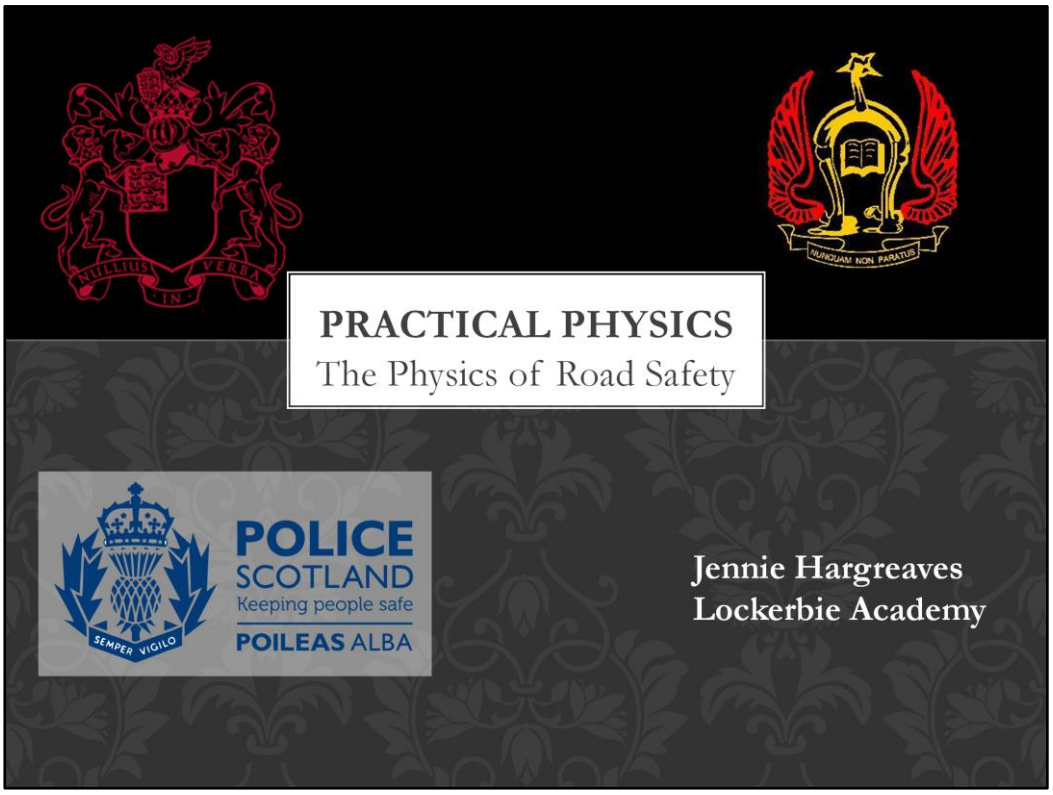


Slide 1
Lockerbie Academy Science Dept. has been in the forefront of integrating Physics curricular content with practical road safety. This is something that all school could do without difficulty.

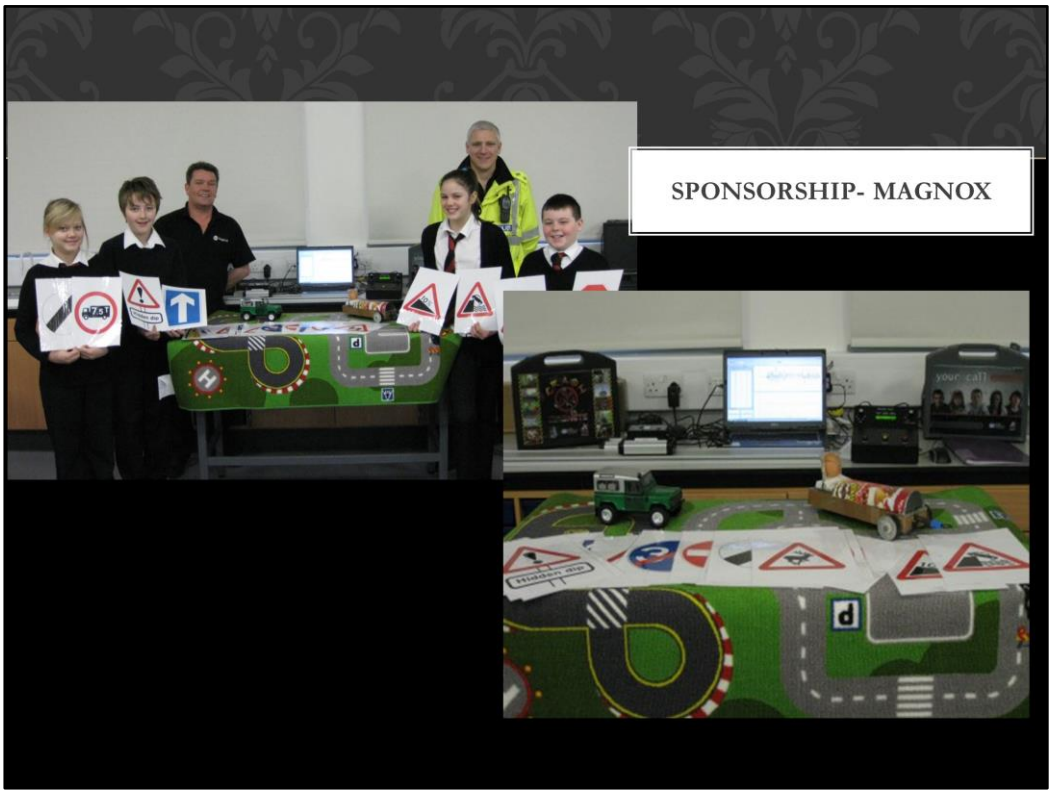
Slide 2

I decided to look into the topic of Road Safety after a Professional Development activity when I was issued with a Fifex timer- each police authority, before amalgamation, was supplied with 5 of these for use in schools and I wonder how many still know where they are! Over my 20+ years at Lockerbie Academy we have lost too many students and former students to road and vehicle incidents, (at least 7), and I don't think this is particularly unusual in our rural area.

Another activity produced by SSERC's and the IoP – "Tart Ma Kart" (based on the TV programme "Pimp my Ride", but as a copyrighted term the Scottish Version was invented). This activity involves students creating a barrier on a physics trolley to reduce impact forces.

Students learned about crumple zones, seat belts and air bags as a means of reducing force and increasing the time taken to slow down- all good and relevant curricular physics. Road Safety was being used as part of the Physics National Qualifications AVU (added value unit) and schools were talking about Road Safety.

We also had an opportunity to mention Safe Car design and the ENCAP (the European New Car Assessment Programme) rating, of which few students had heard.



Slide 3

We were fortunate to be able to apply, and receive funding from the Magnox SAFETY budget as part of the Chapelcross Decommissioning project. We used this money to buy resources for a CfE (Curriculum for Excellence) topic on Road Safety covering speed, distance, time, there was also resources provided for the Personal Social and Health Education.

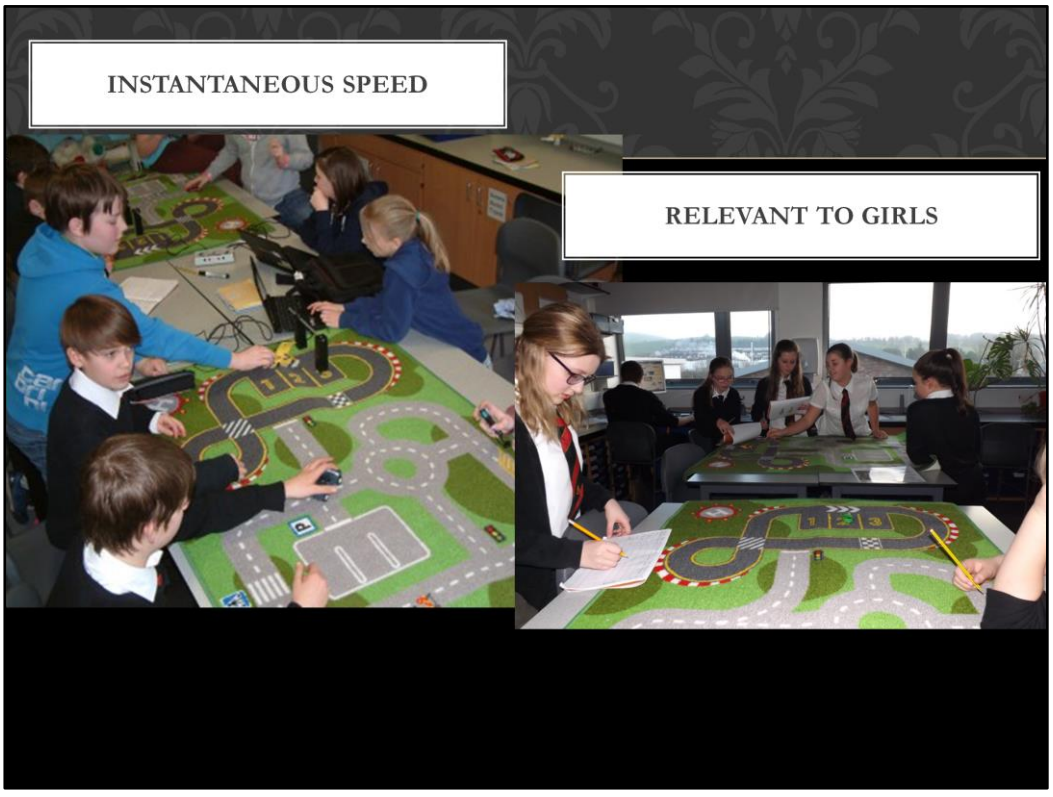
Slide 4

Through my research I created a game called Chicken Run using the Fifex timers- During this game students predict the stopping distances of two drivers using a toy steering Wheel at certain speeds and weather conditions, with various distractions such as arguing children in the back seat and using mobile phones. Students use whiteboards/show me board to write their predicted stopping distances. It indicates the difference between individual drivers, one driver might stop in a greater distance than they predicted but the other driver might have stopped in time under the same conditions. It is noticeable that S1-S3 students have no concept of stopping distances and even when they can be taught the correct stopping distance they cannot translate this into a real distance on the ground. The students love the game and it can really teach stopping distances, problems with road surfaces and introduces dangerous driving conditions. Hopefully students will think twice about arguing with their brothers and sisters in the back of a car. It provides a hard hitting message about stopping distance in the wet and ice.

No students are harmed during participating in this game!

Slide 5

In the classroom students use the playmats and toy cars to complete activities on speed, distance and time. This would work equally well in maths and Physics lessons as both cover the concept in the curriculum. It is certainly an interactive way of completing, what for some is a dull topic. It can be developed to cover many outcomes. It also appears to show some potential poor drivers and speeders by the student approach to this task. Some students indicate at roundabout and some don't appear to know the correct route around a roundabout! For some the time to complete the route is irrelevant providing they travel safely with the car, other students zoom around the track doing wheelies and driving off the road.



Slide 6: The equipment is used further to discuss and measure average speed, instantaneous speed and the difference between them. It is used to demonstrate. Acceleration, distance travelled there is plenty of potential and links to the various learning outcomes. We've also used them to explain the difference between scalar and vector quantities, something that comes up at Nat 5 in Physics.

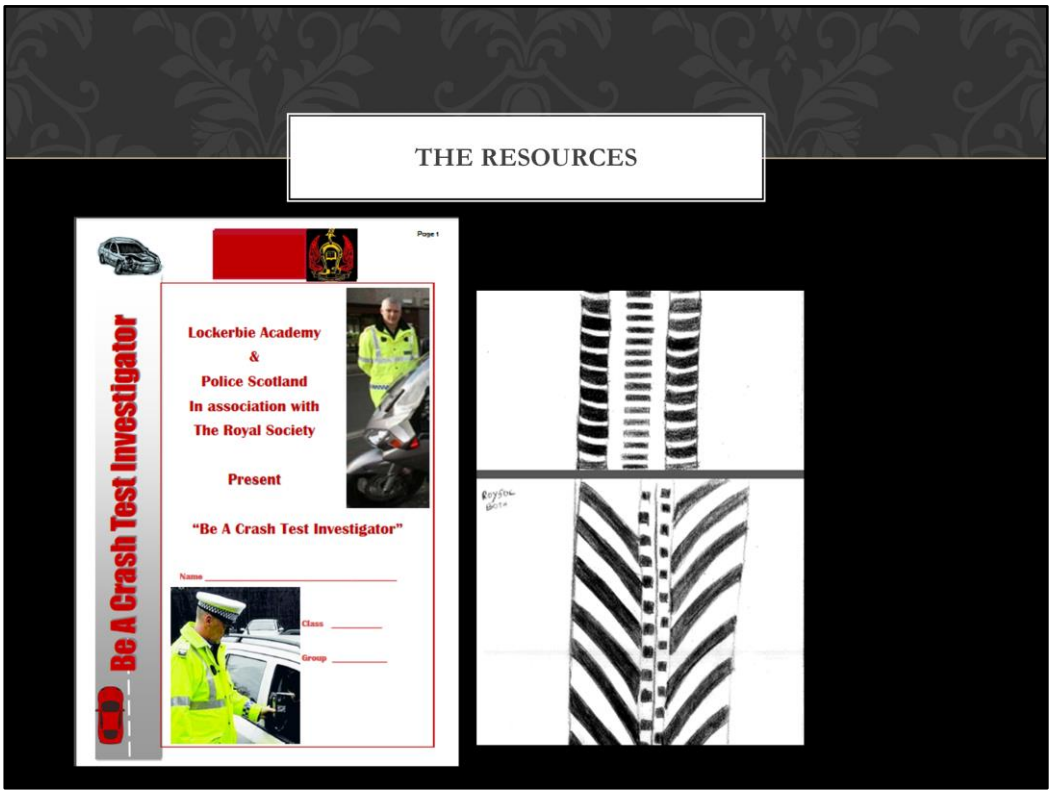
We introduce instantaneous speed and link this to speed cameras, speed limits for different vehicles and roads and also average speed cameras. This all follows with the outcomes of why it is better to use a light gate than a stop watch for measuring instantaneous speed.

The girls find it enjoyable too, although they generally prefer to work in groups of girls.

Slide 7: Our most successful project was completed as part of the Partnership Grants Scheme, funded, by The Royal Society. We linked up with Inspector Neil Hewitson from Police Scotland and had many discussions on how we could engage and get the road safety message across to students. The answer was “Be a Road Crash Investigator”

During this activity a road incident is laid out in the hall. Students have to work through various activities to discover what happened, including witness statements, measurements, and observations. Students can struggle with some of the concepts but with careful guidance the satisfaction on the students’ faces when they discover what happened is thrilling to see and everyone enjoys a bit of police tape! We are often fortunate to have some excellent input from Police Scotland Roads Policing Dept members to talk students through the activity. Having Police Scotland involved gives the activity extra kudos in the students eyes and they are very receptive to what the police tell them. This activity probably works best with S3 students, although some of the work is at Higher level. We’ve tried it out with a top S2 class, and S3s and S4s. Although the original work was put together with Inspector Neil Hewitson, we have been equally fortunate to have the support of his successor Inspector Campbell Moffat who has expanded the programme. The Roads Policing unit put together the information and we made up the teacher and pupil resources. It was a great team effort building on the knowledge from the police and the teachers’ understanding of the students. It hit so many aims. We would love to have a greater range of real life scenarios that teachers could draw on to select for their situation.

Slide 8:
This event covers all the following aims
1. How a road crash is investigated.
2. To understand the scientific process and how it relates to Road Crashes.
3. To work as a team, to use each person's skills to draw conclusions from evidence.
4. To discover situations where kinematics, dynamics and the equations of motion are used in real life to draw conclusions from incidents.
5. To work collaboratively with outside agencies, to understand their job, to and to question Scientists about their work.
6. To be safe road users and to have a better understanding of how to drive safely.
7. To take witness statements and to find out if these fit with the evidence at the scene of the incident.
8. To have fun through Science and use fun and imagination to solve problems.



Slide 9:
All the resources have been made up for two separate scenarios so it would take a very small effort and for other schools to run this event. The resources are all ready to share as so many people and organisations have been so generous with their time and money to make this work that we want others to be able to benefit. This event could be put on in all schools for very little money as you can probably borrow a ride on car..

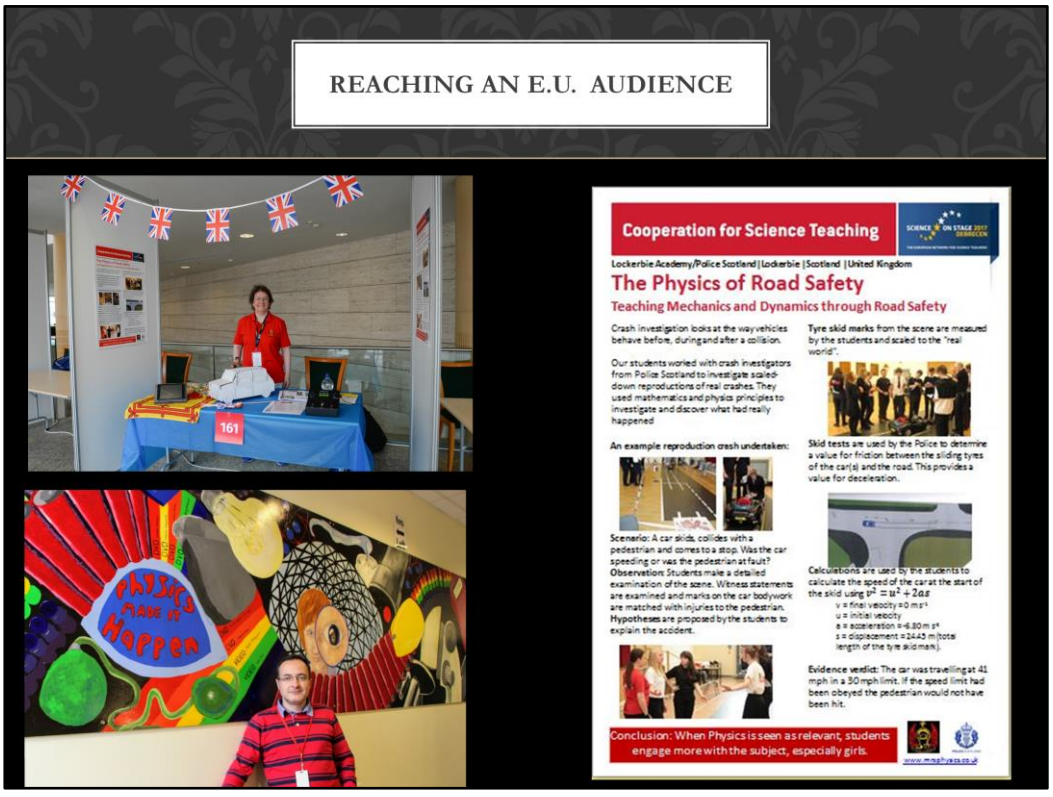
Slide 10:
At Higher we've been fortunate enough to have the Police Investigators come in and talk about a crash that many of the local police investigators were involved in. This is a hard hitting talk and really good for the students who are just coming up to driving age. This part of the project actually preceded our initiatives, but through our collaboration with Police Scotland we were able to incorporate our resources so the lesson ends with the students using more equations of motion and completing momentum equations and being road crash investigators too.

Slide 11:
A recent activity that we've incorporated into our annual programme of Road Safety Events is the Winter Drive Campaign. Across Scotland Police have a week long campaign to get motorists to think about winter driving and car safety. We suggested that the Police train our students and they complete the checks whilst overseen by the Police. Tesco have been really helpful here and offered us space and sponges. Students are trained to check lights, wipers, washer bottles, number plates and tyre tread depth and pressure. Students wash the car lights and number plates and top up washer bottles. This will be our third year of running this. Students from the first year returned to help out in the second year. They were great at training their parents and it really permeates the community.

Slide 12:
We have embraced several Road Safety Events and weeks. We notice that very few people in the UK sign up for PROJECT EDWARD in September and it would be beneficial if schools can be encouraged to take part and send the message home. BRAKE produce some great resources for Road Safety events.

Slide 13:
Students have been able to share their knowledge of Road Crash Investigations with other adults and children. Through the students enthusiasm for their work, LA's Be a Crash Test Investigator was chosen as the school exhibit at the Royal Society Summer Science Exhibition in 2014 and students also took part in the D&G Mayhem Science Festival. All of this improves communication and self esteem. Being able to explain this knowledge to people older than them has made them excellent Road Safety Ambassadors.

Slide 14: We have been involved in Road Safety Competitions firstly through Your Idea- Your initiative which resulted in Jennie Hargreaves going to Renault HQ. In 2014 we exhibited at the Royal Society SSE and in 2016 we won the Best Education Award for Road Safety and the Overall Road Safety Award.
At a ceremony in Brussels, Commissioner for Transport Violeta Bulc presented today the Excellence in Road Safety Awards 2016. This prize recognises commitments to road safety that have a significant impact on saving lives on Europe's roads.
Awards in the category "school challenge" went to the Colegio Público Miguel de Cervantes in Gijón (Spain), and Lockerbie Academy (UK).
Awards in the category "best practice" went to Børneulykkesfonden and Codan Forsikring (Denmark), Centrum Bezpieczeństwa Ruchu Drogowego (Poland), and ACA Automobil Club (Albania).
This year, a special prize was dedicated to Jacques Barrot, former Transport Commissioner and ardent supporter of road safety, who handed over the very first European Road Safety Award exactly ten years ago. The winner was selected by the audience present at the ceremony from among the five winners. Lockerbie Academy (UK). Violeta **Bulc** said: *"I am very impressed with the commitment and creativity that this year's winners have demonstrated. Grassroots initiatives like these are crucial in our efforts to reach our strategic goal to halve road fatalities by 2020. I can only encourage everyone, at whatever level you work, to carry on the great work and to pass on your experiences, so that great ideas can be used again elsewhere."*

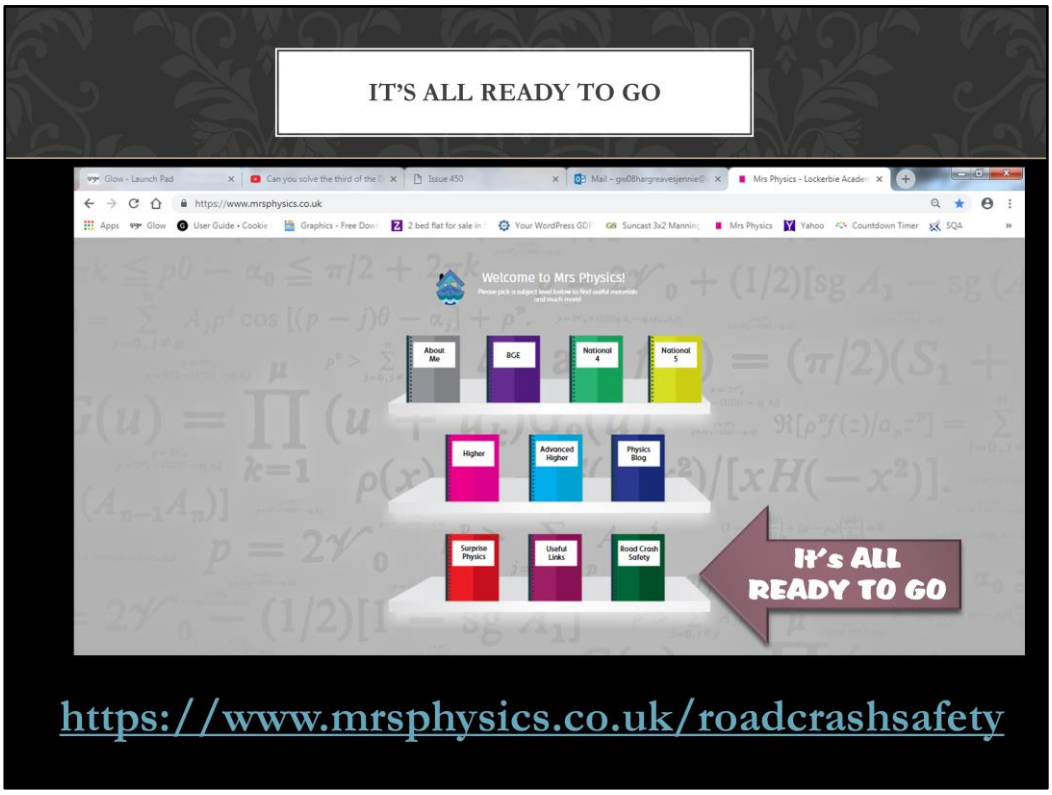


Slide 15:
We have been able to spread this work across the EU and formed part of an Exhibit at the Science on Stage 2017 Conference in Debrecan, Hungary, where 450 Science Teachers compared their work. New contacts were made to increase the range of the work.

Slide 16: Over the last 10 years this work has been published 3 x in TESS articles (twice by Gregor Steele in his piece) and one through the insight section. Students wrote up the experience in Young Scientist. Articles have also been completed for ASE Journal, Catalyst and Science in Schools, a European Journal of Science Teaching Contacts have been made and people have asked for the materials

Slide 17: We try to keep road safety as a topic that is discussed at various stages of student education and throughout the year for all ages, hoping that road safety becomes something subconscious and second nature.

Slide 18: Special thanks must go to Inspectors Neil Hewitson and Campbell Moffat and their team, without whom none of this would happen and continue. They have shown a real passion for passing on the Road Safety message to our Young People. Thank you guys for your inspiration and care for our YP.



Slide 19: Although time is required to update all the resources, they are already available for worldwide use.