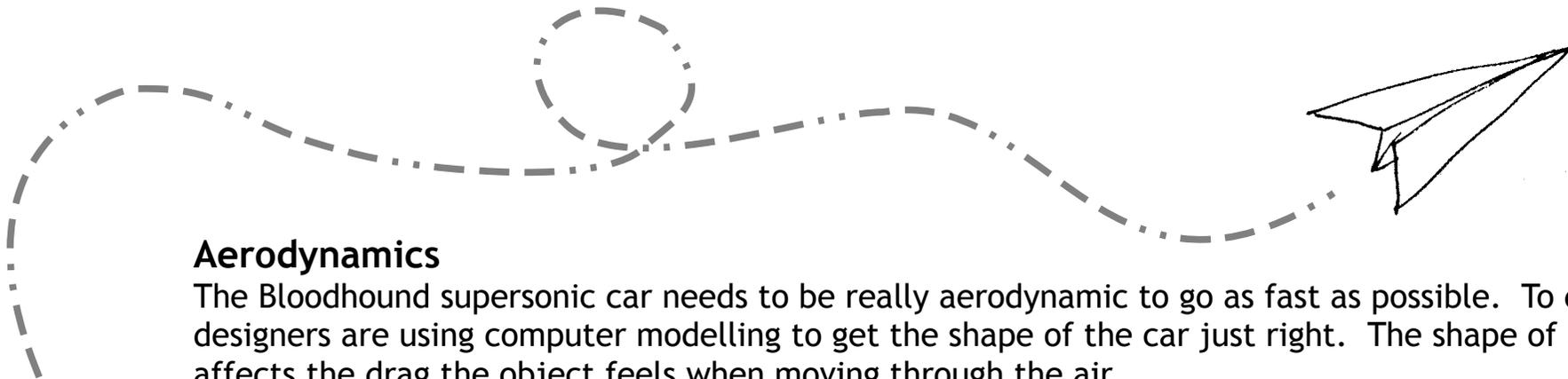


## Whose birthday is it?

You can use maths in surprising ways.

Try this .....

Trick your class with this probability question. What do you think the chances are of two people having the same birthday? Take votes from your class (No chance!, High chance, Medium chance). Get people to put their hands up if they are born in January. If more than one person puts their hand up ask them the date of their birthday. Repeat for every month. For a group of 23 people there's a 50% chance that two people will share the same birthday. This rises to an amazing 99% probability for just 57 people. That means in two classes there's about a 99% chance that two people will have the same birthday. It reaches 100% with 366 people (unless they're born in a leap year)!



## Aerodynamics

The Bloodhound supersonic car needs to be really aerodynamic to go as fast as possible. To do this the designers are using computer modelling to get the shape of the car just right. The shape of an object affects the drag the object feels when moving through the air.

You will need: A piece of A4 paper, Some counters

### Try this.....

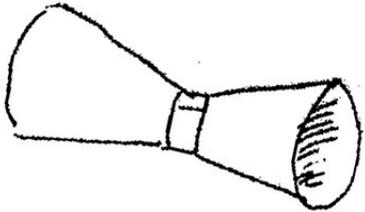
Mark a place for yourself to stand. Stand with your arm outstretched holding a piece of A4 paper. Throw the paper as far as you can. Mark where it land with a counter. Fold the paper in half, go back to your starting position and do it again. Keep doing this until you can't fold the paper anymore. What do you notice? Try changing the shape of the paper in other ways. What's the best shape?

## Disease spread game

Lots of different factors can affect the spread of diseases. Getting good models for this can help us to predict how serious a threat to the population a disease might be.

Try this.....

You can use this online disease spreading game to change a disease and see how it spreads. Make it very infectious, change how many people in the group are infected to start with and see how it changes how quickly the disease spreads and dies out.  
<http://motivate.maths.org/content/DiseaseDynamics/Activities/e-CounterPlague>



## Spinning cups

Maths can help us to understand lots of the effects we see in sports. One great technique lots of sports-people use is spin. Spin can help you to confuse a batsman in cricket or trick a goalie in football by sending a ball in an unexpected direction.

You will need: 2 plastic cups, Cellotape, 2 large rubber bands, tied together

Try this.....

Take two plastic cups and place them end to end. Tape them together around the middle. Take two large rubber bands tied together and hold the end against the centre of the cups with your thumb. Twist it around the cups and pull the other end taut with your other thumb. Launch the cups! The cups will not only spin but also rise UP. The spinning of the cups means the air moves faster over the top of the cups than the bottom and causes a difference in air pressure above and below the cups giving them an upwards force. Something very similar is going on when a footballer puts spin on the ball when taking a free kick. One side of the ball has slower air moving past it and so more pressure on it than the other and the ball ends up bending in one direction, confusing the goalie.

