



Mathematics lesson 5 - Teacher notes

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Learning aim:

To determine theoretical probabilities based upon experimental data.

Curriculum links and Skills Builder focus skills chart:

England The national curriculum	Probability Pupils should be taught to use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size.
Scotland National 5 Mathematics	Reasoning skills Interpreting a situation where mathematics can be used and identifying a strategy; explaining a solution and relating it to context.
Wales WJEC GCSE mathematics specification	Statistics Calculating theoretical probabilities based on equally likely outcomes; Estimating probabilities based on experimental evidence.
Skills Builder Framework Focus Skills	
Speaking – The oral transmission of information or ideas	Speaking step 7 I speak engagingly by using facts and examples to support my points.
Teamwork – Working cooperatively with others towards achieving a shared goal	Teamwork step 8 I contribute to group decision making, encouraging others to contribute.

Main skills developed and how:

- Calculation – Students will calculate theoretical probabilities from experimental data using probability tree diagrams.
- Calculation – Students will solve conditional probability problems.

Equipment required:

- Student worksheet (foundation or higher available)
- Answer sheet
- PowerPoint
- Calculator

Suggested layout of the session:

2 minutes – Introduce the session aim and main skills. Make sure students understand any unfamiliar phrases in the learning aim.

Discuss the scenario on the board with students. Allow students time to discuss the meaning of staff retention and wellbeing. You might also discuss here why staff retention is so important to a business and how the role of a Human Resources Manager might support it.

10 minutes – Go through the worked example of a probability tree diagram on the board (this will not be required if you are using the foundation paper) and then use this concept to model aloud how you could approach question 1. Students can then begin working their way through the questions on their worksheets, either in pairs or in small groups. The questions in each section progress in difficulty.

3 minutes – Read out the answers. Students can peer or self-mark. If there's time, ask students to discuss the two questions on slide 5 of the PowerPoint and then invite some responses.

5 minutes – Assign groups of 4-5 students and set them the presentation activity. Help Fatima create a 2-minute presentation to the bank executives, drawing together the answers to the questions in

activity 1. In the presentation, students will need to include:

- What the purpose of this research was.
- Key data from the probability tree that you think is most impactful.
- Key comparisons of the offices in the UK.
- Conclusions you can draw from the data.
- What you think the company should do next based on the data (for example, conduct another round of research to find out what makes people unhappy at work).

When the students deliver the presentation, they will need each member of the group to participate. This could mean each team member presenting back one of the above bullet points.

5 minutes – Select 2 groups to deliver their presentations to the rest of the class. If you have time, you can ask all groups to deliver their presentations. As the other groups are presenting, ask students to use the criteria for the presentations to help them provide feedback.

Ways to differentiate:

- Scaffold the warmup and main task.
- The questions progress in their level of challenge, so you might want to select the first two or three for students to work through together in small groups before they work on any independently.

How to extend the session – if required:

- Use a two-way table instead of a tree diagram.
- Using worded question scenarios is more typical at KS5. The skills required are similar: it is only the presentation of the question which is different.

