

S1 • Ordering probabilities

Mathematical goals

To help learners to:

- understand that probabilities are assigned values between 0 and 1.

To enable learners to:

- decide an appropriate value for the probability of a given event;
- use some of the vocabulary associated with probability such as 'certain', 'impossible', 'likely'.

To develop learners' ability to:

- order decimals between 0 and 1.

Starting points

Learners should have some experience of decimal numbers.

Materials required

Cards (approx. 10 cm by 8 cm) with events written on (for examples, see next page);

- long piece of string;
- pegs or sticky tape.

For each learner you will need:

- several blank cards;
- felt tip pen;
- long strip of paper.

Time needed

At least 30 minutes.

Suggested approach **Beginning the session**

Fix the string across the room or along one wall. Onto one end, attach a card that says 'Certain' and onto the other end attach a card that says 'Impossible'. At intervals in between, attach cards that say 'Fairly likely', 'Very likely', 'Not very likely', 'Equally likely' and others, if wanted, using the language of probability. Ask a learner to arrange them into an appropriate order between the two extremes.

Whole group discussion

Pre-prepare some cards that refer to learners in the group and some that refer to events that are either topical or of particular interest to the learners, e.g.

- Kirsty will get her mobile phone out during this session;
- Hull City will get promotion;
- Mike will keep quiet for 10 minutes;
- Tomorrow's session will be cancelled;
- Aysha will arrive late to the next session.

Ensure that there is one card that refers to each learner, plus a few that refer to topical events. It is useful if one event card refers to something that is almost certain to happen and another to something that is almost impossible. Attach the topical event cards anywhere on the string between 'Certain' and 'Impossible'. Ask learners to discuss among themselves the order in which they should appear, depending on how likely they think that the event is. Learners should rearrange the cards accordingly.

When everyone is satisfied, give each learner the card that refers to him or her and ask him or her to place it on the probability line in a position that reflects how likely they think the event is.

Next, label the 'Impossible' card as 'Probability 0' and the 'Certain' card as 'Probability 1' and explain that probabilities are measured between 0 and 1. Ask for suggestions for numerical values (in decimals) for the topical card events. Write these values on blank cards and attach them above the event cards. The cards that relate to events that are 'almost certain' and 'almost impossible' should prompt discussion about how to get a very small number using decimals and how to get a number very close to 1.

Give every learner a blank card and ask them to write on it a decimal value of the probability of the event about themselves. Ask learners to attach the card above their event card.

Ask learners to look at the line and consider whether any events should be moved so that the probabilities are in the correct order. If

learners are left to argue this out among themselves, without any teacher intervention, it can create some very interesting discussions about the size of decimals, e.g. which is the correct order for 0.8, 0.9 and 0.88; many learners have the misconception that '0.88 is bigger than 0.9'.

Reviewing and extending learning

Give a numerical value such as 0.75 and ask learners, working in pairs or groups, to suggest an event that could have that as the probability of its happening. Share the suggestions and invite comments as to whether they are appropriate for the given probability. Repeat this for other numbers.

Give each learner a long strip of card or paper and ask them to draw a probability line of their own, with events and associated probabilities of their own choice.

Consider the probabilities of some other everyday events.

What learners might do next

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