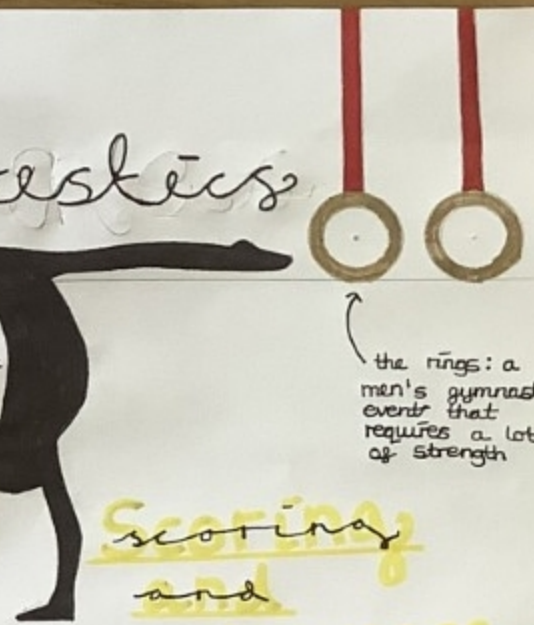
Maths in Gymnastics

Symmetry

In a handstand, your hands must be symmetrical to keep your balance. If they are not symmetrical, it is impossible to hold a handstand. You will also need symmetry to vault. Vaulting requires an explosive power onto your hands and if your hands aren't symmetrical then it could cause injury. Symmetry in maths is involved with shapes. For two objects to be symmetrical in maths, they must be the same size and shape, with one object having a different orientation from the first.

SOHCAHTOA

The 'bridge' is a basic gymnastics move that requires moving the spine, shoulders and hip in hyperextension, whilst your weight is balanced on the hands and feet. It creates a triangular shape which is the shape that is used to solve SOHCAHTOA. SOHCAHTOA stands for: $\sin = \frac{\text{opposite}}{\text{hypotenuse}}$ $\cos = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\tan = \frac{\text{opposite}}{\text{adjacent}}$



the rings: a men's gymnastic event that requires a lot of strength

Angles

Wherever a gymnast does a skill, they are at a different angle each time. When a gymnast is in a handstand, they are at an 180° angle which is obtuse. When a gymnast does a back flip, back handspring or a trick that requires feet coming off the floor, they have angular momentum from their push off. Other than floor, they also have angular momentum on the bars. When doing giants, a constant swing around the bar, the 180° angle is consistent even if speed increases. When the gymnast does a split they are in a straight line, which is a 180° angle. When a gymnast does a scorpion, when the gymnast stands on one leg and pulls the other foot back then upwards, this is an obtuse angle on the leg they are standing on. The leg they curve is an acute angle because it is less than 90°. Similar to the splits, a handstand split is a straight line of 180° but this skill also shows a linear pair. In boys gymnastics, they do an event called the rings. When holding a middle split, their legs are at right angles and their legs represent a straight line. Not just gymnastics skills incorporate angles but the gyms they train in. Most gyms are rectangular meaning there is four 90° angles (which is like the floor) and the beams and bars both have 180° straight lines.

Scoring and Average

Scoring in gymnastics also uses math. The way the judges score a gymnast is with decimals. Decimals in maths are used to teach place value and are learnt in both primary and secondary education. In gymnastics, the highest score possible to achieve is 10.00 and the lowest is 1.00: no matter the score, it is always a decimal. The number in the hundredths place after the decimal has to be either a zero or a five. Average is also used in calculating the gymnast's score. There is always multiple judges who will all give different scores. To get the overall score they take the average of all scores given by the judges.

Pythagoras

On the floor, a routine consists of several tumbling passes and different dance moves to connect the routine. The floor is usually a 40 inch by 40 inch square and because gymnasts tumble diagonally, we can split the square into two triangles. The diagonal forms the hypotenuse of the triangle then label the sides a, b and c. The formula for pythagoras theorem is: $a^2 + b^2 = c^2$. Through the calculation we can find that gymnasts have 57.57 ft to tumble across. We can also associate pythagoras theorem with a bridge. A bridge shows a right-angled triangle and can show a pythagoras question.

pythagoras equation:

$$a^2 + b^2 = c^2$$