LESSONS ON REACTION TIME/ THINKING, BRAKING AND STOPPING DISTANCES

I introduce reaction time by starting with INSTANTANEOUS SPEED as an example. The sheet is in the other attachment as the second experiment. I discuss instantaneous speed as the speed that the police use to tell if you are speeding. It is the speed at a particular point. I then give the formula v=d/t but indicate that *d* has to be very small, say the length of the car and *t* has to be small so the time to pass a point. I then push a car as fast as I can over the table top and get the loudest kid to try to time how long it takes to go over the line. Then we discuss why this isn't really possible. They then get the idea of reaction.

We discuss where reactions are important and who needs good reactions. I then do a couple of experiments to test reaction time. There are the ones on the internet

Sheep Dash

5 min road test

Red dot yellow dot

And then there is the instruction sheet using a ruler (but the 0mm should be level with the thumbs when dropping) Simple Science produce some ready-made reaction rulers. Also it would be good to compare the different results (on additional sheet)

Then we go on to talk about how important this is in a car's ability to stop.

- The STOPPING DISTANCE of a car is made up of TWO parts
- THINKING DISTANCE
    - Thinking distance is the distance a car will travel in the time it takes you to react to the situation.
- BRAKING DISTANCE
    - The distance the car will travel as the brakes are applied

Stopping distance = thinking + braking
distance distance

Stopping distance the distance it takes a car to stop.

Thinking distance is the distance moved whilst you are reacting to the hazard.

Braking distance is the distance that the car moves whilst braking

Then I use the reaction timers, get 2 tables from along the top corridor and the steering wheels. Each student needs a quiz board.

I make a table on the board as below

Name	conditions	Reaction time	Thinking distance	Braking distance	Stopping distance (TD +BD)
	30mph				

	Dry Concentrating				

I then divide the rest of the students up into 2 and each half supports one of the players. The students have to guess the stopping distance of the player they are supporting. The idea is to get as close the stopping distance value as possible but not less than the value, cos then they've been run over.

Eg I am voting for Gordon. I predict that at 30mph in the dry you have a stopping distance of 50m. When you do the reaction timer it gives you a time (note this is in ms) and then a thinking distance and braking distance. Add these two up to get the stopping distance.

So for example if your reaction time is 0.745s and you get a thinking distance of 14m and a braking distance of 14m then your total stopping distance is 28m. I am therefore within the stopping range and don't get run over. If I'd predicted 20m I would have been run over! If Cath had predicted 30m then she'd win as she was closer without getting run over.

NB TO START GIVE THE KIDS NO CLUES AS TO THE RANGE OF TIMES AS THEY GENERALLY DON'T HAVE A CLUE AND GET IT TOTALLY WRONG. Often the first prediction is somewhere between 5 and 12m

The point is to show the students that initially they have no concept of how far it takes a car to stop. Discuss with the students what can affect your reaction time

Eg alcohol, drugs, drink, screaming kids, texting putting on music etc

Build up slowly with things like those listed

- 30mph dry
- 30 mph wet
- 30 mph texting dry
- 30 mph icy
- 40mph dry
- 40 mph wet
- 30 mph listening to loud music coming from the board (usually affects teachers more than students!) dry

- 30 mph texting dry
- 50 mph dry
- 60 mph dry
- 70 mph dry
- 70 mph wet
- And here is the killer 70 mph icy (that is about 750m stopping distance which is about to TESCO)

After a while the students get the idea of stopping distance, reaction time. I then take them if time outside or along the corridor to work out how far some of these distances are.

This usually takes more than a period as I ensure all students have had a go at driving. BY THE WAY, one rule. **The students should be looking at the "road" and not hovering over the stop button. Its to simulate an emergency stop (I'll get one with foot pedals eventually)**

Each student gets one shot and then swap students so they all get a go. I generally let friends go up against each other as they get quite competitive.

NB Some kids have done it whilst drinking juice etc. The imagination is the limit.