

# MATHEMATICS WITH DR SAM BALLAS

## TALKING POINTS

### KNOWLEDGE:

1. Make a list of all the 2D shapes you can think of and how many sides each of them has.
2. Now do the same for all of the 3D shapes you can think of.

### COMPREHENSION:

3. What is the difference between the standard plane and the hyperbolic plane?
4. Can you explain some of the real-life applications of Sam's work?

### APPLICATION:

5. What types of mathematics are needed for studies in biology, chemistry, physics, geology and other subject areas? Why?

### ANALYSIS:

6. How is the maths Sam does similar or different to maths that you have studied?
7. What motivates Sam to do the work he does?

### EVALUATION:

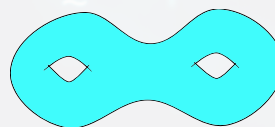
8. From reading what Sam thinks makes a good mathematician, do you believe you have the attributes needed? Why?
9. Which is the most useful piece of advice that Sam gives? Justify your answer.

## ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

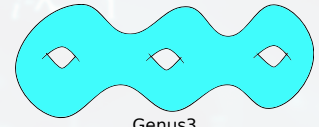
### SAM'S GENUS CHALLENGE:

(Remind yourself of the definition of genus by revisiting 'TALK LIKE A MATHEMATICIAN'.)

1. How many 'holes' does each surface have?
2. Can you draw the appropriate number of non-separating curves?



Genus 2



Genus 3

### MATHS FUN DAY:

Florida State University offers several outreach programmes, with the maths department organising a Math Fun Day every year. There are activities and demonstrations by the faculty and students designed for school children of all ages. The event is usually held in person, but with the global pandemic it is largely an online affair in 2020, so people from around the world will be able to access it.

You can check the website for further details:

<https://www.math.fsu.edu/MathFunDay/>

Remember to revisit the website in early 2021 for news of the return of the usual Math Fun Day!

## MORE RESOURCES

- Plus Magazine is an online resource that aims to introduce readers to the beauty and the practical applications of mathematics. It covers loads of aspects of maths and is a wonderful resource for those interested in learning more: <https://plus.maths.org/content/>
- NRich has thousands of resources related to how maths is used in our everyday lives. Resources are available for students of all ages and abilities and there are teaching resources too: <https://nrich.maths.org/>
- Math Is Fun is a website that has information on just about every branch of mathematics. Regardless of which area of maths you are interested in, you should find multiple resources here. We encourage you to look through the site at leisure to improve your skills and knowledge: <https://www.mathsisfun.com/>