

MATHS WEEK SCOTLAND
PRIMARY TEACHERS PACK

CEILIDH COUNTS

CONNECTING CREATIVITY & MATHS BY INVESTIGATING AND MEASURING DANCE. SUITABLE FOR NON-SPECIALISTS

LEARNING INTENTIONS:

Pupils are learning to:

1. Link creativity, dance and maths
2. Investigate age and distance travelled in a ceilidh dance
3. Collect measuring data in meters.
4. Represent data in tallies, tables & bar charts
5. Interpret the results and compare to predictions



MNU 1-20A

MNU 1-20B

EXA 1-10A

MNU 2-20B

#MATHSWEEKSCOT FREELY ACCESSIBLE
[SCIENCECEILIDH.COM/MATHS](https://www.scienceceilidh.com/maths)





SUCCESS CRITERIA

By the end of the lesson, pupils can:

- Make predictions and fair measurements based on investigating age and dancing
- Understand how to represent and interpret data as a tally, table and bar chart
- Begin understanding results of investigations

RESOURCES

- Large hall/playground
- Projector, laptop, spreadsheet and music (online)*
- Measuring Devices (Clickwheels &/or tape measure)
- Post-It Notes

INTRODUCTION

15 mins

Introduce that we're **exploring creativity, dance and maths**. How could they be linked?

How is maths creative? How does dancing involve maths?

Split the class into groups of 8 and learn **the Virginia Reel** to prepare for later part of the workshop.

You could also test: does height make a difference, what happens with your heartbeat before and after you dance?

PLANNING

5 mins

Discuss that we will be making an experiment around the dance & the different things that we could measure and test.

If looking at age, discuss how we could split the class into three groups based on age (oldest, middle and youngest) - which age group do the class predict to dance the furthest? Why?

Are the oldest taller? The youngest have more energy? The middle group best of both?

MEASUREMENT

10 mins

Create a tally chart based on the birth months as a class, and then convert into a bar graph, discussing what it needs to have (title, labelled axes)

You could make the bar graph on the board, individually or using the Microsoft excel sheet

Separate class into three age groups, and then dancing pairs. In each group, assign at least one or two pupils as the measurers.

INVESTIGATION

10 mins

Dance through the Virginia Reel through once again to remind everyone how it goes. Then have each couple only repeat the galloping step (holding hands & going down the room for 8 beats and back for 8 beats) for the investigation, with the measurer(s) marking how far they reached after 8 beats with the post-it notes (put a line in the middle to mark where to measure).

What makes the test "fair" or well-controlled? Everyone needs to start the gallop at the same point and only go for 8 beats. The measurers can help watch for this!

Each group measures how far the using the click/trundle wheels to the nearest meter, and reports their data.

Investigation could be done outside in the playground

ANALYSIS

5 mins

Explore how to tabulate data we've collected. **Work out the averages & compare them** - who went the furthest? Discuss if the predictions were right or why they might have been wrong.

For older pupils, use tape measures with cms to be more accurate & introduce decimals

Why is it important we repeated the test with more than one pair of dancers?

PLENARY

5 mins

Revise core concepts covered & how we could take this further to understand more. Revise connection of maths to creativity, and link to real sports including real **research around athletes & birth age**.

What could we do to be even more accurate? e.g. Repeat again to get more data, test more pupils the same age, measure & control for height?

HOW ARE CREATIVITY, DANCE & MATHS CONNECTED?

- The heart of maths is problem-solving! Problem solving is inherently creative as it uses tools already mastered (and sometimes a bit of imagination) to create a solution to new challenges.
- Expressive arts like dance use maths as they require keeping count of the timing and ceilidh dance in particular likes to play with geometry and symmetry through the figures dancers make.

VIRGINIA REEL

Set-Up: Start with sets of around 4 pairs in lines with everyone standing opposite their partner

1. Lines go forward towards their partner for 4 beats and back for 4 beats. Repeat again for another 8 beats.

2. Partners swap places with the right hand for 8 beats until back to place.

3. Repeat with the left hand, both hands & then no hands going around each other back to back (a "do-si-do") – each for 8 beats.

4. The top pair in each set gallops down the hall for 8 beats and then back to where they started for 8 beats.

5. The top pair then casts off or "banana peel" to the bottom, with the other dancers in their line following ("follow the leader") for 8 beats. The top pair make a bridge for the other pairs to pass under for 8 beats, ready to start again with a new top pair.

- *If there are more or fewer than 4 pairs, the dance can be repeated as many times as needed so everyone gets a turn!*
- *For the trickier moves like the banana peel, demonstrating first can help.*
- *You can replace the last two beats of step 1 with 3 claps and 3 stamps.*
- *No need to use gender roles for picking partners. Pupils are more comfortable choosing their own friends to dance with and dance positions can be labelled with numbers e.g. first and second line just as easily.*
- *The Virginia Reel is just a suggestion. If there's a dance the learners are more used to that has a gallop step that would work just as well (e.g. the Flying Scotsman).*



MUSIC

Ceilidh music is made up of traditional Scottish reels and jigs. You can also use most pop music as it usually fits the 8 beat structure, which pupils may enjoy! It's usually a bit slower than ceilidh music so you can either dance at a relaxed pace, or speed up the music (use the speed setting at 1.25 or 1.5 x on YouTube). We have included links to traditional & less traditional music to get you started!

AVERAGES

To work out the average for the investigation, we recommend calculating a mean (this is the default formula on the excel sheet). Conceptually, whilst beyond second level, it could be introduced as similar to the "middle number" (though this technically is the median) for the purposes of understanding the results.

RESEARCH: YOUR BIRTHDAY & SPORTS!

Scientists have found that your birthday does have an effect on your sporting success! In sports including football, ice hockey and those represented at the Beijing Olympics, athletes are much more likely to be born in the months which would make them the oldest in their age category. For example, in English youth football academies, 57% of young footballers were born in September, November or December (the age cut-off is the September 1st) compared to 14% born in June, July or August (it should be 25% if each month were equally likely). This is called the Relative Age Effect and may be due to the fact in general the oldest children within a year group are likely to be physically bigger & more coordinated than the youngest, and therefore more likely to be confident and have more training opportunities, all of which accumulate over time.

HOW TO USE THIS RESOURCE

In this guide you'll find an interdisciplinary lesson plan incorporating dancing with mathematics to explore the topics of measurement & investigation techniques. Appropriate for First & Second Level (P3 - P7s) with suggestions for differentiation & covers Experiences and Outcomes within the Curriculum for Excellence for mathematics (Information Handling) and expressive arts.

MNU 1-20A: *I have explored a variety of ways in which data is presented and can ask and answer questions about the information it contains.*

MNU 1-20B: *I have used a range of ways to collect information & can sort it in a logical, organised and imaginative way using my own & others' criteria.*

EXA 1-10A: *I am becoming aware of different features of dance and can practise and perform steps, formations and short dance.*

MNU 2-20B: *I have carried out investigations and surveys, devising & using a variety of methods to gather information & have worked with others to collate, organise & communicate the results in an appropriate way.*

This is designed for a full **50 minute session** but can be adapted to fit within a shorter time period. To adapt for a **25 minute session** discussing measuring techniques and data analysis you could jump straight to the investigation without doing the whole Virginia Reel but just the "Gallop" step.

Accompanying free resources available online include:

Powerpoint and spreadsheet with embedded tables and bar charts for data entry for the class

Music which can be used to accompany the class and **video** of the Virginia Reel

FURTHER LINKS

Maths Week Scotland - for more maths activities and resources: mathsweek.scot

Creative Scotland **video of the Virginia Reel:** <https://vimeo.com/89897918>

Ed Sheeran - "**Nancy Mulligan**" hour long version to play for Virginia Reel (Settings > Speed > 1.25)
<https://www.youtube.com/watch?v=KbTuudLOpCM>

Create your own dances inspired by science concepts with our **Interdisciplinary STEM learning resource** available at www.scienceceilidh.com/teaching

Article discussing the "**Relative Age Effect**" explaining why in the 2008 Olympics 75% of athletes had birthdays in a 4 month window: <https://www.bbc.co.uk/sport/olympics/18891749>

"**Cultivating Creativity in the Mathematics Classroom**": <https://nrich.maths.org/5784>



Science Ceilidh is an award winning education organisation exploring science, traditional arts, creativity and health & wellbeing across Scotland. Our school programme focuses on interdisciplinary learning, raising science and cultural capital, linking schools with research and breaking STEM stereotypes.

Acknowledgements:

A massive thank you to Jenny Macdonald-Denis and the staff and students of Craigour Park Primary School whose feedback, evaluation and learning helped develop this resource. This project was funded by Maths Week Scotland.

Version 1.1 2019 (C) Creative Commons.
All Rights Reserved