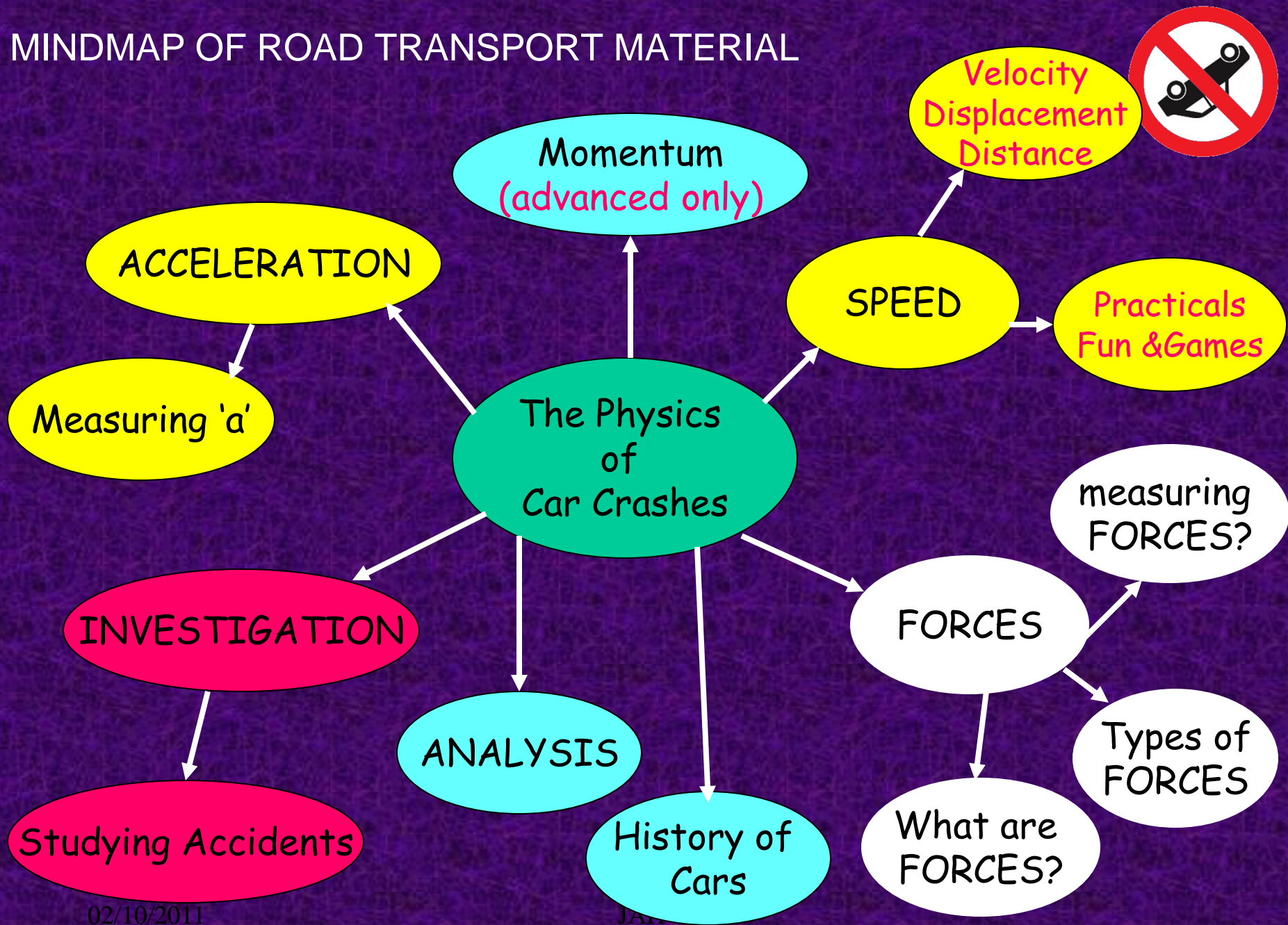




# LOCKERBIE ACADEMY TRANSPORT UNIT

*S1-S3 Road Safety & PHYSICS*

# MINDMAP OF ROAD TRANSPORT MATERIAL



WARNING



If you have problems  
with learning about  
Physics through CAR  
CRASHES then PLEASE  
let your TEACHER  
KNOW a.s.a.p

car crash compilation (ouch!)

JAH



# FOOL INJECTED

**Not to be taken lightly  
for Stuart & Grant's sake**

Let your experience or learn from others...  
you decide at [nomoreliveswasted.com](http://nomoreliveswasted.com)



## BACKGROUND

bbc news background



**For an everyday activity, travelling by road is probably the riskiest thing many of us do on a regular basis.**

On average, some seven people are killed every day on the roads in Great Britain. Hundreds more are injured, many of them seriously, often with life changing consequences.



**In the past 10 years, the death toll has amounted to 32,298. As such road crashes are the largest single cause of accidental death for people aged between 5 and 35 years.**

02/10/2011

IAH



# CRASH TEST VIDEOS



<http://www.youtube.com/watch?v=cdCn8ci-mWM>

<http://www.youtube.com/watch?v=ZMfOWPL81P0&NR=1>

<http://www.youtube.com/watch?v=AMrSxi1Ooro&feature=related>

<http://www.youtube.com/watch?v=mzs1sIoLhU&feature=related>

# CRASH TEST VIDEOS



- **Baby seats**
- <http://www.youtube.com/watch?v=Qef1TXZ05Dg&feature=related>
- <http://www.youtube.com/watch?v=B1ItU6LvNg&feature=channel>
- <http://www.youtube.com/watch?v=Q8gU9zzCGA8>
- **NEWTON 1st Law**
- <http://www.youtube.com/watch?v=8zsE3mpZ6Hw&feature=related>

## Cross curricular Experiences and Outcomes



- I know and can demonstrate how to travel safely. *Health and well being (HWB) 2-18a, 3-18a, 4-18a.*
- I am learning to assess and manage risk, to protect myself and others, and to reduce the potential harm where possible. *HWB 2-16a, 3-16a, 4-16a.*





- The curriculum for excellence requires all teachers to promote numeracy and one of the experiences and outcomes identified is that the pupil's learning should enable them to:
- Interpret numerical information appropriately and use it to draw conclusions, assess risk, make reasoned evaluations and informed decisions.

All teachers are teachers of literacy. Pupils could be asked their opinion on 20 mph speed limits













- I can persuade, argue, explore issues or express an opinion using relevant supporting detail and or evidence. **LIT 3-29a**
- When listening and talking with others for different purposes, I can:
  - communicate information, ideas or opinions
  - explain processes, concepts or ideas
  - identify issues raised, summarise findings or draw conclusions. **LIT 3-09a**





# HOMEWORK

- **HOMEWORK**
- Collect one of the **ROAD SIGN SHEETS**
- Put your name on the top
- Find out what each of your road signs means.
- Only fill in the "Meaning Column"

For each of the Road signs given state what the road sign means and choose the physics term that is most relevant.					
SIGN	MEANING	BEST PHYSICS WORD	SIGN	MEANING	PHYSICS WORD
	"NO ACCIDENTS" Except this is the LA logo it is actually made up but based on the accident warning sign which you can draw!	FORCE- an accident would change an objects, shape, direction or speed			
					
					
					
					

## TEAM- CHALLENGES



- WORK in Groups.
- Choose your group
- Choose a team name
- Choose a logo.
  - simple
  - Agreed
  - On A4
  - Scan and electronic



# Tigra

# Tigers

# Make up your Team Name



## Rules

1. Each team member must have a say
2. No decision can be reached unless everyone in the team agrees
3. No member agrees to a group decision if they have a serious objection
4. No one is to talk to a member of another team.



# Rules for doing investigations



1. No one is to talk to any member of another group.
2. I will not answer individual questions. Discuss problems with your group members first.
3. If a group has a question then every member of that group is to raise their hand.



- We plan to find out and understand about the following terms
- ✓ distance
- ✓ displacement
- ✓ speed
- ✓ velocity
- ✓ instantaneous/ average/ uniform/ speed
- ✓ forces, including weight, and friction
- ✓ time
- ✓ acceleration
- ✓ & momentum if you can handle it!



- We plan to find out and understand about the following terms
  - ✓ at rest
  - ✓ mechanics
  - ✓ dynamics
  - ✓ kinematics





## WORDBANK

Copy the following words into your jotter  
and literacy logs



# WORDBANK

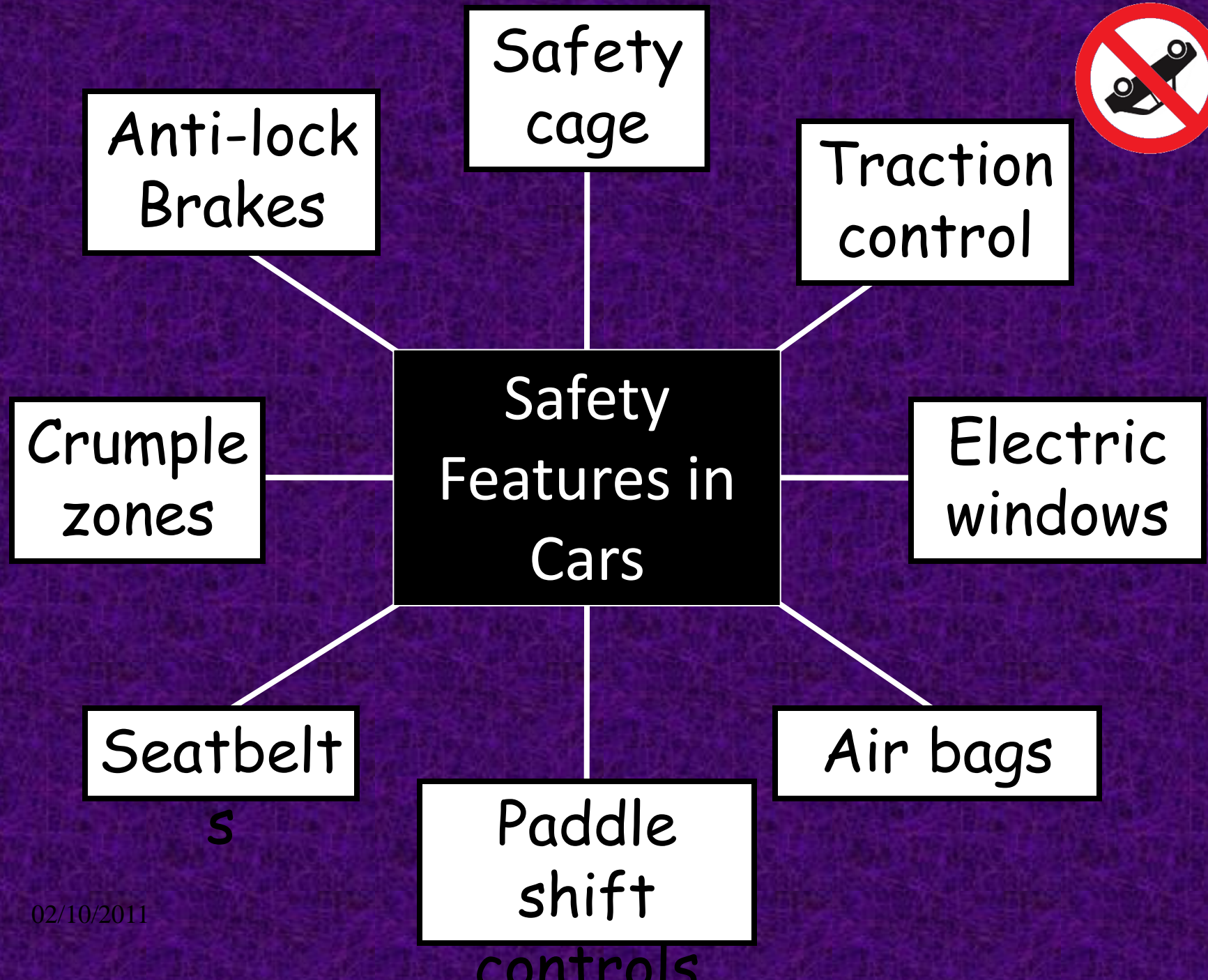
- MECHANICS
- The branch of Physics dealing with motion (how things move).
- KINEMATICS
- Mechanics dealing with motion, speed, acceleration etc
- DYNAMICS
- The mechanics part dealing with Forces



## INVESTIGATIONS & TEAM CHALLENGE

*S1-S3 Road Safety & PHYSICS*







# TART MA CART

Class challenge

# Collisions



[Hyperlink to clip](#)



- What makes a car 'safe'?
- Why are some cars better in crashes than others?
- What happens during a crash?
- Is this car safe?



# Making a car safe



Depends on

- driver education and attitude
- road design
- car maintenance
- car construction

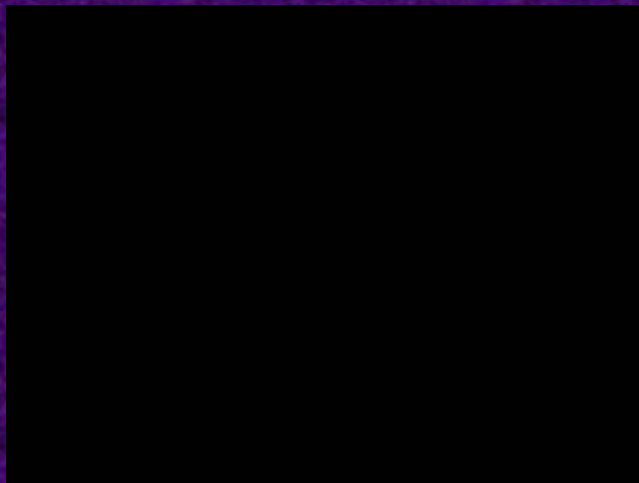
# Driver education



- 30% of accidents involve a driver under the age of 21.
- 8% of driving licences are held by drivers under 21.
- One in three drivers will have an accident by the time they reach 21.
- Boys under 21 are twice as likely to be involved in an accident.



[Hyperlink to video if clip doesn't work](#)





# Road Design



- New roads are subject to strict design standards covering gradients, radius of curvature of bends etc.



Although sometimes it can be a bit confusing!



[bbc archive film](#)

# Road Design



- Existing roads are subject to review and accident black spots improved.



# Road Design



- Roadside furniture is being replaced with crushable structures to minimise vehicle intrusion in a crash.





# Car Maintenance



- Accident prevention is the best way of protecting people in cars.
- Proper maintenance of safety systems - brakes, lights, steering, suspension and tyres - is essential to preventing accidents.
- Very few accidents are attributed to mechanical failure.





..\..\TRANSPORT SAFETY\Tart Ma Cart\CrashTest\_WM V9.wmv

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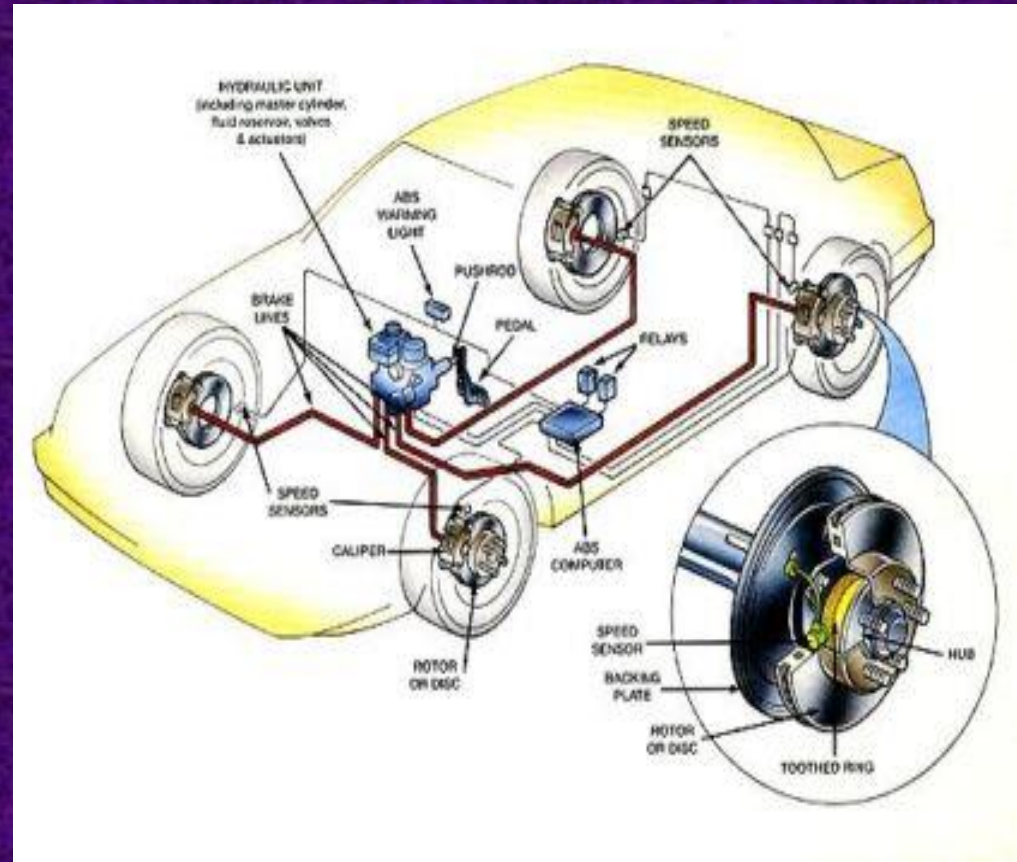
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# Car Construction



- Active safety systems include ABS, traction control, brake assist, dual circuit brakes.





# Car Construction



Passive safety systems include

- seat belts,
- air bags,
- safety cages and padding hard surfaces.





# Car Construction



- Cars are built with a passenger cage.
- A well designed cage should stay intact during a crash.
- Is this car safe?

..\..\TRANSPORT  
SAFETY\Tart Ma  
Cart\40mercedeseclasse  
WMV V9.wmv





# FINAL TEAM INVESTIGATION

# INVESTIGATIONS



Choose **one** of the investigations to choose from or **design your own**

- Friction and the driving surface,
- Car tyre design,
- Brakes how to make them better,
- Being a crash test dummy,
- Seatbelts are they worth it?
- Run offs what should they be made of?
- How and why lorry brakes smell at the bottom of a slope (height and speed)



# PERSONAL RESEARCH INVESTIGATION





Look at Road safety Campaigns, stopping distance, reaction timers, car accidents.

Discuss how cars can be designed to be safe. Where can improvements be made?



## Activities

For a period (a week or a month) collect articles from local and national newspapers about road crashes. Work out how many there were, how many involved car drivers, pedestrians, cyclists, etc. How many involved speeding (either exceeding the limit or driving too fast for the conditions).

Produce a report showing your findings. Present this to other members of the group/class and hold a Question & Answer session with them.



## Did you know?



- 45% of fatal and serious crashes and 53% of road deaths occur on rural roads.

Why are rural roads so dangerous? Think about speed, the nature of the roads and the types of vehicles using them.



## Activities

Road engineering is a successful way of helping drivers drive at safe speeds.

In small groups, pick an area (a few streets wide) and design a road engineering scheme to reduce traffic speeds and make the roads safer for everyone. Some groups should pick an urban area and some a rural area. Mark the changes you propose on a large scale map of the area chosen and produce notes to explain the changes and the reasons for them.

In an urban area, you could choose to design a 20 mph zone or a traffic calming scheme (but keeping the speed limit as 30 mph). In a rural area, choose a village where you want to reduce speeds from 60 mph on the road approaching the village to 30 mph through the village. Don't forget to consider pedestrians and cyclists and to include road markings and signs.

At the end of the project, each group can present their design scheme to the rest of the class.

Ideas about different engineering schemes can be found in the DfT's Traffic Advisory Leaflets and its "Road Safety Good Practice Guide".

SCALE 1:10000 1:5000 1:2500 1:1000 1:500 1:250 1:100 1:50 1:20 1:10 1:5 1:2 1:1





## Activities

Design an awareness raising campaign to include a leaflet, poster and press release.

Who do you think are the key target groups? Think about age, sex, and also social activities. Also take into consideration those locations and times where speeding is more common. Decide whether to cover all drivers or a specific group (does your decision change the method you would use, your target group or where you would locate the campaign?)

Think about campaigns used by other groups and try to make yours effective for your target audience. Run your campaign either in school or in your local community, make sure that you establish a way to evaluate the success of the campaign. Set a time limit for the campaign, this could be a couple of days or a week or more. You will need to

draw up a plan of action to ensure the smooth running of the campaign and source all the materials that you need to set it up. Have you ever been a passenger in a car and been concerned that the driver is going too fast? Look at [www.brag.org.uk](http://www.brag.org.uk) to see how one group of young people have dealt with this issue.



## Take it further...

### Did you know?

In 2004 a survey of vehicle speeds in Britain:

- 53% of car drivers exceed the speed limit on 30 mph roads in built-up areas
- On 40 mph roads, 27% of car drivers exceed the speed limit
- On motorways, 56% of car drivers exceed the speed limit
- On dual carriageways in non-built up areas, 49% of car drivers exceed the speed limit
- 48% of motorcyclists exceed the speed limit on 30 mph roads in built up areas.



## Activities

In the future, cars may not be able to exceed the speed limit. Using the Useful Links section, find out about Intelligent Speed Adaptation (ISA). Organise a class debate. Have one or two people to speak for and against the motion "This class calls for all cars to be fitted with technology to stop them exceeding the speed limit". Think about the advantages and disadvantages of taking the control away from the driver. What is best for society?

DISCUSSION- Choose one of the topics to discuss



- Should the speed limit on motorways be increased?
- What should be the punishment for drink drivers?
- The age for people to learn to drive should be increased/ decreased.
- The cost for Fuel in rural areas should be reduced
- We should learn to drive at school
- Driving lessons should be free and compulsory
- The insurance for young drivers is too expensive
- All cars in Scotland should have snow tyres in winter



# VIDEOS



Check out

1. THE COLLISIONS VIDEO  
on CLICKVIEW
2. Surviving Car CRASHES



# HISTORY OF CARS

# HISTORY OF CARS

Motoring  
through  
History2.ppt



- Watch the slide show of the some of the developments of cars over the last 130 years



# THINK OUT OF THE BOX!





There is a saying among road safety professionals that 'the safest car is the one with a spike sticking out of the steering wheel'

Could this be true?

Are there any disadvantages to making cars safer?



# TASK

## Summarise this introduction