions in the HSC | See above. |
| Multi-stage events and probability tree diagrams. | Multi-stage events should be introduced through modelling of these events.  As many HSC style questions involve marbles being draw from bags and the use of dice and playing cards it is a good opportunity to familiarise students further with “*popular activities and games”*  Discussions should involve   * When probabilities should (and can) be calculated with a table or a tree diagram and how multistage event probabilities are calculated. e.g. Multiply along the branches of a tree diagram, add across the branches of a tree diagram. * What alternative terminology is used for replacement and non-replacement and what situations normally involve replacement or non-replacement. | [The birthday paradox](http://www.numberphile.com/videos/23birthday.html)  [Lottery YouTube video - Numberphile](https://www.youtube.com/watch?v=U7f8j3mVMbc)  [Dice and Tables - The last banana thought experiment](http://ed.ted.com/lessons/the-last-banana-a-thought-experiment-in-probability-leonardo-barichello) |