

**HAMAD BIN ABDULLAH BIN JASSIM
INDEPENDENT BOYS SCHOOL**

RESEARCH PROJECT

REACTIONS

**FIRST NATIONAL
STUDENT RESEARCH FAIR
2009**

**SHERATON HOTEL
23RD – 24TH MAY**



GRADE 10.9

**STUDENTS : Ayman Abdel Munem, Khalid Nasr Al-Qadi, Saleh Sadeq,
Mohamed Basher, Abdel Aziz Hussain, Teachers: Mr Mohammed
(Maths), Mr Wajdi (Science), Mr Charlie (SSO Team, Cognition).**

IN THE BEGINNING

After receiving information that a Research Competition was to be held for the first time in Qatar, the SSO Team discussed the possibility of entering a group into either the Science or Mathematics area.

As Research was an area that still needed some input into the school and for Staff training it was felt that this would be a good opportunity to develop the strategies for open-ended child centred learning and also developing some independence in the students for their own learning.

A selection of students was made from 10.9, at the advice of their Science teacher, Mr Wajdi, who had a group of students interested in finding out more about " Comets."

He asked me to meet them and to discuss the possibilities from there.

OUR FIRST MEETING

In meeting the five students I found indeed that they were very interesting and enthusiastic about learning. Because of the time factor our discussions led to something that could be tested and applied to current safety problems in Qatar.

DEVELOPING THE IDEA

Looking at people's reactions and how this affects accidents on the road in Qatar seemed to be something interesting to try. As the students had already studied Statistics, I knew they had ideas about how to display and analyse data. Braking time was eventually arrived at and simple testing of reactions using a metre ruler would give us some initial data and a premise to work from.

Using a metre ruler the students tested a class on their reaction time in clutching a dropped ruler and recording the place on the ruler from 0 cm that they stop it at as it falls. Using this data we saw that there were significant differences between only 21 individuals and transferred this to braking on cars and the time it takes.

A practical test was designed for some of the adults at the school with cars to test the time and distance covered when signalled to stop.

The students were to signal with a flag when the car was to stop and the time it takes to stop was measured as well as the distance the car had travelled.

To ensure the driver was unsure when to stop some of the students spread down the designated track but only one had the flag. As the flag was raised the driver had to brake.

The distance past the flag was then measured.

The time was started when the flag was raised and stopped when the vehicle stopped.

The drivers did two runs – the first at 20km/h and the second at 40km/h.

We wanted to know if the distance and times were significantly different.

To ensure all of the students understood how to do the test all students rotated around the tasks. This allowed them to experience each part of the testing and understand the difficulties each part has in obtaining information. All aspects in both time and distance with speed were recorded into tables.

Once this was done the students spent time together in small groups analysing the collected information.

They arranged it so that the Median, Mean and Range could be calculated and then compared between individuals as well as between the different speeds.

We then compared this with the initial variations from the metre ruler test to find similar differences between individuals.

The students then designed tables and graphs in which to imbed the data so that it could be better displayed. This was then put onto a large cardboard display board with titles for display in the library before being entered into the First Qatar Student Research Fair.

Each of the students contributed within the group on all of the data and pictures and diagrams used. There were photos selected from the testing to be used around the display board at the Fair.

These are included in this report to give a full understanding of what was done.

QUESTIONING TECHNIQUES

As part of the development of some research or investigation of a problem good questioning technique is required.

To do this open-ended questions need to be asked to allow the students to pool all their knowledge and think widely about the topic as possible.

How can we do this?

What would work here?

What else could we do?

How can we explain that further?

Where could this be done?

It is important to explore all aspects of the topic and find some areas that need further refinement and so more defined questions are required.

What would we need to do for this to work?

How can we best record that?

Which would be the best way to do that?

When would be the best time to do it?

How can we organise that so that it works?

FURTHER DEVELOPMENT

As the ideas become clear and some specific testing seems possible then making diagrams so that all students in the group can follow and understand was necessary.

Aspects of how to keep it fair and some safety aspects needed to be thought about as well.

We tested the idea about the metre ruler. We first used a 30cm ruler but realised it was too short and too light. As we had some longer wooden rulers in the mathematics department these were tried and proved successful.

As we discussed the way to test the car trials the car-park was the best place and during classes was selected as the best time, inviting teachers and staff during their non-teaching time for testing.

A large clear area was used and low speeds to leave the driver in control at all times as well as enough stopping distance away from other vehicles, as well as the gates and walls.

Only low speeds up to 40km were thought to be best. My input was needed here. I tested the course and the speeds first to see how the testing would operate.

I then had to look at safe ways for the students to be involved and the systems that can be used. We devised the 3 optional students to stand visibly beside the track with the time keeper and measure standing behind them. They were then out of the roadway of the cars but visible by the drivers.

A flag was devised as the most suitable method for indicating to the drivers to stop.

With all three having their hands down the flag was unsighted then by the drivers and they had to react when the flag was raised.

After testing it was found that the time-keeper had to stand behind the flag carrier so that the time could be taken more accurately.

The distance could then be measured from the flag carrier to the front of the car. A straight line was measured. This was then recorded in metres and centimetres.



The students then worked on the data collected and were able to calculate the Median, Mean and Range of the information collected.

METRE RULE REACTIONS

The results showed that there were extreme differences in just 20 people. Some had stopped the ruler at 12 -20 cm. But many others were not able to stop it until 70-80 cm.

BRAKE REACTION TEST

Would we find the same with the brake reaction test too?

When the students studies the data we found that as a general rule there was twice the distance covered before stopping at 40km/h as that at 20km/h. There was little difference in the reaction time. Speed affects the distance that drivers can stop within. Reaction time is added to it.



DOING THE MEASUREMENTS OF THE CARS



QUESTIONS

The students then had to discuss how to select some Focus Questions from which to give our study some direction.

We had to look at what the information was going to give us some ideas about?

What was our information and data going to reveal?

As a group we brainstormed about the questions that we are trying to achieve. We presented all of our ideas and then selected those that give us the direction we needed and would also give us suitable results to discuss with our information.

This helped to then give us a defined direction for the way in which we used the data and helped to explain what was important about it.

Keeping our theme of Reactions around a traffic topic was where we finished up and relating reactions to driver reactions.

HOW TO DISPLAY OUR DATA

In discussions we found that we had studied statistics and could find the Median and Means of collections of data and so this was the way we would use our data.

We would also use Frequency tables to display the information that we had obtained and then use calculators to get the calculations necessary for analysis of our tasks.

A graph was also suggested and this was in the form of a Bar Graph to show the information as well.

We needed to then display our work and it was suggested to use a folding cardboard free standing unit. This was then made and titles and pictures added to the tables and graphs. When all was completed the students discussed how to best arrange it and then glue it on.

The sheets of cardboard were sellotaped and background coloured paper was glued on first, before sticking the project details on, in an ordered sequence.

THE DISPLAY UNIT

To ensure that the work of students is displayed well what is really required is a self-standing cardboard unit consisting of 3 panels. Each of the side panels can then be extended or opened to hold the whole unit upright.

Titles should be placed across the top centre with all work displayed on it.

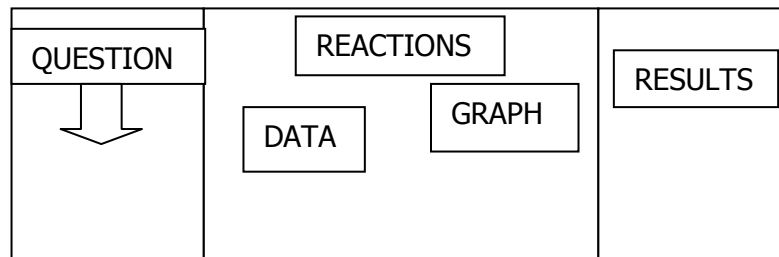
The work should go from left to right with the Key Questions and Purposes of the research project stated. Next should be statements written on how the data was collected and further statements or questions that needed to be solved.

All data presentations should follow across the display unit to finish with the final outcomes.

Any models and samples should be left as free-standing within the area contained in front of the box unit.

This would be the same for a Research Project or Science Display.

The names of the students should also be found on the display unit to the bottom and either right or left.



SETTING UP AT THE FAIR



The boys have set up their pictures and display board.

They are now just setting up their Power Point.

Mr Mohammed is checking that all systems are working.

COMPLETING OUR PREPARATION



All systems seem to be working.

**THE TEAM – READY FOR THE PUBLIC
AND QUESTION TIME FROM THE
JUDGES.**



The Boys are excited about the first time preparing for a public display and have worked really hard to get this far.

Mr Charlie is really pleased with their efforts.

EXPLAINING OUR EXPERIMENTS TO THE PUBLIC



