DEVELOPING MATHEMATICAL MINDSETS THROUGH GOLF

ABERDEEN STANDARD INVESTMENTS SCOTTISH OPEN 2020



A PARTNERSHIP PROJECT WITH

WINNING SCOTLAND FOUNDATION AND ABERDEEN STANDARD INVESTMENTS



Winning Scotland Foundation





THIS EDUCATION PACK



We are all surrounded by things which rely on maths in one way or another. It is no exaggeration to say that maths is the language of modern life"

Emeritus Professor Adam McBride, University of Strathclyde

Numeracy and mathematics are core to education and skills development across all aspects of learning and teaching. The Making Maths Count report was published by the Scottish Government in September 2016 and sets out a range of recommendations that aim to raise awareness of, and confidence and attainment in, maths and promote its value and relevance to education, life and work .

Aberdeen Standard Investments, together with the Scottish Government, Winning Scotland Foundation and East Lothian Council have developed an initiative to help encourage greater enthusiasm for maths amongst the country's children

Within this education pack there are pupil activities that link golf, major event planning and maths providing opportunities for rich discussion and conceptual understanding of maths.

The Aberdeen Standard Investments Scottish Open takes place at The Renaissance Club from 1st - 4th October for the 38th staging of the event. The Scottish Open regularly attracts one of the strongest fields on the European Tour calendar. Previous champions include Justin Rose, Rickie Fowler, Phil Mickelson, Alex Noren and last year's champion Bernd Wiesberger.

WINNING SCOTLAND FOUNDATION



Our vision

Winning Scotland Foundation is a charity with a purpose to enable all young people in Scotland to be confident and resilient. A major aspect of our work is to advance the education of Scotland's children using the principles and practice of 'growth mindset' psychology.

Our Mindset in Education programme supports the development of a growth mindset culture – where pupils understand that their talents and abilities can be developed through effort, strategies and persistence – across the Scottish curriculum and in every classroom. We provide training programmes to teachers and school leaders to enable deep learning on growth mindset, facilitate practical delivery and encourage whole-school ownership.

Bringing people together

We help young people aged 3-18 in Scotland flourish in school, sport and in the community. By working in partnership with public, private and charitable organisations, we increase our reach and impact, enabling more young people across the country to thrive in society and make a positive contribution wherever they go.

Our work builds on more than a decade of collaboration with Scottish sport and education, exploring innovative approaches for developing young people.

EDUCATION PACK: AIMS

With East Lothian once again hosting this exciting event this provides the perfect backdrop for local pupils to develop their maths skills in a fun, inclusive and exciting way.

These lessons have been produced in consultation with educators, and can be adapted to the age and stage of your pupils.

All lessons provided in this pack are linked to the Curriculum for Excellence, National Improvement Framework and contain specific cross-curricular links to a broad range of other subjects.

Recently, there has been a growing interest in the application of mindset mathematics, driven by Stanford University's Dr Jo Boaler, one of the world's leading authorities on maths education.

Dr Boaler endorses growth mindset practice in maths. Learning in this way, young people are empowered with the knowledge that with purposeful effort, a willingness to learn from mistakes, and the motivation to persevere in the face of difficulty, they can succeed in maths and beyond.

Pupils engaged through mindset mathematics are shown to be more positive about maths, perform better, and enjoy maths without anxiety – an issue affecting up to 80% of Scottish school children.

For further information on this, visit:

- · www.winningscotlandfoundation
- https://www.youcubed.org/

OBJECTIVES

The education pack engages second level pupils with the various elements involved in running a major golf event. It will encourage discussion and development of growth mindset behaviours such as challenge and struggle, learning from mistakes and the importance of effort - and importantly - how this links to numeracy.

This education pack aims to highlight this practical link and emphasises how numeracy skills are used continuously both in and out of school.

The content aims to transform the mindset that influences our perceptions of who can and can't be 'good at maths' the stereotype that reveals itself every time someone says, "I'm not a maths person".





EDUCATION PACK - CONTENT

Golf is an ideal platform to promote mindset maths. By applying maths skills to something that is fun, inclusive and exciting, learning becomes a joy. From pars to handicaps, wind speed to distance, ball trajectory to the slant of the green, almost every aspect of golf relies on numerical calculation.

Numeracy is the set of maths skills that people use in everyday life, such as counting money, planning times of activities or calculating results of sports performances. The pupil challenges in this resource aim to highlight this practical link and emphasise how numeracy skills are used continuously both in and out of school.

THIS PACK CONTAINS TEACHER SUPPORT SHEETS, LESSON PLANS AND GROUP ACTIVITY SHEETS:

1. Mindset in golf - pupil activities

- Player Profiles
 - Bernd Wiesberger
 - Calum Hill
 - Stacy Lewis
 - Kylie Henry
- Event planning
- Score keeping

PLAYER PROFILE: BERND WIESBERGER

The 2019 Aberdeen Standard Investments Scottish Open was played at The Renaissance Club in North Berwick and was won by Austrian, Bernd Wiesberger.

Date of birth: 08/10/1985
Place of birth: Vienna, Austria

Height: 6' 2"



HOW BERND PLAYED

	Golf Shots Taken			
	Round One	Round Two	Round Three	Round Four
Bernd Wiesberger	67	61	65	69

PLIPIL CHALLENGE

TOTIL OTTALLETTOL		
How many shots in total did Bernd have across the	e four rounds of golf?	
Bernd was born on 8th October 1985 - how many	days ago was he born?	
I was born on	I was born	days ago.
Bernd Wiesberger is how many days older than yo	nu2	
being wesberger is now many days older than ye	,u	
Bernd is 1 metre 88 centimetres tall, I am	metrecentimetres	
In centimetres, I am centimetre	s tall, Bernd is centi	imetres taller
than me.		

MATHEMATICAL MINDSETS - GROUP ACTIVITY

PLAYER PROFILE: CALUM HILL

Calum Hill was the highest placed Scottish player at the 2019 Aberdeen Standard Investments Scottish Open, he finished 26th.

Date of birth: 03/11/1994

Place of birth: Kirkaldy, Scotland

Height: 5' 10"



HOW CALUM PLAYED

	Golf Shots Taken			
	Round One	Round Two	Round Three	Round Four
Calum Hill	68	64	71	66

PUPIL CHALLENGE

How many shots in total did Calum have across the four rounds of golf?						
Calum was born on 3rd November 1994 - how many days ago was he born?						
I was born on	I was born	_days ago.				
Calum Hill is how many days older than you?						
Calum is 1 metre 78 centimetres tall, I am	metrecentimetres					
In centimetres, I am centimetre than me.	s tall, Calum is cent	imetres taller				

MATHEMATICAL MINDSETS - GROUP ACTIVITY

PLAYER PROFILE: STACY LEWIS

The 2020 Aberdeen Standard Investments Ladies Scottish Open was played at The Renaissance Club in North Berwick and was won by America's Stacy Lewis.

Date of Birth: 16/02/1985

Place of Birth: Ohio, United States

Height: 5' 4"



HOW STACY PLAYED

	Golf Shots Taken			
	Round One	Round Two	Round Three	Round Four
Stacy Lewis	71	66	70	72

PUPIL CHALLENGE

How many shots in total did Stacy have across the	e four rounds of golf?	
Stacy was born on 16th February 1985 - how mar	ıy days ago was she born?	
I was born on	_I was born	_days ago.
Stacy Lewis is how many days older than you?		
Stacy Lewis is 1 metre 65 centimetres tall, I am _	metrecentim	etres
In centimetres, I am centimetre than me.	s tall, Stacy is	centimetres taller

MATHEMATICAL MINDSETS - GROUP ACTIVITY

PLAYER PROFILE: KYLIE HENRY

Kylie Henry was the highest placed Scottish player at the 2020 Aberdeen Standard Investments Ladies Scottish Open, she finished 12th.

Date of Birth: 30/08/1986

Place of Birth: Glasgow, Scotland

Height: 5' 7"



HOW KYLIE PLAYED

	Golf Shots Taken			
	Round One	Round Two	Round Three	Round Four
Kylie Henry	71	75	69	68

PUPIL CHALLENGE

How many shots in total did Kylie have across the four rounds of golf?	
Kylie was born on 30th August 1986 - how many days ago was she born?	
I was born on I was born	_days ago.
Kylie Henry is how many days older than you?	
Kylie is 1 metre 72 centimetres tall, I ammetrecentimetres	
In centimetres, I am centimetres tall, Kylie is than me.	_ centimetres taller

MATHEMATICAL MINDSETS: TEACHER SHEET

PLAYER PROFILE: BERND WIESBERGER

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Date of birth: 08/10/1985
Place of birth: Vienna, Austria

Height: 6' 2"



HOW BERND PLAYED

	Golf Shots Taken			
	Round One	Round Two	Round Three	Round Four
Bernd Wiesberger	67	61	65	69

PUPIL CHALLENGE

How many shots in total did Bernd have across the four rounds of golf? 262

Bernd was born on 8th October 1985 - how many days ago was he born?

To calculate use: https://imrodmartir	i.com/my-days	5		
I was born on		I was born		days ago.
Bernd Wiesberger is how many days	s older than yo	ou?		
Bernd is 1 metre 88 centimetres tall,	I am	metre	_centimetres	
In centimetres, I am_	centimetre	s tall, Bernd is _		_centimetres taller

than me.

MATHEMATICAL MINDSETS: TEACHER SHEET

PLAYER PROFILE: CALUM HILL

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Date of birth: 03/11/1994

Place of birth: Kirkaldy, Scotland

Height: 5' 10"



HOW CALUM PLAYED

	Golf Shots Taken			
	Round One	Round Two	Round Three	Round Four
Calum Hill	68	64	71	66

PUPIL CHALLENGE

How many shots in total did Calum have across the four rounds of golf? 269

Calum was born on 3rd November 1994 - how many days ago was he born? To calculate use: https://imrodmartin.com/my-days

I was born on	I was born	days ago.
Calum Hill is how many days older tha	ın you?	
Calum is 1 metre 78 centimetres tall,	I ammetre	_centimetres
In centimetres, I am	centimetres tall, Calum is	centimetres taller
than me.	_	

MATHEMATICAL MINDSETS: TEACHER SHEET

PLAYER PROFILE: STACY LEWIS

The 2020 Aberdeen Standard Investments Ladies Scottish Open was played at The Renaissance Club in North Berwick and was won by America's Stacy Lewis.

Date of Birth: 16/02/1985

Place of Birth: Ohio, United States

Height: 5' 4"



HOW STACY PLAYED

		Golf Sh	ots Taken	
	Round One	Round Two	Round Three	Round Four
Stacy Lewis	71	66	70	72

PUPIL CHALLENGE

How many shots in total did Stacy have across the four rounds of golf? 279

Stacy was born on 16th February 1989 To calculate use: https://imrodmartin.c	, , ,	born?
I was born on	I was born	days ago.
Stacy Lewis is how many days older th	nan you?	
Stacy Lewis is 1 metre 65 centimetres	tall, I ammetre	centimetres
In centimetres, I amthan me.	_ centimetres tall, Stacy is	centimetres taller

PLAYER PROFILE: KYLIE HENRY

Kylie Henry was the highest placed Scottish player at the 2020 Aberdeen Standard Investments Ladies Scottish Open, she finished 12th.

Date of Birth: 30/08/1986

Place of Birth: Glasgow, Scotland

Height: 5' 7"



HOW KYLIE PLAYED

		Golf Sh	ots Taken	
	Round One	Round Two	Round Three	Round Four
Kylie Henry	71	75	69	68

PUPIL CHALLENGE

How many shots in total did Kylie have across the four rounds of golf? 283

Kylie was born on 30th August 1986 - how To calculate use: https://imrodmartin.com/	, , ,	
I was born on	_ I was born	_days ago.
Kylie Henry is how many days older than y	/ou?	
Kylie is 1 metre 72 centimetres tall, I am _	metrecentimetres	
In centimetres, I am certhan me.	ntimetres tall, Kylie is	centimetres taller



MATHEMATICAL MINDSETS GROUP ACTIVITIES

EVENT PLANNING PUPIL INFORMATION SHEET

Congratulations! Your group have been selected to manage the event.

Decide in your groups who will be responsible for planning / managing:

- Spectators
- · Score keeping

For each day you will be given scenarios that will affect the planning of the event. Work together as a group to calculate the correct figures.

Event planning - spectators

It is expected that over the four days, 50,000 people will attend the event

Staff are required to run the event, each person is paid £250 per day. Each day these numbers of staff are needed:

	Thursday	Friday	Saturday	Sunday
Staff	260	330	350	360

The ticket prices are:

	Thursday	Friday	Saturday	Sunday
Adults	£23	£27	£30	£27
Children	£9	£9	£9	£9

It also costs £2750 per day to hire the The Renaissance Club The total prize money paid to the golfers is £600,000

Use the information on this sheet to complete the planning sheets for all four days.

Event planning - score keeping

The score keeping group have the responsibility of keeping the score card for last year's winner Bernd Wiesberger.

We will look at the final round from last year, calculate his round each day, how far he walks, along with the number of eagles, birdies, pars, and bogies he recorded.

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EVENT PLANNING: SPECTATORS PUPIL ACTIVITY SHEET

Let's do some event planning (imagining spectators are allowed to attend).

50,000 spectators are expected over four days, this is broken down as:

Spectators	Thursday	Friday	Saturday	Sunday
Adults	5000	6800	12,300	13,100
Children	1200	2100	4300	5200

How much money will you expect to make from ticket sales each day?

- Thursday:______
- Friday:_____
- Saturday:
- Sunday:_______

Staffing costs for each day will be:

- Thursday:

- Sunday:_______

Total cost to hire The Renaissance Club for all four days will be:

Total expected income and costs will be:

Total ticket sales:_____

Total staffing costs:

The Renaissance Club hire:

Player prize money:____

Profit / loss:_____



EVENT PLANNING: SPECTATORS

TEACHER SHEET

Before the event starts, lets do some planning. 50,000 spectators are expected over four days, this is broken down as:

Spectators	Thursday	Friday	Saturday	Sunday
Adults	5000	6800	12,300	13,100
Children	1200	2100	4300	5200

How much money will you expect to make from ticket sales each day?

Thursday: £125,800
Friday: £202,500
Saturday: £407,700
Sunday: £400,500

Staffing costs for each day will be:

Thursday: £65,000
Friday: £82,500
Saturday: £87,500
Sunday: £90,000

Total costs to hire The Renaissance Club for all four days will be:

Total expected income and costs will be:

Total ticket sales: £1,136,500
Total staffing costs: £325,000

• The Renaissance Club hire: £11,000

• Player prize money:£600,000

• Profit / loss: £200,500

Note: Depending on the level of your pupils and groups, you may wish to add in some stretch tasks such a percentage discount for people purchasing tickets for two or more days, or a penalty cost for spectator damage to the green.

Perhaps discuss other costs and income not covered here but that might be relevant to an event like this such as food and drink, transport, merchandise etc.

You may also wish to mention the different level of award within the total prize money and encourage a gender pay gap discussion - use this article to open discussion:

https://www.bbc.co.uk/sport/golf/44955232



EVENT PLANNING: SCOREKEEPING PUPIL INFORMATION SHEET

Fore! Unlike the scoring system of most sports, in golf, less is actually more. A score of 72 is much better than a score of 102. Keeping score in golf may seem simple: hit the ball, find it, hit it again, and so on, then add up the number of shots taken at the end. However, it's not always that easy.

Golf scoring

Par is the number of shots (or strokes) a top-class golfer is expected to take to play each hole based on its length and difficulty.

It also refers to an expected total of shots for the whole round of 18 holes.

Par for a course usually ranges between 70 and 72 shots but most golfers never match that.

Par for a hole is usually between three and five shots. If you take four shots on a par-four hole you make par. But if you do better or worse than that you're introduced to some funny names.

Take three shots on a par-four hole (i.e. one less than par) and you call it a birdie.

Take five shots on a par-four hole (i.e. one shot more than par) and you've got a bogey.

These are just names though. What counts is the number of shots you play on each hole, which are added together for your total score for the round.

GOLF SCORING

- Albatross: Three shots less than par
- Eagle: Two shots less
- Birdie: One shot less
- Par: Expected shots
- Bogey: One shot more
- Double bogey: Two shots more

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EVENT PLANNING: SCOREKEEPING PUPIL ACTIVITY SHEET

This activity sheet will take you through Bernd Wiesberger's round of golf during last year's championships. You will look at his scores for each hole and use the scorecard to help make calculations.

The following page has Bernd's full scorecard

What is the par score for the course?	
First nine holes:	
Second nine holes:	
Total:	
In total, how many shots did Bernd Wiesberger hit dur	ring the:
First nine holes:	
Second nine holes:	
Total:	
How many:	
Bogies:	
Pars:	=
Birdies:	
Eagles:	
Bernd Wiesberger's Score	
What is the par score for the course?	
Was Bernd Wiesberger over or under par?	
How many shots over / under par was Bernd?:	
How many yards did Bernd walk during the:	
First nine holes:	
Second nine holes:	
Total:	

BERND WIESBERGER SCORECARD: ABERDEEN STANDARD INVESTMENTS SCOTTISH OPEN 2019

Hole	П	2	m	4	20	ဖ	7	œ	6	10	11	12	13	14	15	16	17	18
Par	2	4	3	4	33	4	2	4	m	4	4	2	4	4	m	2	co	4
Yards	488	490	183	364	137	398	202	419	161	385	411	512	384	328	139	505	167	385
Score	2	2	3	4	33	4	4	4	2	4	4	4	4	4	m	4	4	4

USE THE BLANK TABLE BELOW TO HELP CALCULATE THE SCORES (THE FIRST HOLE IS DONE FOR YOU)

Hole	1	2	8	4	2	9	7	œ	6	10	Ħ	12	13	14	15	16	17	18
Par	2	4	3	4	33	4	2	4	3	4	4	2	4	4	3	2	co	4
Yards	488	490	183	364	137	398	202	419	161	385	411	512	384	328	139	202	167	385
Par?	Yes																	
Score?	Par																	

REMEMBER: ALBATROSS: THREE SHOTS LESS THAN PAR / EAGLE: TWO SHOTS LESS / BIRDIE: ONE SHOT LESS / PAR: EXPECTED SHOTS /

BOGEY: ONE SHOT MORE / DOUBLE BOGEY: TWO SHOTS MORE

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EVENT PLANNING: SCOREKEEPING

TEACHER SHEET

This activity sheet will take you through Bernd Wiesberger's round of golf during last year's championships. You will look at her scores for each hole and use the scorecard to help make calculations.

What is the par score for the course?

First nine holes: 35

Second nine holes: 36

Total: 71

In this round, how many shots did Bernd Wiesberger's hit during the:

First nine holes: 34

Second nine holes: 35

Total: 69

How many:

Bogies: 2

Pars: 12

Birdies: 4

Eagles: 0

Bernd Wiesberger's Score

What is the par score for the course? 71

Was Bernd Wiesberger's over or under par? Under

How many shots over / under par was Bernd Wiesberger's: 2 Under

How many yards did Bernd Wiesberger's walk during the:

First nine holes: 3145

Second nine holes: 3216

Total: 6361

Extension activity:

Pupils may wish to chart Bernd Wiesberger's final round in a graph with 0 on the axis as par and negative and positive numbers?

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GOLFERS AND GROWTH MINDSET

Having completed the activities within this resource, take some time to discuss how they felt during the tasks. Some may have found the tasks difficult, others may not have been challenged enough. Use this as an opportunity to discuss growth mindset and reinforce the positive pedagogical elements of challenge, struggle and importantly the role of making mistakes.

Task:

- 1. Split the class into small groups,
- 2. Ask the groups to identify at least one person in each group to take on the role of being:
 - A world-leading golfer
 - A journalist, who is going to interview the golfer

In their small groups ask the pupils to think about growth mindset and identify the types of questions a journalist may ask, and importantly, how a professional golfer may answer them (of course with a growth mindset)

You may wish to ask questions such as:

- What is the best mistake you have ever made?
- What do you enjoy persevering with?
- Can you share a time you have shown resilience?
- · Can you explain a growth mindset?
- What does it take to become a great golf player?
- Have you ever felt like giving up because something was difficult?

Have a bit of fun with this, however this can also be used as a great way to discuss growth mindset and how they may face challenges in their lives.

Why not film the pupils interviewing their classmates and send the video to us?

Email: info@winningscotlandfoundation.org

Twitter: @winningscotland



MATHS ON FLAGS

Having completed the activities within this resource, take some time to put this into practice with this class challenge. Start by having a number talk with your class. If you are not sure about number talks, watch this video from world renowned maths expert, Jo Boaler:



Click the picture or go to: https://www.youtube.com/watch?v=YKegyzRj8-k

Task

Following the number talk, allocate each pupil or group with some numbers to represent golf holes 1-18. Ask them to create an expression or calculation that equates to their allocated numbers — or more than one if they wish. Each flag is to show a maximum of four characters or two superscripts, eg:

$$3^2 + 3^0$$

Here are some examples featured during the 2019 tournament, created by pupils in East Lothian schools.

1	2	3	4	5	6	7	8	9
$\frac{3}{4} + 0.5^2$	½ x 4	93 ÷ 31	23-4	-7 + 12	25% of 24	210 ÷ 30	4.5 + 3.5	1/6 of 54
10	11	12	13	14	15	16	17	18
$\sqrt{(6^2 + 8^2)}$	55 ÷ 5	√144	15 - 2	2, 6, 10, ?	20 - 5	4 x 3 + 4	30 + 16	6 ² x 0.5

Use this as an opportunity to discuss the many different ways of using numbers, building computational skills, reinforcing number sense, and working on the habits of mind that not only make pupils stronger mathematicians, but also stronger problem solvers and communicators in all academic areas.

We would love to hear how the number talk went along with the expressions the pupils came up with. Ask pupils to create flags using paper and share them by:

Email us: info@winningscotlandfoundation.org

Send us a tweet: @winningscotland

MORE INFORMATION...







The education pack aims to engage pupils working at second level with the various elements involved in running a major golf event. It aims to encourage discussion and development of growth mindset behaviours such as challenge and struggle, learning from mistakes and the importance of effort - and importantly - how this links to numeracy.

For further information on Winning Scotland Foundation's work on growth / fixed mindset visit www.winningscotlandfoundation.org

For more information on the men's Aberdeen Standard Investments Scottish Open including how to buy tickets please visit: www.asiscottishopen.com

For more information on the Aberdeen Standard Investments Ladies Scottish Open including how to buy tickets please visit: www.ladiesscottishopen.com

Aberdeen Standard Investments is a proud sponsor of Scottish Golf at all levels. To learn more about Aberdeen Standard Investments please visit www.aberdeenstandard.com

We would appreciate your feedback on this education resource, please take 2 minutes to complete the feedback survey:

https://www.surveymonkey.co.uk/r/RHJM28H



