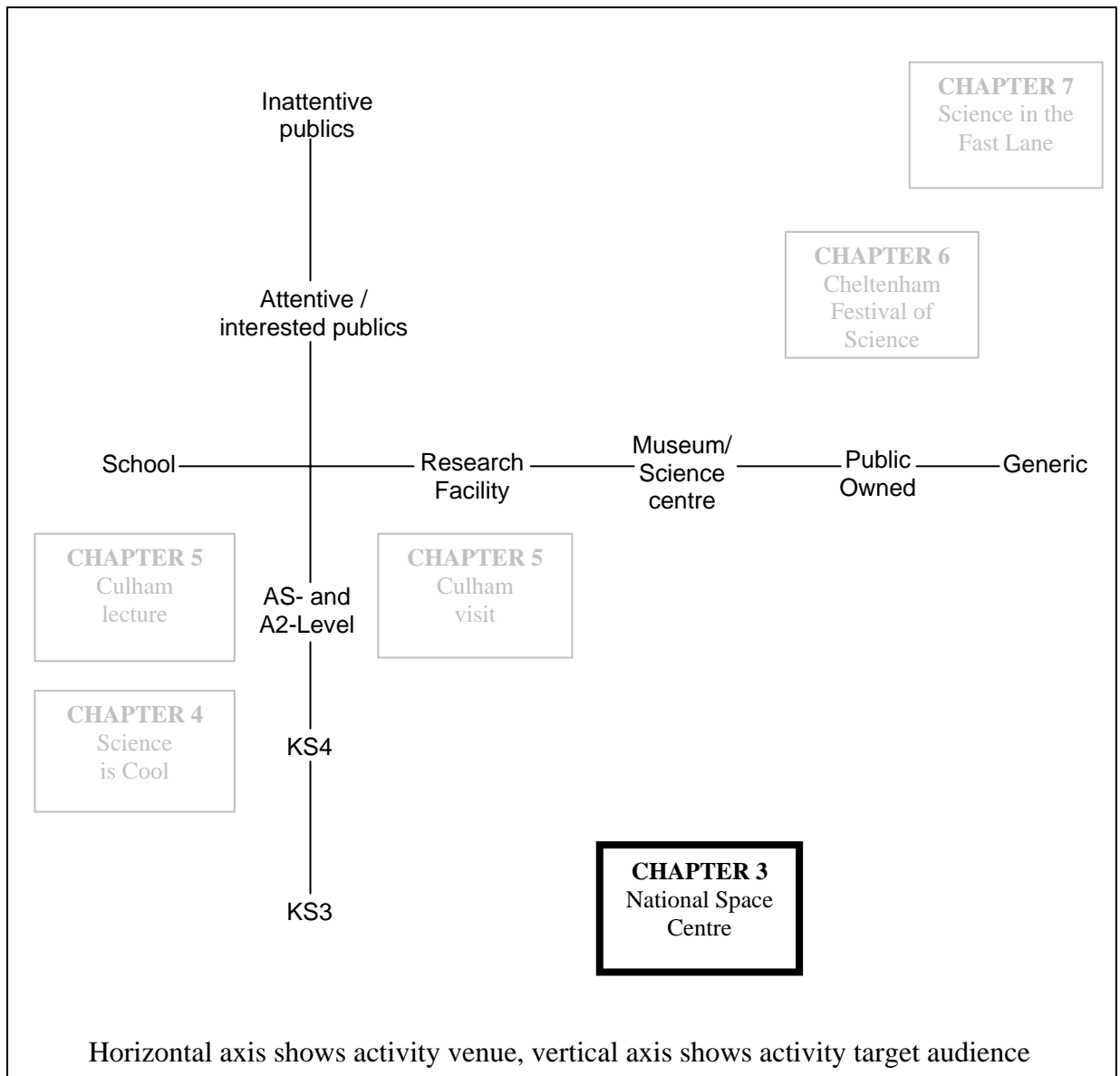


*Chapter 3*



**EVALUATION OF THE IMPACT OF A SPACE CENTRE  
VISIT ON THE COGNITIVE AND AFFECTIVE DOMAINS  
OF KEY STAGE 3 STUDENTS**

*Research axes*



Chapter 3 is an evaluation of the impact of a visit to the National Space Centre on the cognitive and affective domains of Year 8 students. The visit comprised a planetarium show, simulated space mission and time spent in the galleries. Students appeared to enjoy the intervention, and it was found to have a positive short-term impact on students’ attitudes towards physics, as well as offering educational value.

### **3.1 INTRODUCTION**

Visits and field trips have long been used as an educational tool to support student learning in all areas of the curriculum. As summarised in Chapter 1, learning in informal settings outside the classroom is an interesting and expanding area of research. It has been demonstrated that allowing individuals to take responsibility for their own learning in such settings can prove valuable (Falk *et al*, 1986). Science centres and science museums aim to provide an enjoyable and educational experience for their visitors, and research has indicated that this can impact on affect and cognition (Wellington, 1990; Tuckey, 1992; Shamos, 1995, Ramey-Gassert *et al*, 1994).

The present study explores the impact of a school visit to a science centre in the UK on Year 8 students. The National Space Centre, the focus of the present study, has an advantage in arousing student interest, as space science topics are often already popular (Osborne & Collins, 2000). The visit involved several structured and unstructured activities, as described in the subsequent sections.

#### **3.1.1 The National Space Centre**

The National Space Centre, situated in Leicester, UK, is a science centre incorporating an advanced multimedia planetarium, several galleries and the Challenger Learning Centre. Each school included in the present study visited a planetarium show and the galleries (including the '*Into Space*' tower) and took part in a simulated mission in the Challenger Learning Centre.

### **The planetarium show ‘*The Planets*’**

The show ‘*The Planets*’ takes place in one of the most sophisticated multimedia planetaria in the world, featuring advanced audiovisual facilities and an integrated electronic voting system. ‘*The Planets*’ is a programme that explores the solar system and is aimed at students in Key Stages 2 and 3. It uses the planetarium’s inbuilt audience response system which uses electronic voting to quiz students’ knowledge about each of the planets as they are visited throughout the course of the show. This aims to reinforce the learning taking place during the programme. The programme communicates information regarding each of the planets in the solar system, including their size, structure, atmosphere and whether they have satellites. Each programme is delivered by a presenter who controls the voting questions and a series of video sequences, one for each of the planets.

### **The galleries**

The galleries in the National Space Centre include a mixture of traditional museum-type exhibits (including rockets and satellites), and interactive exhibits. The galleries cover the way humans have explored space as well as space science, and include information on the latest space exploration programmes.

### **The Challenger Learning Centre**

In the Challenger Learning Centre, a class simulates a space mission, and students take on the roles of astronauts and mission control scientists. Previous research into the impact of a visit to the Challenger centre on Key Stage 2 students (10 and 11 year-olds) had interesting results. For some students, there were significant gains in enthusiasm for science and in the appreciation of science in society, and a minority

of students reported that they had been inspired to become scientists following the visit (this was more often the case for girls than for boys). However, there appeared to be no shift in attitude for half of the students involved in the study, and even some negative attitude shifts, especially amongst a minority of girls in whom the experience induced some anxiety (Jarvis & Pell 2002). The current study focuses on students in Key Stage 3 (12 and 13 year-olds)

## **3.2 METHODOLOGY**

### **3.2.1 Data collection**

Data were collected from Year 8 students from 3 schools visiting the Space Centre in 2003 and 2004. A questionnaire-based survey of students was conducted to measure indicators of attitudinal and cognitive change. The first stage questionnaires were administered in the week before the visit, and the second stage questionnaires were administered in the week following the intervention. The opinions of teachers were also sought using questionnaires administered after the visits. However the response rate was so poor that the teacher results are not included here.

### **3.2.2 Data collection materials**

The study used closed-form before-and-after questionnaires to survey the impact of the intervention on the cognitive and affective aspects of students' thinking. Evaluation questions also surveyed students' opinions of the visit itself. Cognitive and affective impacts were measured both directly, using multiple-choice physics questions and attitudinal indicators, and indirectly by asking students to assess how much they felt they had learned, or if the way they felt about physics had changed.

The questionnaire consisted of four parts: A cover sheet, a set of attitudinal questions, a set of questions testing scientific knowledge, and a set of evaluation questions. Copies of the questionnaires are given in Appendix 3.1.

### **3.2.3 Pilot study**

A copy of the script for '*The Planets*' (the planetarium show described in Section 3.1.1) was made available to the researcher for the design of the questions testing scientific knowledge. A pilot study was conducted in July 2003, primarily to ensure that these questions were pitched at an appropriate level. The level was found to be appropriate, and as no changes were necessary to the data collection materials the pilot respondents were included in the study cohort. Recruiting schools for the study proved challenging; the primary reason being that requests to participate needed to come from Space Centre staff as well as the researcher. In addition, the questionnaires were distributed by post and a number of the schools recruited into the study returned only the first or second stage questionnaires. The main study required responses from each student both before and after the intervention, so students from these schools could not be included in the subsequent analysis.

## **3.3 RESULTS**

### **3.3.1 The study cohort**

A total of 179 Year 8 students from three secondary schools took part in the present study. The responses of those students who had not completed the question regarding whether they had seen '*The Planets*' were removed, leaving 175 students. The study cohort is described in Figure 3.3 below.

**Figure 3.3** *The study cohort*

<i>Sample</i>	<i>n</i>	<i>Age %</i>		<i>Gender %</i>	
		<i>12</i>	<i>13</i>	<i>Male</i>	<i>Female</i>
Student	175	38	62	49	51

*All students were in Year 8*

### **3.3.2 Association between attitudes, perceived ability and museum visits**

Figure 3.4 shows associations between students' pre-existing attitudes towards physics and their perceived ability and frequency of visits to museums and science centres. The p values were obtained using Kendall's tau-b measure of association (as described in Chapter 2); the table presents both the correlation coefficients and the p values.

**Figure 3.4** Association between attitudes, perceived ability and museum visits

	<i>Rate physics ability as good</i>		<i>Often visit museums and science centres</i>	
	$\tau$	$p$	$\tau$	$p$
<b>Nature of the subject</b>				
Like physics	0.38*	0.00	0.24*	0.00
Interesting	0.42*	0.00	0.34*	0.00
Boring	-0.33*	0.00	-0.22*	0.00
Relevant to everyday life	0.23*	0.00	0.24*	0.00
<b>Academic demands of subject</b>				
Easy	0.37*	0.01	0.18*	0.00
Remembering facts rather than understanding ideas	-0.18*	0.06	-0.13	0.01
Good at maths	0.11	0.19	0.09	0.09
<b>Types of student</b>				
More a boys subject	-0.03	0.65	-0.03	0.67
More a girls subject	-0.07	0.20	-0.08	0.30
People who don't mix well	0.04	0.41	-0.05	0.57
<b>Communication of subject</b>				
Uses lots of difficult words	-0.07	0.48	-0.05	0.27
Uses everyday words with different meanings	0.11	0.58	0.04	0.10

\* denotes association significant at the 95% confidence level or above

These data indicate that students who rate their physics ability higher than average are more likely to have a positive attitude towards the nature of physics. The associations indicate that these students like the subject, find it interesting and relevant and reject the notion that it is boring. In terms of the academic demands of the subject, those students who rate their ability as high are more likely to agree that physics is easy, and disagree that physics is more about '*remembering facts than understanding ideas*'. Students who often visit museums and science centres outside school are also more inclined to like physics, find it interesting, easy and relevant, and reject the idea that it is boring.

### **3.3.3 Impact of the visit on students' affective domain**

Figure 3.5 shows the responses to the attitudinal tracking questions before and after the intervention. The p values shown in the table were calculated using the Wilcoxon signed ranks test. The percentages shown in Figure 3.5 merge the responses for '*strongly agree*' and '*agree*' under the '*affirm*' heading, and the responses '*strongly disagree*' and '*disagree*' under the '*reject*' heading. The statistical analysis was conducted on the data before the responses were merged, that is, where responses were given on a 5-point scale.

**Figure 3.5** Differences in responses before and after the visit

	<i>Before %</i>			<i>After %</i>			<i>p</i>
	<i>Affirm</i>	<i>Neutral</i>	<i>Reject</i>	<i>Affirm</i>	<i>Neutral</i>	<i>Reject</i>	
<b>Nature of the subject</b>							
Like physics	31	53	16	54	34	12	0.00*
Interesting	47	39	14	63	25	12	0.00*
Boring	21	39	40	13	38	49	0.00*
Relevant to everyday life	47	33	20	47	37	15	0.32
<b>Academic demands of subject</b>							
Easy	12	45	43	15	48	37	0.01*
Remembering facts rather than understanding	16	54	30	14	51	35	0.15
Good at maths	40	42	18	25	43	32	0.00*
<b>Types of student</b>							
More a boys subject	6	22	72	8	22	70	0.76
More a girls subject	3	26	71	2	24	75	0.17
People who don't mix well	5	22	74	4	22	74	0.93
<b>Communication of subject</b>							
Uses lots of difficult words	46	39	15	38	38	24	0.01*
Uses everyday words with different meanings	21	49	29	23	53	24	0.19

\* denotes difference significant at the 95% confidence level or above

These results indicate that a visit to the National Space Centre had a positive impact on students' attitudes towards physics. Following the visit, respondents were significantly more likely to say they liked physics, agree it was interesting and reject the notion that it was boring. Respondents were also less likely to agree with (and more likely to reject) the idea that physics uses 'difficult, complicated words' following the intervention. Students were also more likely to agree that physics is an

easy subject after the intervention, and more likely to reject the notion that physics requires mathematical ability.

Over a third of students (36%) reported that the visit had changed the way they felt about physics. A further 40% felt the visit had not changed their opinion, and the remaining 24% were not sure. To explore this issue further, students were asked to describe the way in which their feelings about physics had changed. All of their responses indicated a positive shift in attitude:

*“I thought physics would be boring but I was wrong”*  
(12 year-old female)

*“Made me think - not just boring facts”* (13 year-old male)

*“Shows it can be fun to learn”* (12 year-old female)

Chi-square tests were used to examine whether students who reported a positive shift in attitude were those who liked or were interested in physics before the intervention. No significant associations between the variables were identified.

#### **3.4.4 Impact of the visit on students’ cognitive domains**

Figure 3.6 shows the percentages of students answering the knowledge quiz questions correctly and incorrectly before and after the visit. The p values were calculated using McNemar’s test for differences, as described in Chapter 2.

**Figure 3.6** Knowledge quiz responses before and after the visit

<i>Question</i>	<i>% Correct</i>		<i>p</i>
	<i>Before</i>	<i>After</i>	
<b>Control – knowledge unrelated</b>			
Which is the closest planet to the Sun?	93	95	0.45
Why are planets visible?	83	83	1.00
What type of fuel is burned at the centre of the Sun?	37	43	0.08
Roughly how long ago do scientists think the Big Bang happened?	21	19	0.85
<b>‘The Planets’-related questions</b>			
What type of force holds the solar system together?	76	87	0.00*
What are Saturn’s rings made of?	60	88	0.00*
Which is the seventh planet from the Sun?	71	77	0.16
What is the name of Pluto’s moon?	32	39	0.09
What is Jupiter’s red spot?	42	79	0.00*
Which is the hottest planet in the solar system?	49	70	0.00*

\* denotes difference significant at the 95% confidence level or above

Four of the six questions relating to information covered in ‘*The Planets*’ showed a significant increase in correct responses following the visit. It is impossible to attribute this to the show alone; all of the schools involved also visited the museum galleries and took part in a Challenger mission. None of the control questions (those that were not related to the content of the presentation) showed a significant difference in correct responses before and after the intervention. This indicates that the high levels of significance measured for the other questions mean real learning has taken place, albeit only measured in the short term.

Students perceived the ‘*Planets*’ show as educational: almost all students (99%) felt they had learned at least ‘*a little*’ physics from the show, while 74% felt they had learned at least ‘*some*’ physics and 26% felt they had learned ‘*a lot*’ of physics. The

use of the voting system appears to have helped reinforce students' learning. As one student put it:

*'[The show was] good as you guess what you think and then find out if it is right' (12 year-old female)*

Other comments about *'The Planets'* included:

*"Cool because they taught me lots of stuff and it was fun"*  
(13 year-old male)

*"It really did make me learn something about the solar system. It was fun"* (13 year-old female)

*"It is a good way of learning about space. The quiz is good"*  
(13 year-old female)

### **3.4.5 Evaluation questions**

8 out of 10 students (84%) who saw *'The Planets'* felt it was interesting, and a similar proportion (79%) felt that the scientific level of the programme was *'about right'*. However a fifth (18%) felt it was *'too easy'*. Most students (77%) rated the length of the show as *'about right'* and most (80%) were satisfied with the pace of the show. Three-quarters (76%) agreed that *'The Planets'* was a *'fun way to learn about physics'*.

### **3.4.6 Students' impressions of the visit**

Students were asked to write down their favourite and least favourite parts of the visit. The responses were grouped into categories and the results are shown in Figure 3.7.

**Figure 3.7** Students' favourite and least favourite parts of the visit

<i>Response</i>	<i>Number of responses</i>	
	<i>Favourite</i>	<i>Least favourite</i>
Challenger mission	116	7
'The Planets' show	49	11
Galleries	3	23
'Into Space' tower	3	16
All	2	
Other	2	5
Waiting/queuing		10
Shop		10
Nothing		9
Leaving		8
Lunch/Food		7

Students appeared to enjoy the Challenger mission and 'The Planets', as these were the most popular activities. The least popular were the galleries and the 'Into Space' tower. Reasons for their unpopularity included:

*"Going round the galleries not much hands on or stuff to do"*  
(12 year-old male)

*"Galleries cos we had no guidance just left to get on with it"*  
(13 year-old female)

*"The space tower cos I climbed up all the steps and there was nothing there"* (12 year-old male)

Some students in the sample disliked 'The Planets', saying it was 'too easy'. The show is targeted at Key Stage 2 and 3 audiences, and Year 8 students are at the upper end of this range. This is reflected in some of the comments. Despite this, students' overall impressions of the visit were generally positive.

*"[I] don't find physics boring anymore"* (12 year-old female)

*"Exciting and fun and interesting"* (13 year-old male)

*“I think that the Planets show was good because it put facts into a fun interactive form people will enjoy and remember”* (13 year-old male)

*“Excellent and a cool way to learn”* (13 year-old female)

*“It was a fun way to learn physics rather than writing notes in a classroom”* (13 year-old female)

## **3.5 DISCUSSION**

### **3.5.1 Results summary**

Overall, students responded well to the visit. Following the visit, students were significantly more likely to accept the idea that physics is interesting, reject the idea that it is boring, and agree that they liked physics. This generally positive shift is likely to be due to the fact that the students found the visit enjoyable, and that a range of activities were included in the visit, appealing to students with different interests and learning styles. Students were also significantly more likely to reject the notion that physics uses difficult language following the visit. This highlights the effective design of the National Space Centre’s exhibits and programmes, where the science is presented in an accessible manner and the programmes are appropriately targeted. A third of students reported that the visit had improved the way they feel about physics.

A significant positive shift in physics knowledge was indicated for four out of six questions relating to the subject matter in *‘The Planets’*, with no shift in knowledge for ‘control’ questions (those that did not relate to the programme content). Students enjoyed the show, and felt it was educational, although some students found the content too easy – probably because the target audience for the show also includes younger students. This finding highlights an issue facing any programme developer:

how to design a programme appealing to students with a range of abilities without alienating the least able or patronising the most able. Interestingly, some students commented that the ease with which they answered the questions during ‘*The Planets*’ was a positive aspect of the programme, whereas some felt it was detrimental.

### **3.5.2 Impact on Key Stage 3 students**

The results described in this section of the work show a positive, short-term impact on the affective and cognitive domains of students visiting the National Space Centre. As discussed in Chapter 1, it is believed that the decline in attitudes towards science begins at Key Stage 3, so positive interventions at this time may be crucial to countering this trend. Indeed, the results of the present study indicated that the positive shift towards ‘liking physics’ was not limited to those students who held an existing interest in the subject.

It is, of course, unclear how this positive impact will change over time, and whether the situational interest stimulated by the visit to the National Space Centre will develop into a longer-term individual interest in students. There was an indication, however, in some of the students’ comments that they themselves anticipated long term effects, for example, ‘[I] *don’t find physics boring anymore*’. This emphasises that evaluation of any medium and long-term impact of interventions such as the one considered in the present study are increasingly important in research in this area. However, such work is not straightforward. In addition to methodological issues such as timescale and difficulty in tracking students, it is incredibly difficult (if not impossible) to measure a causal relationship between an intervention such as a

science centre visit and a long-term shift in attitude. This presents one of the most interesting challenges currently facing science communication researchers.

### *Appendix 3.1*

#### Data collection materials

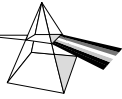
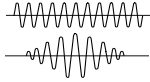
- Student questionnaires, pre- and post-intervention (NB attitudinal questions and quiz questions were identical at both stages – these pages of the questionnaire are only included once)

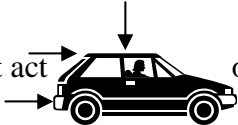
# Physics Questionnaire

We are doing a big study to see what people think of some of their school subjects, like Science. We are especially interested in what you think about Physics.

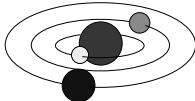
## Physics is about all of the below:

- Electricity  and circuits

- The way light  and sound work and travel 

- Gravity and other forces that act  on things and how things move

- Magnets  and electric motors

- Space, stars  and planets

## Now for the questions...

Please take a few moments to answer the following questions

### Firstly, some information about yourself...

Your First Name..... Your Surname.....

Age ..... School Year group .....

Male/Female ..... School  
.....

### How do you feel about Physics?

I really like  
Physics

I quite like  
Physics

I neither like  
nor dislike  
Physics

I don't like  
Physics  
much

I really don't like  
Physics

### Outside school, do you ever visit Museums or Science Centres?

Lots of  
Times

Often

Sometimes

Very  
Occasionally

Never

### How good do you think you are at Physics?

Really  
Good

Quite  
Good

About  
Average

Quite  
Bad

Really  
Bad

**These questions are about Physics**

Physics is an **interesting** subject

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

You need to be **good at maths** to do physics

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

Physics is more of a **boys** subject

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

Physics is a **boring** subject

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

Physics is more to do with **remembering facts** than understanding ideas

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

The things I learn in physics **relate to my everyday life**

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

People who really like physics **don't mix very well** with other people

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

Physics is more of a **girls** subject

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

Physics uses **difficult, complicated** words

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

Physics is an **easy** subject

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

Physics uses **easy, everyday words** but with a **different meaning**

I strongly agree

I agree

I neither agree nor disagree

I disagree

I strongly disagree

## Quick Quiz

The following questions are about some Physics topics. Answer the questions by ticking the box that you think is the right answer.

Here is an example of how to answer the questions:

Which of the following television soaps is about life in London?

Eastenders <input checked="" type="checkbox"/>	Coronation Street <input type="checkbox"/>
Hollyoaks <input type="checkbox"/>	Neighbours <input type="checkbox"/>

**And now for the Quiz...**

**Which planet is the closest to the Sun?**

Jupiter <input type="checkbox"/>	Earth <input type="checkbox"/>
Mercury <input type="checkbox"/>	Venus <input type="checkbox"/>

**Planets are visible because...**

They emit light from their surfaces <input type="checkbox"/>	They reflect the Sun's light <input type="checkbox"/>
Gases in the planets' atmospheres emit light <input type="checkbox"/>	They reflect light from the stars <input type="checkbox"/>

**What type of force holds the solar system together?**

Gravity <input type="checkbox"/>	Magnetism <input type="checkbox"/>
Electric fields <input type="checkbox"/>	Inertia <input type="checkbox"/>

**What are Saturn's Rings made of?**

Rock and ice <input type="checkbox"/>	Gases <input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

Dark matter	Frozen oils
-------------	-------------

**Which is the seventh planet from the sun?**

Saturn <input type="checkbox"/>	Jupiter <input type="checkbox"/>
Uranus <input type="checkbox"/>	Neptune <input type="checkbox"/>

**What is the name of Pluto's moon?**

Titan <input type="checkbox"/>	Miranda <input type="checkbox"/>
Io <input type="checkbox"/>	Charon <input type="checkbox"/>

**What is Jupiter's "Red Spot" ?**

Iron Oxide on the planet's surface <input type="checkbox"/>	A large crater <input type="checkbox"/>
A hurricane <input type="checkbox"/>	A volcano spewing red gas <input type="checkbox"/>

**Which is the hottest planet in the Solar System?**

Mercury <input type="checkbox"/>	Earth <input type="checkbox"/>
Saturn <input type="checkbox"/>	Venus <input type="checkbox"/>

**What type of fuel is burned at the centre of the Sun?**

Methane <input type="checkbox"/>	Hydrogen <input type="checkbox"/>
Oxygen <input type="checkbox"/>	Ammonia <input type="checkbox"/>

**Roughly how long ago do Scientists think the Big Bang happened?**

550 million years ago <input type="checkbox"/>	15 billion years ago <input type="checkbox"/>
150 billion years ago <input type="checkbox"/>	550 billion years ago <input type="checkbox"/>

*Thanks!*

## Physics Questionnaire

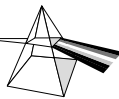

We are doing a big study to see what people think of some of their school subjects, like Science. We are especially interested in what you think about Physics.

We would also like to know your opinion on your recent visit to the National Space Centre, and especially what you thought about the show "*Planets*".

Please take a few moments to answer the following questions

### Physics is about all of the below:

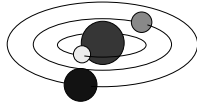
- Electricity  and circuits

- The way light  and sound work and travel 

- Gravity and other forces that act  on things and how things move

- Magnets  and electric motors

- Space, stars and planets



## Now for the questions...

Please take a few moments to answer the following questions

### Firstly, some information about yourself...

Your First Name..... Your Surname.....

Age ..... School Year group .....

Male/Female ..... School  
.....

### How do you feel about Physics?

I really like  
Physics

I quite like  
Physics

I neither like  
nor dislike  
Physics

I don't like  
Physics  
much

I really don't like  
Physics

***NSC/SPACETHEATRE/POST***

**These Questions are about the Space Centre Visit**

**Which parts of the Space Centre did you visit?**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Planets state .....	Galleries/ Show	Into Space Exhibition areas	Challenger Tower	other, please mission

**If you visited the Galleries, did you use the Space Trails?**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes	No	Don't Know

**What did you think of the "Planets" show?**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very Interesting	Interesting	Neither Interesting nor Boring	Boring	Very Boring

**What did you think of the length of the show?**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Much Too Too Long	Too Long	About Right	Too Short	Much Short

**What did you think of the pace (speed) of the show?**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Much Too Fast	Too Fast	About Right	Too Slow	Much Too Slow

**What did you think about the Science in the show?**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Much Too Easy	Too Easy	About Right	Too Difficult	Much Too Difficult

**Do you think the "Planets" show is a fun way to learn some Science?**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I strongly agree	I agree	I neither agree nor disagree	I disagree	I strongly disagree

**How much Science do you think you learned from the show?**

A Lot

Some

A Little

None

**Overall, how would you describe your Space Centre experience?**

Very Good

Good

Neither Good  
Nor Bad

Bad

Very Bad

**For you, what was the best bit of the Space Centre visit and why?**

**For you, what was the worst bit of the Space Centre visit and why?**

**Do you think that visiting the Space Centre has changed the way you feel about Physics?**

Yes

No

Don't Know

**If YES, in what way?**

**What did you think about the Space Centre and Planets show? Please write down why you thought this. Please write as much as you can.**

*Thanks!*