**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 4 | STRAND: STATISTICS AND PROBABILITY | **SUB-STRAND:** **CHANCE 2** | **WORKING MATHEMATICALLY:** **MA3-1WM MA3-2WM MA3-3WM** |
| OUTCOMES: MA3-19SP | **Conducts chance experiments and assigns probabilities as values between 0 and 1 to describe their outcomes**  |
| **CONTENT:**  | **Compare observed frequencies across experiments with expected frequencies (ACMSP146)*** Use the term 'frequency' to describe the number of times a particular outcome occurs in a chance experiment
* Distinguish between the 'frequency' of an outcome and the '[probability](http://syllabus.bos.nsw.edu.au/glossary/mat/probability/?ajax" \o "Click for more information about 'probability'" \t "_blank)' of an outcome in a chance experiment (Communicating)
* Compare the expected frequencies of outcomes of chance experiments with observed frequencies, including where the outcomes are not [equally likely](http://syllabus.bos.nsw.edu.au/glossary/mat/equally-likely-outcomes/?ajax" \o "Click for more information about 'equally likely'" \t "_blank)
* Recognise that some random generators have outcomes that are not equally likely and discuss the effect on expected outcomes, eg on this spinner, green is more likely to occur than red or grey or blue (Reasoning)
* Discuss the 'fairness' of simple games involving chance (Communicating, Reasoning)
* Explain why observed frequencies of outcomes in chance experiments may differ from expected frequencies
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * CircleUse the circle to make a spinner showing only the colours red, blue, green, yellow and black.
* Write down a 'chance' word to describe the likelihood of getting each of the colours on your spinner.

RED \_\_\_\_\_\_\_\_\_\_\_\_ GREEN \_\_\_\_\_\_\_\_\_\_\_\_ BLACK \_\_\_\_\_\_\_\_\_\_\_\_ BLUE \_\_\_\_\_\_\_\_\_\_\_\_ YELLOW \_\_\_\_\_\_\_\_\_\_\_\_  |
| WARM UP / DRILL | * What is the Probability of ......?
* Students consider likelihood of outcomes of events.
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| QUALITY TEACHING ELEMENTS | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge
* Deep understanding
* Problematic knowledge
* Higher-order thinking
* Metalanguage
* Substantive communication
 | * Explicit quality criteria
* Engagement
* High expectations
* Social support
* Students’ self-regulation
* Student direction
 | * Background knowledge
* Cultural knowledge
* Knowledge integration
* Inclusivity
* Connectedness
* Narrative
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| RESOURCES | virtual dice – number faced. varied shapes<http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks1/maths/dice/index.htm>multiple dice. dot facedhttp://www.curriculumbits.com/prodimages/details/maths/mat0005.htmlset of diceClass set of dice, pen, paper, coins |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * Define the term ‘Probability’ -Probability is the chance that something will happen - how likely it is that some event will happen.
* Review - List a set of real-life happenings and discuss the probability of them happening in terms of certain, likely, unlikely, impossible.
* Look at the probability of rolling a certain number on a dice. Discuss the evenness of any number being possible.
* Introduce the term ‘frequency’. Frequency is how often something occurs in a data set
* What were the frequencies of the experiment? Were they expected? Did they prove or disprove the expected probabilities?
* Using data from dice experiment combine tallies across the class. Compare frequencies of larger sample. Were results closer to expected probabilities? Discuss importance of size of sample group.
* List games played involving an element of chance. Is the probability of winning even for all players. Divide list into like chance of winning. What kind of games don’t have even chance of success?
 | LEARNING SEQUENCES2 or Early S3 | * Compare the likelihood of obtaining particular outcomes in a simple chance experiment, eg for a collection of 7 red, 13 blue and 10 yellow marbles, name blue as being the colour most likely to be drawn out and recognise that it is impossible to draw out a green marble.
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| LEARNING SEQUENCES3 | * In pairs roll the dice 50 times and tally results. Discuss outcomes (can also graph results).
* Pose the question: what is the probability that a number less than 5 will be rolled?
* Redo the experiment and discuss and compare results.
* Question: How fair were the results in each of the experiments?
* Using data from dice experiment combine tallies across the class. Compare frequencies of larger sample. Were results closer to expected probabilities? Discuss importance of size of sample group.
* **Design a Chance Game**

The teacher tells the story: ‘Two students decide to invent an addition dice game, where they are sure to win. Before they invent the game they decide to determine the odds. Students roll two dice 20 times. They add the numbers shown on the two dice, tally the results and record the chance of each answer occurring eg 6 occurred 3 out of 20 times.’* Possible questions include: Do all totals have an equal chance of being rolled? How could you change the likelihood of certain totals occurring?
* **Investigation:** Students invent a game using two dice of their own design where they have a greater chance of winning. They explain and discuss the approach taken in inventing their game.
* ***Variation****:* Students invent a multiplication or division dice game where they have a greater chance of winning.
* **Assessment Activity-** Counter probability. Explain your answer. Work in a small group. If you place 2 red counters, 2 blue counters and 2 green counters in a bag, what are the possible outcomes if you remove 2 counters without looking? Show the possibilities as a table or list. If you take 3 counters from the bag, what is the probability of one of them being blue? Show the probability on the number line – 0 -1 using decimals. If you take 1 counter from the bag, what is the probability of it being blue? Show the probability on the number line – 0 -1 using decimals. If you add 3 blue counters and a brown counter to the bag, what is the probability of taking a brown counter from the bag?
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| LEARNING SEQUENCEExtension Early S4 | * Students will represent probabilities of simple and compound events MA4-21SP

Describe single-step chance experiments in which the outcomes are not equally likely, eg the outcomes for a single roll of a die with six faces labelled 1, 2, 3, 4, 4, 4 are not equally likely since the outcome '4' is three times more likely to occur than any other outcome (Communicating, Reasoning) * Design a spinner, given the relationships between the likelihood of each outcome, eg design a spinner with three colours, red, white and blue, so that red is twice as likely to occur as blue, and blue is three times more likely to occur than white (Problem Solving)
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| **EVALUATION & REFLECTION** | Student Engagement: Resources:Achievement of Outcomes: Follow-up: |