SCISSORS, PAPER, ROCK

Game for 2 players.

For scissors hold out 2 fingers like a pair of scissors.

For paper hold your hand out flat.

For rock clench your hand into a fist.

Count 1, 2, 3 and then both players make one of the signs scissors, or paper or rock at the same time.

Scissors beats paper, paper beats rock and rock beats scissors.

It is a draw if both players make the same sign.

Play the game with a friend.

Is it a fair game? Do you both have the same chance of winning?

If you play the game many times do you make each of the signs roughly the same number of times?

Are you equally likely to make the scissors sign, the paper sign or the rock sign?

List all the different possible events that can happen each time you play this game.

Chinese Splits: In China people play this game standing up facing their opponent. They start with their feet together and when they lose they step to one side so that their feet get further apart. After a while they are doing the splits. Play this game and see who can last longest before giving up or falling over.

SOLUTION

PLAYER 1	SCISSORS	SCISSORS	SCISSORS	PAPER	PAPER	PAPER	ROCK	ROCK	ROCK
PLAYER 2	SCISSORS	PAPER	ROCK	SCISSORS	PAPER	ROCK	SCISSORS	PAPER	ROCK
WINNER	DRAW	1	2	2	DRAW	1	1	2	DRAW

Table showing winners for all possible events.		PLAYER 1		
		SCISSORS	PAPER	ROCK
PLAYER 2	SCISSORS	Draw	2	1
	PAPER	1	Draw	2
	ROCK	2	1	Draw

Probability is about understanding the events in the sample space and counting the number of events that fit a particular description, for example 'Player 2 wins'.

The nine different events in the sample space are listed in the table. This shows that Player 1 has a 1 in 3 chance of winning, player 2 has a 1 in 3 chance of winning and there is a 1 in 3 chance of a draw.

NOTES FOR TEACHERS

Why do this activity?
Learners will enjoy playing this game and it will introduce them to some fundamental mathematical thinking about probability.

Intended learning outcomes
- Experience of involvement in a game that requires some mathematical thinking about probability.
- Development of mathematical thinking about the different possible events in a situation.
- Introduction to the concept of a sample space (**without** technical language).
- Exploration of the concept of equal chances and a fair game.

Suggestions for teaching
Explain the game and get the class to play in pairs.

While they are playing write these questions on the board:

> Is it a fair game? Do you both have the same chance of winning?
>
> If you play the game many times do you make each of the signs roughly the same number of times?
>
> Are you equally likely to make the scissors sign, the paper sign or the rock sign?
>
> List all the different possible events that can happen each time you play this game.

Then ask the learners to talk about the questions and to try to find answers. After about 5 minutes ask them to write down their answers. This is a DO, TALK, RECORD lesson cycle that you might try to plan for most of your lessons.

Then have a plenary class discussion about the answers and list all the different possible events on the board. Ask "how can we record these possibilities clearly?" and introduce the first table in the solution getting the learners to tell you what to fill in the different cells. For older learners this is a good context in which to use a 2-way table.

You can introduce the Chinese Splits version of the game at the end of the lesson or in another lesson.

Key questions
What are the different things that can happen when you play this game?
How many different events happen when you play this game?
Are you sure that you have made a list of all the possibilities? How do you know?
How many of those events end in a draw?
How many of those events end in you winning.
How many of those events end in your opponent winning?

Possible extension
In a Box https://aiminghigh.aimssec.ac.za/grades-5-to-12-in-a-box/

Possible support
This is a game that can be played by all ages and learners of all abilities without the need for extra help from the teacher. By asking suitable key questions teachers can guide learners to deepen their understanding of the basic concepts of probability by thinking about the concepts of "how many possibilities?"; "what are the chances of …" etc.

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA and to Years 4 to 12 in the UK.				
	Lower Primary or Foundation Phase	Upper Primary	Lower Secondary	Upper Secondary
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6