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# Outdoor Learning Hubs

A Scottish Attainment Challenge Innovation Fund Project

Mike Harvey, Katrina Rankine, Rona Jensen Report

12 Dec 2017

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## Acknowledgements

This project could not have been completed without a great deal of help and input from the following people:

West Lothian Council

Fiona MacPhail, Fiona Stewart & Kim Kerr, Riverside Primary School  
Allison Kennedy & Craig Potter, Knightsidge Primary School  
Susan Mackenzie & Carolyn Brearley, Harrysmuir Primary School  
Fiona Wales, Deans Primary School

Paul Stark, active schools and community sports manager, who provided resources and access to information without which this project could not have been completed.

Michael Davis, from the Performance Management Team, was great in steering us through the CEM data and producing much of the excellent analysis in the research section of this report.

Low Port Outdoor Center

A big thankyou to all of the outdoor team who covered for myself and Rona while we were away working on this project. Also the domestic and admin team who helped deal with all the extra work we created.

I would also like to express my thanks to John Lewis, the center manager at Low Port, for his work on the original funding proposal and for pushing us to do “more”...all the time!

Lastly, the project team of Katrina Rankine (Principle Teacher) & Rona Jensen (Low Port Centre Instructor), two excellent professionals who managed to make a difficult and sometimes stressful project enjoyable.

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# Introduction

## Summary

The aim of this project was to raise attainment in literacy and numeracy through “Outdoor Learning Hubs” formed around two primary school clusters within Livingston in West Lothian. The two clusters were Inveralmond and Deans in Livingston.

This project was funded by Education Scotland as part of the Scottish Attainment Challenge to reduce the poverty related equity gap within Scottish education.

- **The staff (1.5 FTE outdoor instructors & 0.5 FTE principal teacher) focused on an Outdoor Learning and a predominately numeracy based research project that went across both school clusters and involved two control schools, a total of 120 P5 children, over the school year 2016-2017.**
- **A separate project involved working with all the schools within the clusters (13 schools and 325 children) to spread the literacy and numeracy programs developed during the project in a sustainable manner to the school teaching staff. A CLPL programme for teachers was also delivered as part of the project.**
- **A significant increase in the value added data for Mental Arithmetic (MA) and General Maths (GM) was displayed by the study group against both the control group and the whole of the West Lothian P5 cohort. An average increase of 6 months for Mental Arithmetic and 2 months for General Maths.**
- **A health and wellbeing questionnaire study on the children’s attitudes to learning also showed a 20% increase over the year while the control group decreased by 3% over the same time period.**

These results were unexpected and, we think, noteworthy in that for a 12 week programme (2hrs per week) the children gained on average 6 months of Mental Arithmetic and 2 months of General Maths against a similar cohort of children within the control schools.



## Outdoor Learning taking place in West Lothian

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# Methodology

## Numeracy

We used CEM (Centre for Educational Management) data to identify areas requiring improvement within the numeracy curriculum of the chosen P5 study schools.

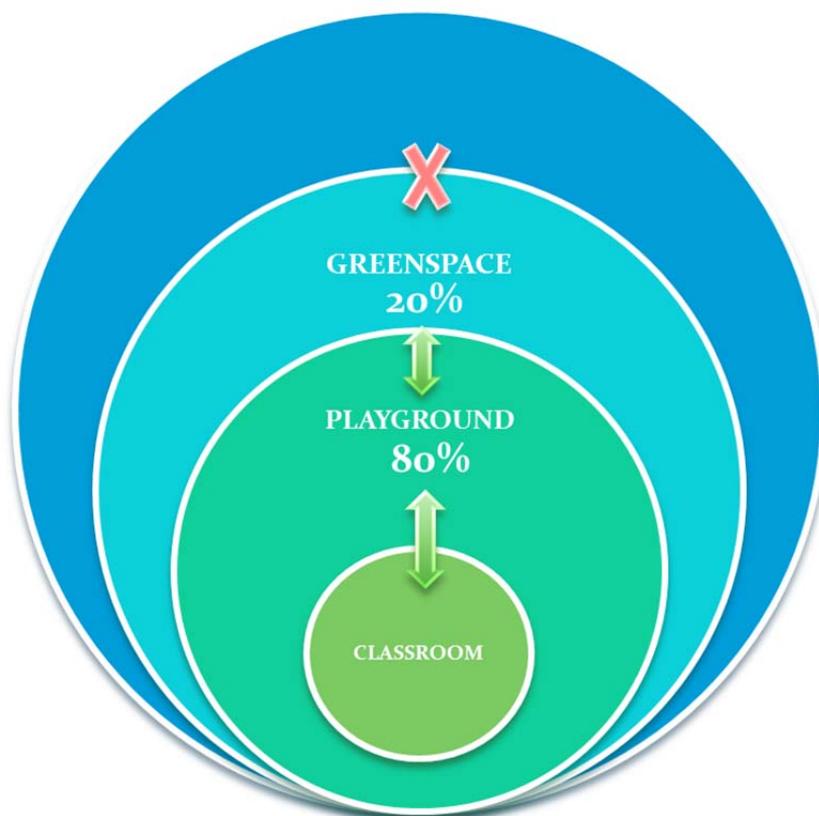
Having identified the areas we wished to target for improvement, we designed a programme of outdoor numeracy and literacy activities. As this study would run through the winter months of January to April we wanted activities that would keep the children active.

Therefore each activity involved active playground games, maths or literacy challenges and orienteering of various types and difficulties.

Just to be clear, we use the word orienteering loosely. We took and adapted the orienteering process of finding controls with a map and changed it to finding “challenges” in small groups. We did this by setting up “challenges” at each control to involve a wide variety of mathematics and literacy challenges i.e. mild, spicy or hot mathematics linked word problems and for literacy we had storytelling, VCOP and ambitious vocabulary activities.

Nearly all of this work took place in the playground and to a lesser extent the local green spaces.

### Where the Outdoor Learning took place

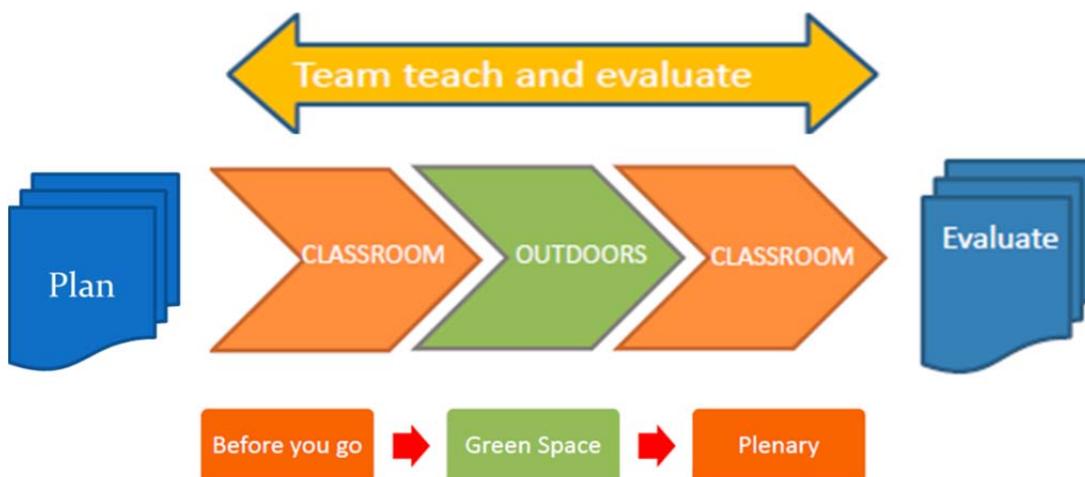


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We used correctly scaled and detailed maps that were professionally produced to a high standard (Appendix 3). All of the schools in the cluster were also provided with simplified safe travel maps that identified all the local green space suitable for outdoor learning (Appendix 4).

Both numeracy and literacy sessions were structured as illustrated in the diagram below. We tried to involve as much feedback as possible on strategies to solve problems during the sessions and afterwards in the classroom. The class teacher was closely involved in the activities, the plenary sessions and encouraged to continue with the sessions both in class and in the playground.

### Outdoor learning Session Structure



The other activities which followed on from the main study but did not precede the testing of the children were a “Brilliant Residential” at the Low Port Outdoor center. This focused on both curricular subjects in both numeracy and literacy and aspects of the John Muir Award. It was also great fun.

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## Research

### Deprivation Analysis

Education Services utilise the Scottish Index of Multiple Deprivation (SIMD) in many ways to compare various indicators of performance across different levels of deprivation. A key aim of the Raising Attainment strategy is to close the attainment gap between the most and least advantaged as deprivation is seen as a barrier to attaining, both locally and nationally.

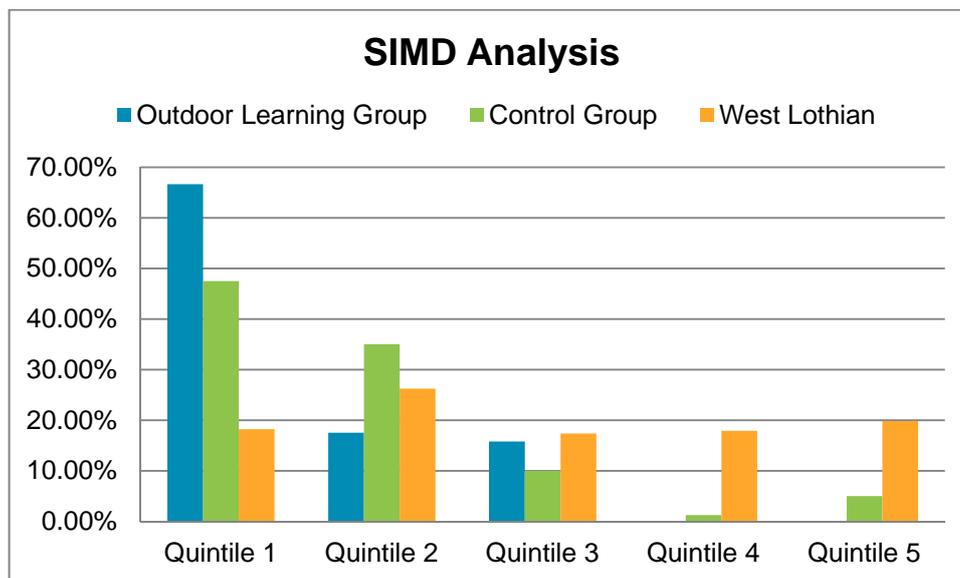
We used this information to identify schools and classes both to work in and act as a control group:

**Outdoor Learning** – P5 classes in Knightsridge Primary School & Riverside Primary School

**Control Groups** – Two P5 classes within local clusters with a similar SIMD rank

**West Lothian** – All pupils at P5 stage in West Lothian schools

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
<b>Outdoor Learning</b>	66.67%	17.54%	15.79%	0.00%	0.00%
<b>Control Group</b>	47.50%	35.00%	10.00%	1.25%	5.00%
<b>West Lothian</b>	18.23%	26.23%	17.39%	17.92%	19.83%



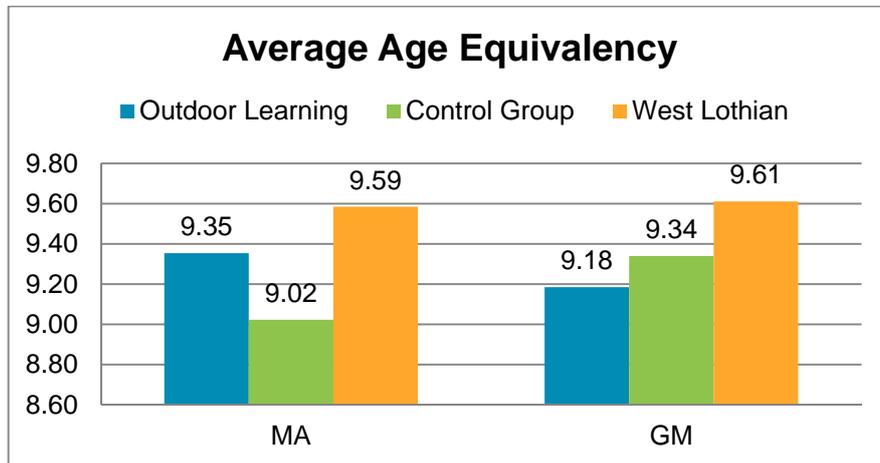
The above information shows the deprivation profile of the groups involved in the Outdoor Learning project and the wider West Lothian P5 population.

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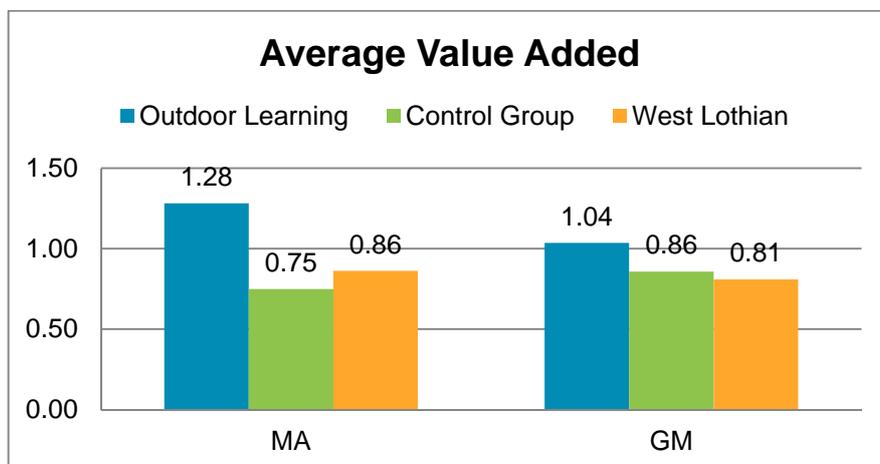
## Adaptive Testing

Adaptive Testing is used throughout West Lothian Primary Schools as a diagnostic tool to identify areas of strengths and weakness in a pupils' learning. This information can be used to assess the impact of the outdoor learning work.

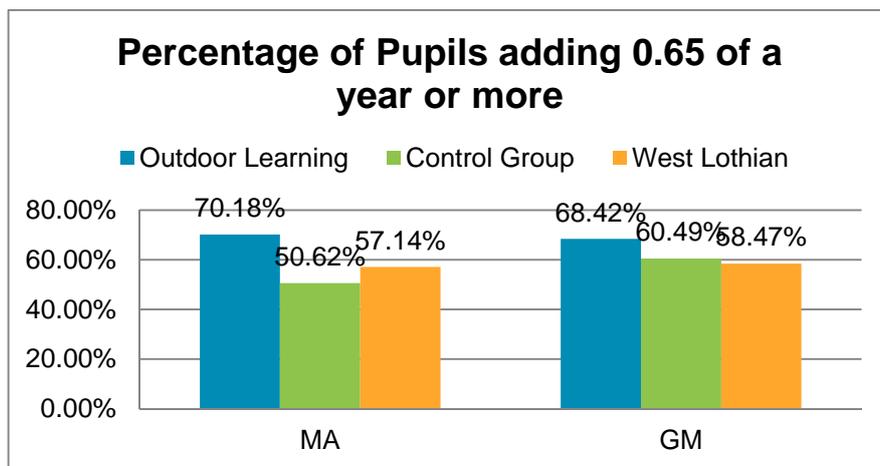
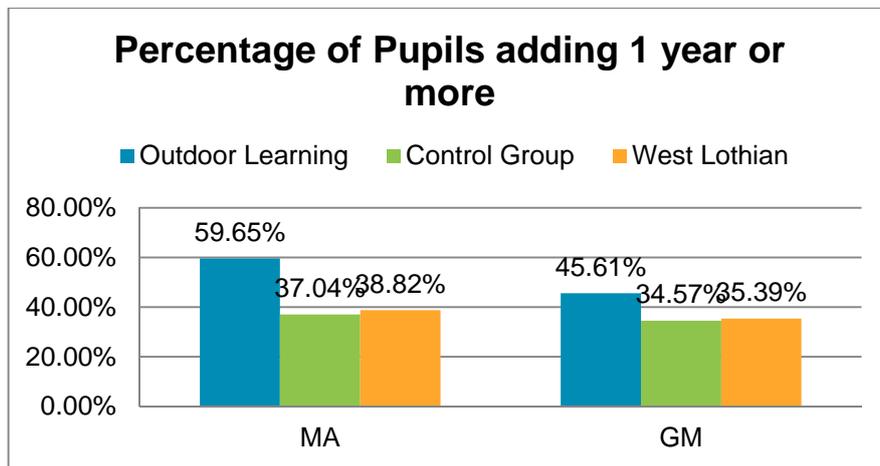
The focus of this work has been in numeracy, there are two adaptive tests that focus on this part of the curriculum – one test of Mental Arithmetic (MA) and one test of General Maths (GM).



The above graph shows the average age equivalency score of the identified groups, pupils should be close to or above their chronological age at the time of the test to be identified as being on-track.



The above graph shows the average value added of the identified groups, value added is the difference between age equivalency scores in 2015/16 and 2016/17. As there is usually around one calendar year between the tests we would expect value added results to be around one year.



The above two graphs show the percentage of pupils making good progress in Mental Arithmetic and General Maths between adaptive tests in 15/16 and 16/17. The first graph measures pupils adding 1 year or more to their age equivalency. The second graph measures pupils adding 0.65 of a year to their age equivalency.

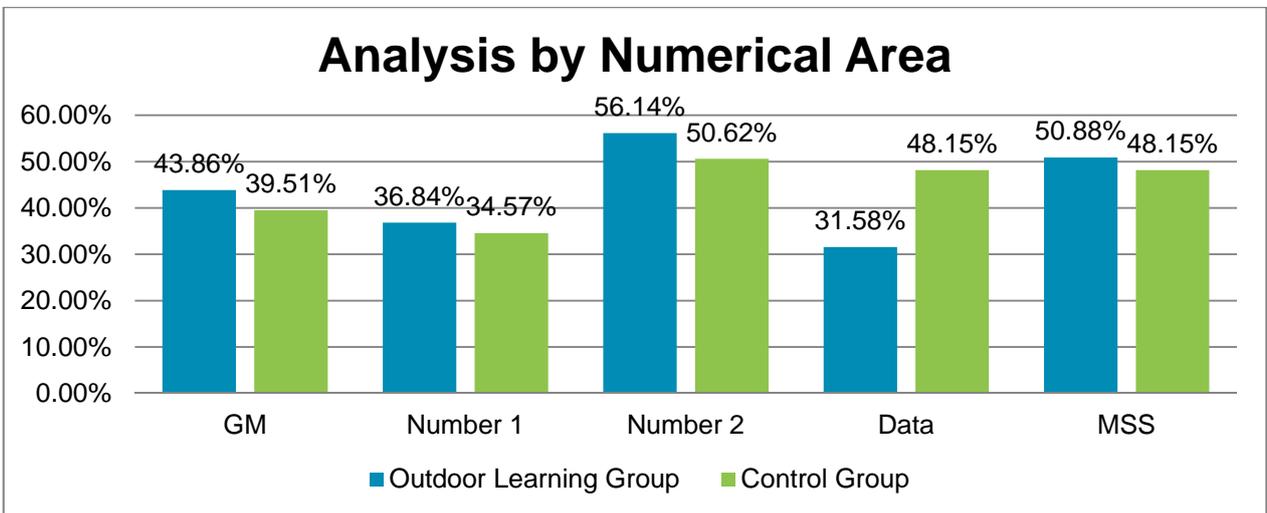
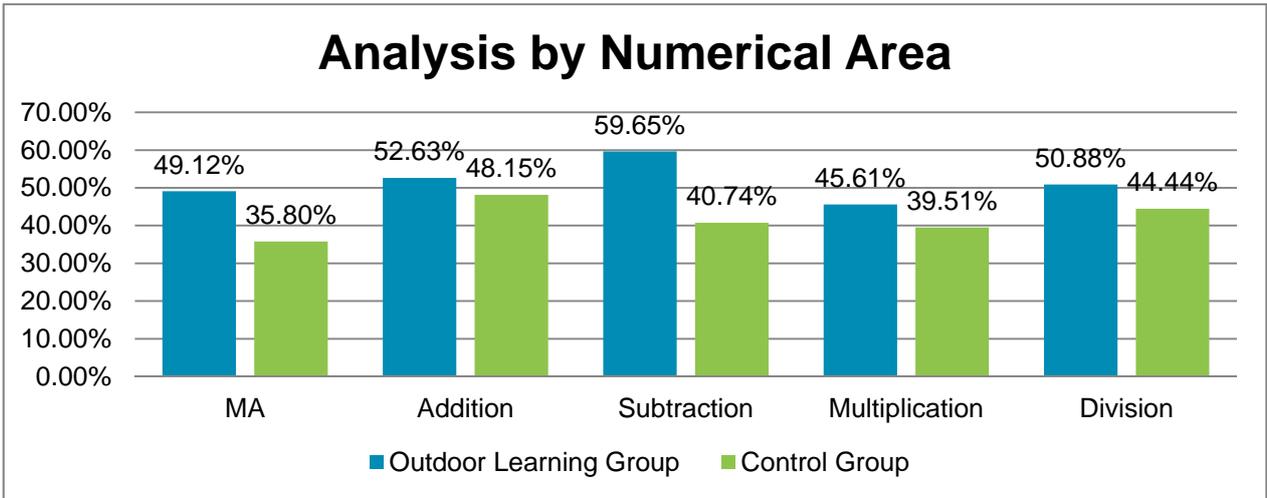
As well as overall performance in Mental Arithmetic and General Maths the adaptive testing can be used to drill down further into the component parts of the testing.

Analysis of this can be seen below (this measures % of pupils whose age equivalency is within 0.3 of a year or better from chronological age):

	MA	Addition	Subtraction	Multiplication	Division
<b>Outdoor Learning</b>	49.12%	52.63%	59.65%	45.61%	50.88%
<b>Control Group</b>	35.80%	48.15%	40.74%	39.51%	44.44%
<b>West Lothian</b>	54.51%	56.78%	51.13%	54.87%	53.89%

	GM	Number 1	Number 2	Data	MSS
<b>Outdoor Learning</b>	43.86%	36.84%	56.14%	31.58%	50.88%
<b>Control Group</b>	39.51%	34.57%	50.62%	48.15%	48.15%
<b>West Lothian</b>	53.67%	50.96%	57.76%	55.14%	54.78%

This is shown below graphically as the % of pupils who's age equivalency is within 0.3 of a year or better than chronological age



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## Health and Wellbeing

We used a simple questionnaire to ask the children eight questions about how they were getting on at school and what they were learning (see below). This was administered to the study schools and the control schools at the start and end of the project. We selected four of the questions that were linked to the children's achievement, learning and activity levels for analysis.

### Pupil HWB Questionnaire 2016-2017

Please tick a number that describes best how you feel.  
You can pick any number (1,2,3,4 or 5)

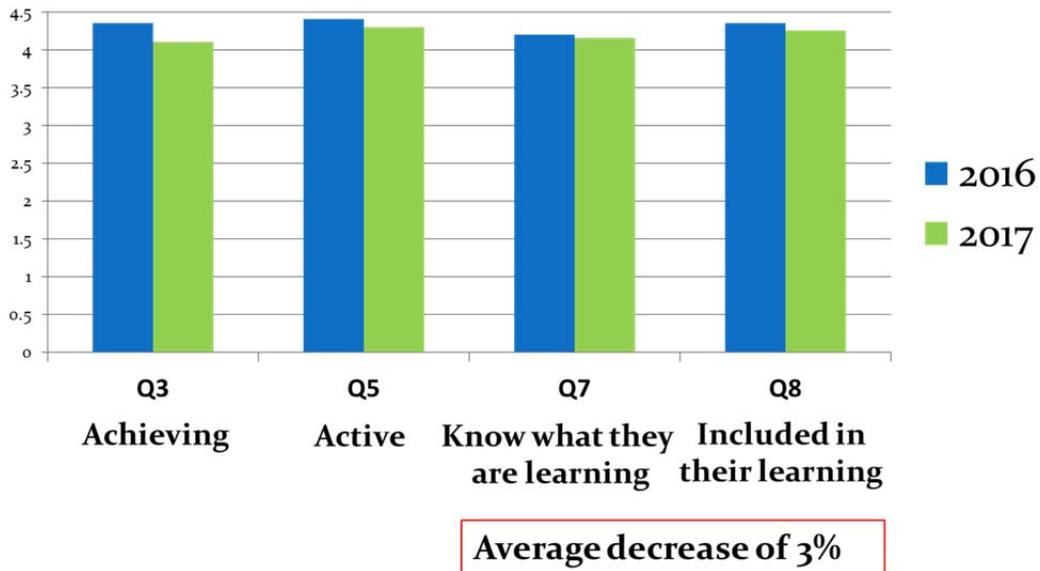
1= not like me (not true)

5= very like me (very true)

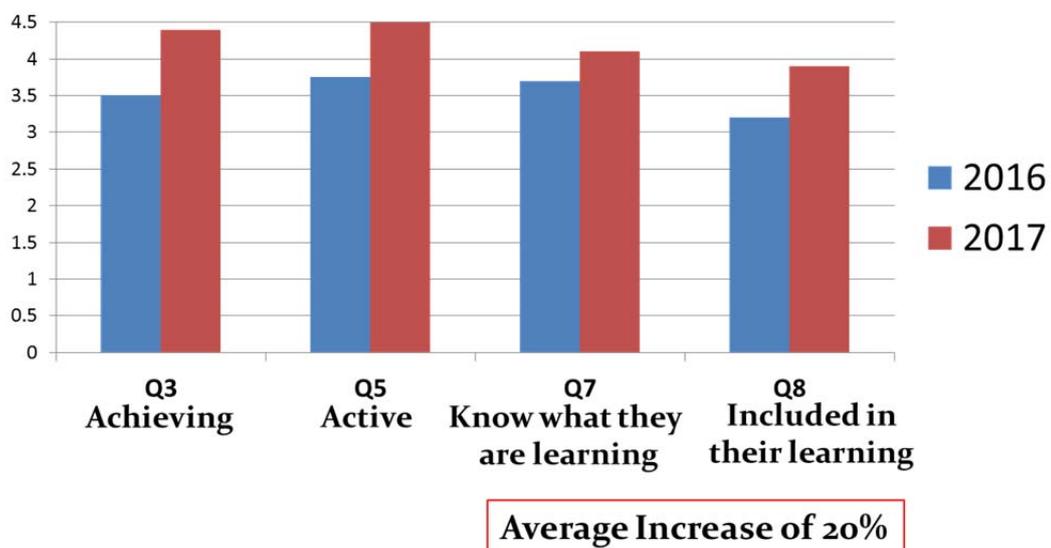
**This is not a test and you cannot get it wrong!**

1. Overall, how safe do you feel? This might mean...  
do you feel safe at school or do you know what to do if  
your worried or is there someone you can talk to if your frightened or sad.
2. Overall, how healthy do you feel? This might mean...  
people at school help you make healthy choices, you learn  
about healthy lifestyles, including thinking about your feelings.
3. Overall, how do you feel you are achieving?  
This might mean...someone encourages you to learn and do your  
best at school, you get the chance to talk about what you like to do at school and you  
get the chance to share and celebrate your achievements.
4. Overall, how nurtured do you feel? This might mean...  
you know people care about you at this school, if you have a problem,  
you know how to get help or your teacher knows you well as an individual.
5. Overall, how active do you feel? This might mean...  
you get the chance to exercise, you get to go to fun places  
and you have active hobbies or interests outside.
6. Overall how respected do you feel? This might mean...  
people listen to what you say, at school you get to contribute  
and your views are taken into account
7. Overall, how responsible do you feel? This might mean...  
you understand how you should behave and take part in a positive way,  
you know what your learning at the moment and what you will learn next.
8. Overall, how included do you feel? This might mean...  
you feel you belong in your class, school or community, you have friends you  
can count on and you can help others feel included in play and learning.

## Pupil HWB Questionnaire 2016-2017 Control Schools



## Pupil HWB Questionnaire 2016-2017 Study Schools



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## **Teacher Questionnaire results (See Appendix 5)**

Before the project began we were interested in finding out how much Outdoor Learning was taking place within the 13 primary schools in the clusters we would work with. We conducted a survey of the teaching staff to see what the attitudes to outdoor learning were and how often this was happening in the primary schools.

**The main findings are summarized below:-**

### **Graph 1**

This indicates the majority of teaching staff consider Outdoor Learning to be “very effective” at engaging learners and “extremely effective” at improving health and well-being. It was also considered to be “moderately effective” at improving attainment in numeracy and literacy.

### **Graph 2**

This shows that between 40-50% of teachers “Sometimes” consider Outdoor Learning when planning literacy and numeracy outcomes.

### **Graph 3**

In an average week, between 60% and 69% of teachers do no outdoor teaching of either numeracy or literacy respectively.

Between 24% to 34% of teachers did approximately one hour of Literacy and Numeracy respectively in an average week.

### **Graph 4**

53% of teachers, on average, do between 1-5 lessons per term outdoors (Playground, Greenspace etc.)

### **Graph 5**

Within the last 3 years just over 57% of the teachers responding to this survey had attended CLPL in Outdoor Learning.

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## Conclusion and Discussion

This project over a short period of time, 12 weeks for 2 hours a week, appears to have had a positive impact on the MA, GM and the health and wellbeing of the primary school pupils we worked with compared to control schools and the general West Lothian school population in P5.

The project and school staffs were certain the project would have an impact on the pupils, all of whom enjoyed this Outdoor Learning challenge approach to numeracy and literacy. However, the scale of the increase in numeracy and the number of pupils that showed a large increase in Value Added for MA and GM was unexpected.

If you are unfamiliar with adaptive testing, Value Added is the difference between the expected result (established by baseline testing) and the actual performance under test conditions. It has many influences and is subject to a number of random errors but generally it is useful for evaluating changes, or as in our case, interventions across school populations from similar socio-economic backgrounds.

Bearing this in mind, what appears to have occurred during this project is the top performing children stayed in the same relative position, as did the very poorest, before and after the project. In other words these children, with a few exceptions, performed much as expected.

It was in the middle and lower quota of the student grouping that the gains took place. These children made substantial gains between the test periods and gave us the result illustrated by the two graphs on page 6.

It was the scale of this gain, half a year, averaged across the whole study group that surprised the project team.

These results were particularly illustrated in the case of Darren P, a P5 pupil who took part in the outdoor numeracy programme (see Appendix 6). The scores are for 15/16 and 16/17 and show that he made value added gains of almost 53 months. This equates to a 4 ½ year gain in MA over a 12 week intervention and although this was one of the largest gains, it was not unusual within the study.

We should also like to note that one area we did not cover during the project was data handling. After discussions with the local education officers responsible for numeracy we decided against including this topic. The result of this was that our study group performed worse than the control group (See Appendix 7)

However, we know it would be wrong to attribute these gains and figures solely to our project due to the complex and often linked variables which can influence attainment. A longer study, over a number of years, would be required to identify accurately any underlying pattern and specific effects. But given the undeniably positive nature of these results it would definitely be worth pursuing.

The health and wellbeing evaluation was conducted through surveys in November 2016 and again in June 2017; the final evaluation being after the children had taken part in both John Muir Award activities and a Brilliant Residential experience at the Low Port Outdoor Centre.

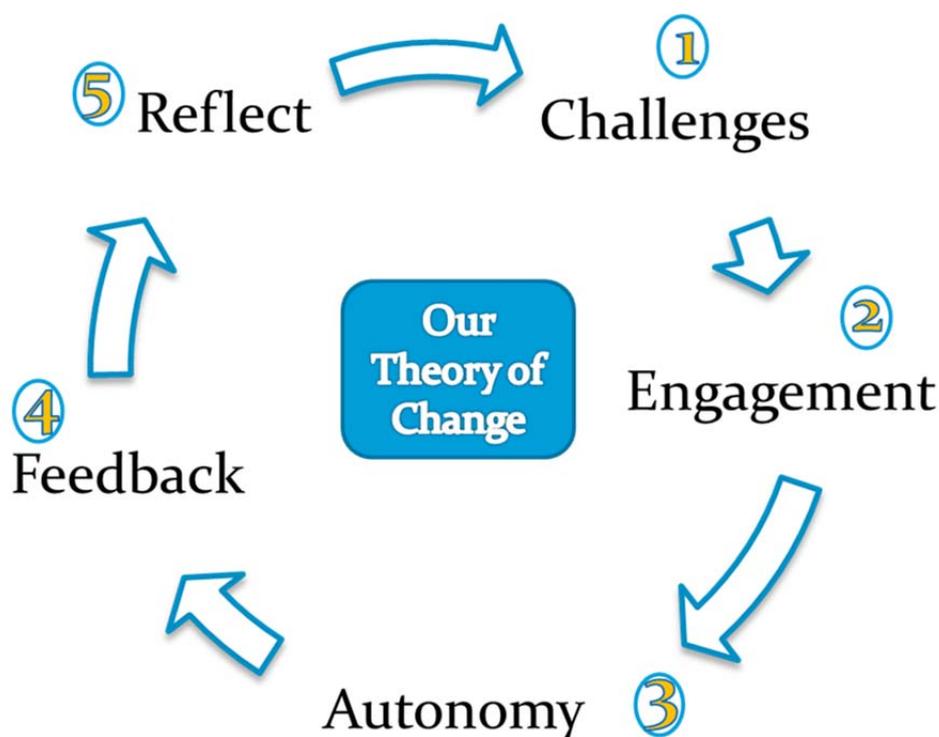
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Again this showed a positive result, a 20% improvement over the school year. Again we were slightly surprised at the small drop in HWB (3%) within the control school groups.

We cannot comment on the control school results other than to say the school staff reported the children taking part in the main study wholeheartedly enjoyed the Outdoor Learning, the way we presented schoolwork as challenges, the John Muir Award and the Brilliant Residential experience.

A more formal representation of why we think this worked is detailed in our theory of change adapted from Griffith A, Burns M (2015) Outstanding Teaching, Teaching Backwards. Crown House.

## Theory of Change



This theory involves five elements, all of which we used, but the one that kept coming up time and time again, was engagement.

At almost every opportunity we took the children out into the green spaces around the school and the local community. These were places they knew and had an emotional connection with; they would often explain how they played in these areas or visited it with family members.

Perhaps the simple emotional connection with these local places together with the challenge element we introduced resulted in this educational engagement. We certainly think this happened

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and the school staff made encouraging comments to this effect during the project. But one thing was certain; these children enthusiastically embraced their own learning.

The only other expectations we placed on the pupils was that effort was important, they would be working autonomously in small groups and that feedback would be provided quickly. We also emphasized simple numerical problem solving strategies and the use of drawings with chalk or whiteboards to explain this further, if it was required.

Each session was finished with a plenary that allowed the children to discuss their strategies and hear how other children had tackled the numerical “challenges”.

We also encouraged the class teachers to continue with similar challenges and numeracy games between the outdoor sessions.

Much of this work was conducted with the teacher helping and actively taking part. All of these sessions were based around minimal resources, the majority of which could be found within school.

Yet while we did this outdoor learning throughout the entire winter, week in and week out, we did not see another class outdoors in any of the schools we worked with. It was only towards the end of March that we began to see this happening. These were few in number and predominately early years or nursery classes. This anecdotal observation falls in line with our survey results in Appendix 6.

However despite this, we felt the teacher survey results were encouraging. To see that 48% of the teachers felt that Outdoor learning was Very Effective at engaging pupils and also 35% felt it was Extremely Effective at improving HWB.

We agree with this result and it reinforces the role of Outdoor Learning as an effective tool for engaging pupils and raising attainment, as this study cautiously suggests.

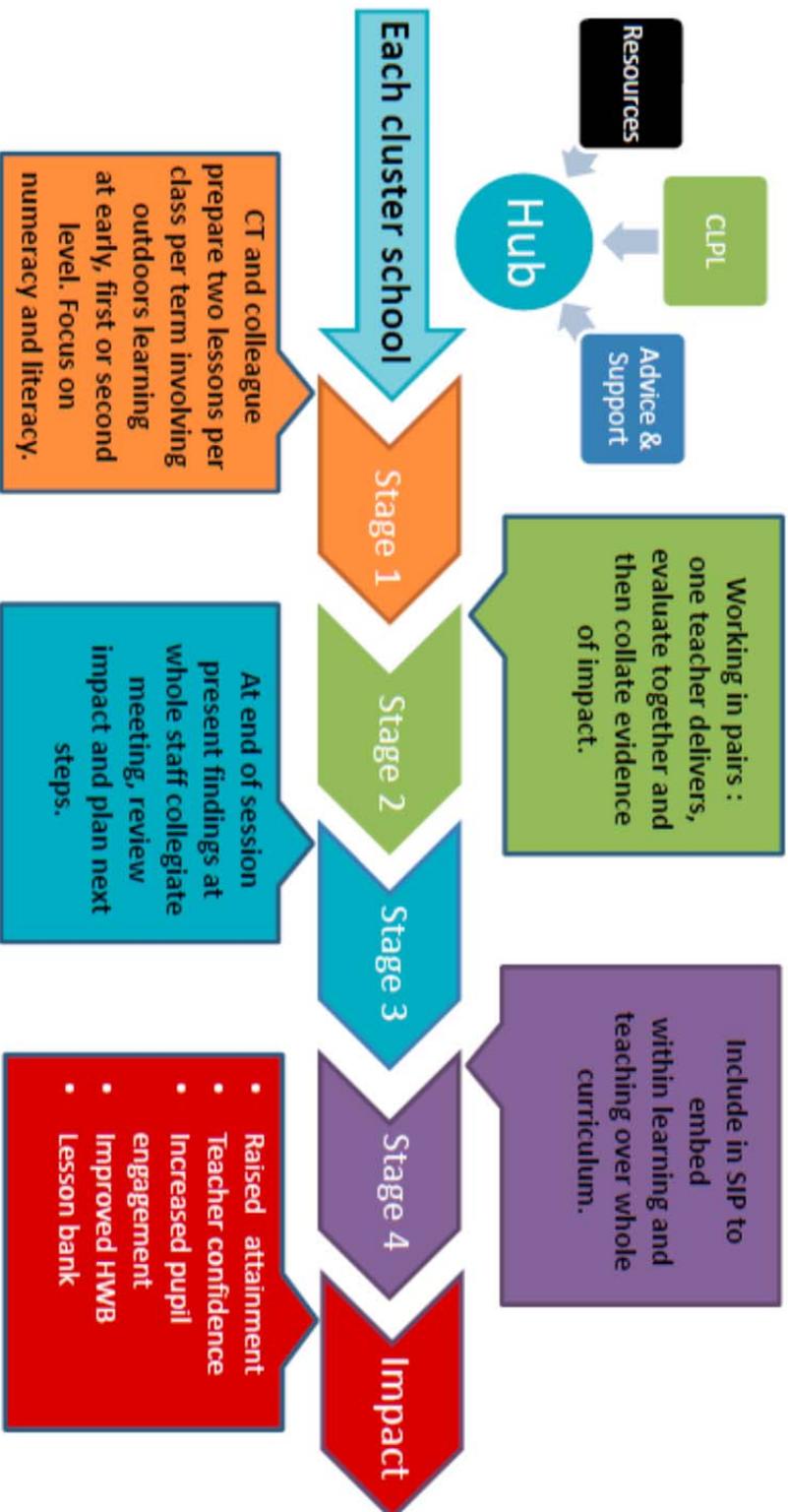
## Recommendations

1. Conduct an extended longer term or longitudinal study into the effect of outdoor learning on raising attainment in numeracy and literacy using the model discussed above or a similar one.
2. Trial, on a wider basis, of the Outdoor learning Hub model and the West Lothian Progression Framework developed as part of this study (Appendix 1 & 2) as a simple tried and tested method of developing Outdoor Learning across a whole school and cluster. Ideally this would form part of a strategic plan to develop Outdoor Learning within the local authority.
3. Use the Leuven Scale or a similar instrument to measure the engagement of pupils with Outdoor Learning as opposed to traditional classroom teaching of numeracy or literacy. Again this would form part of a wider or longer term study.
4. Metacognitive strategies, which we tried to apply, could be developed more explicitly into an Outdoor Learning model or framework with different age and stage applications.

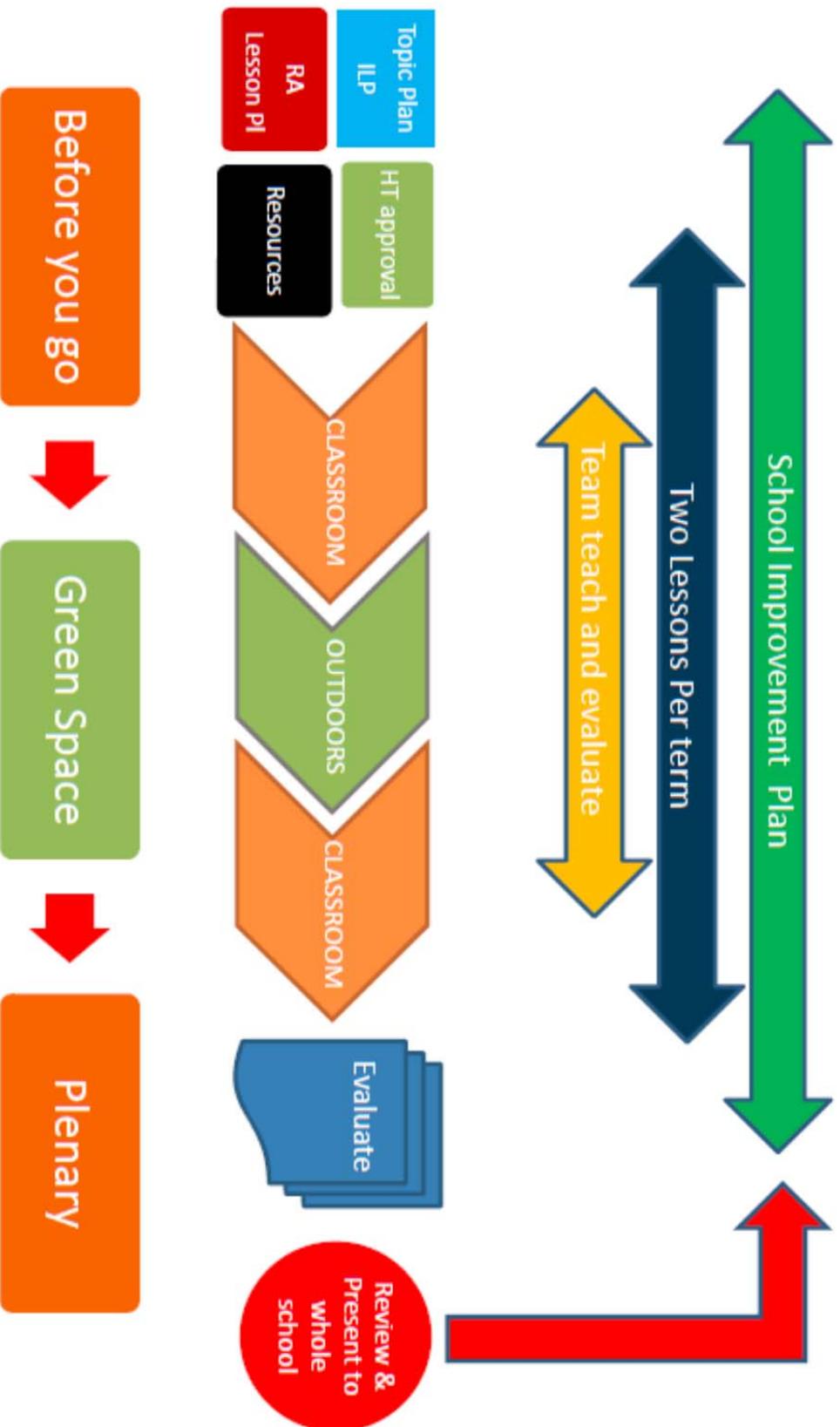
Appendix 1

West Lothian Progression Framework for Outdoor Learning

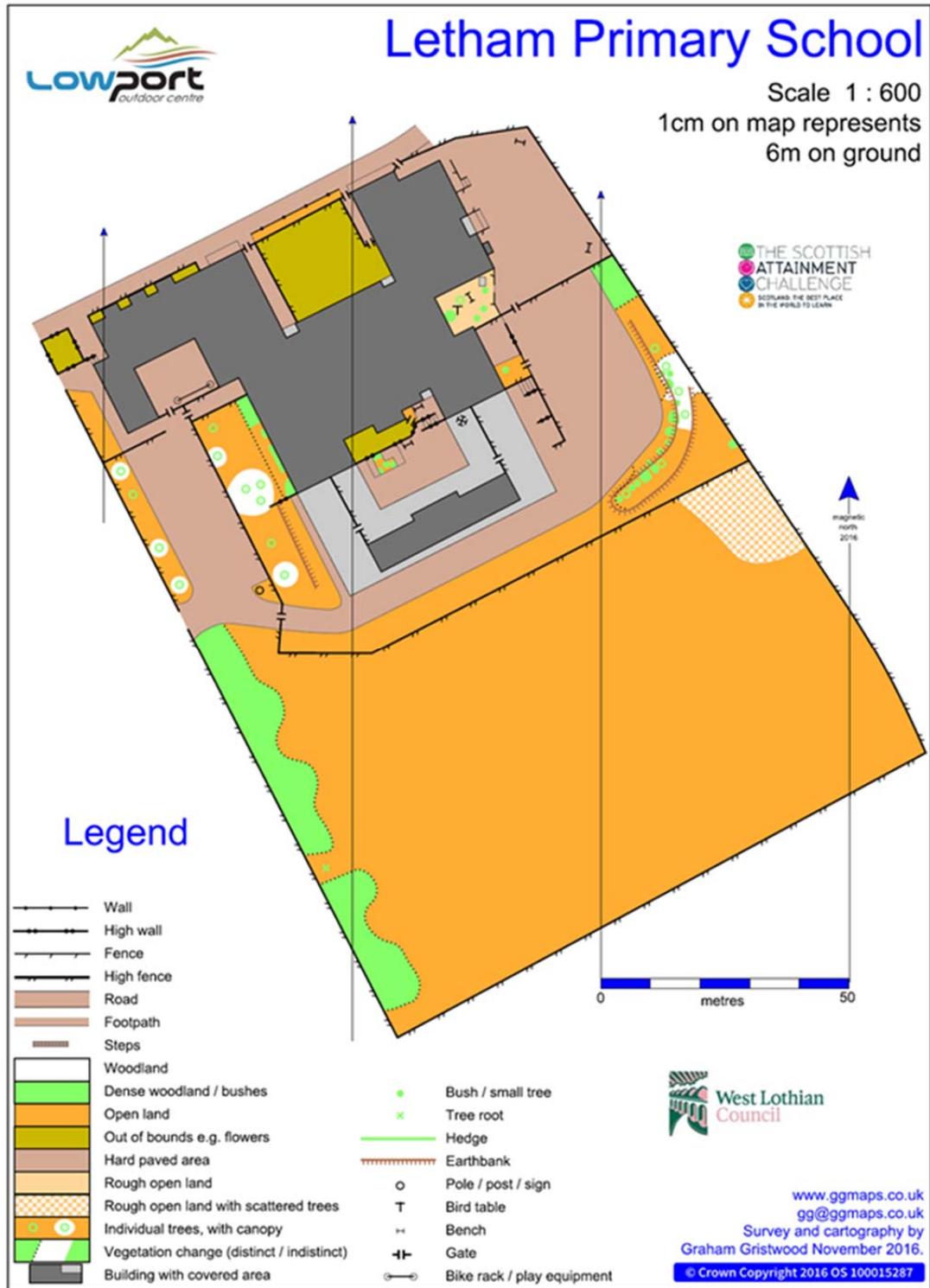
All within the playground and local green space : OL team support & resources



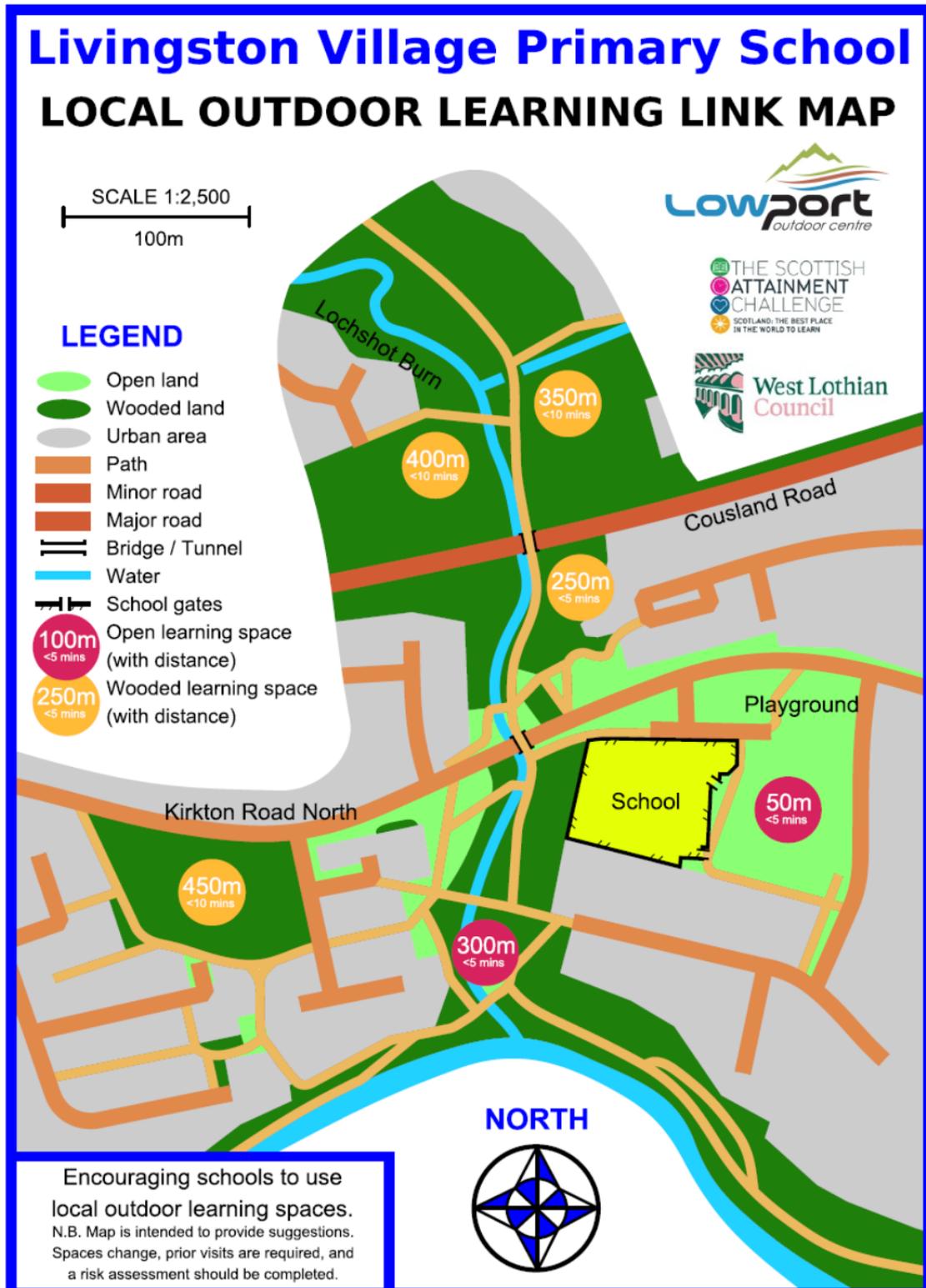
# School Progression Framework Outdoor Learning



Appendix 3

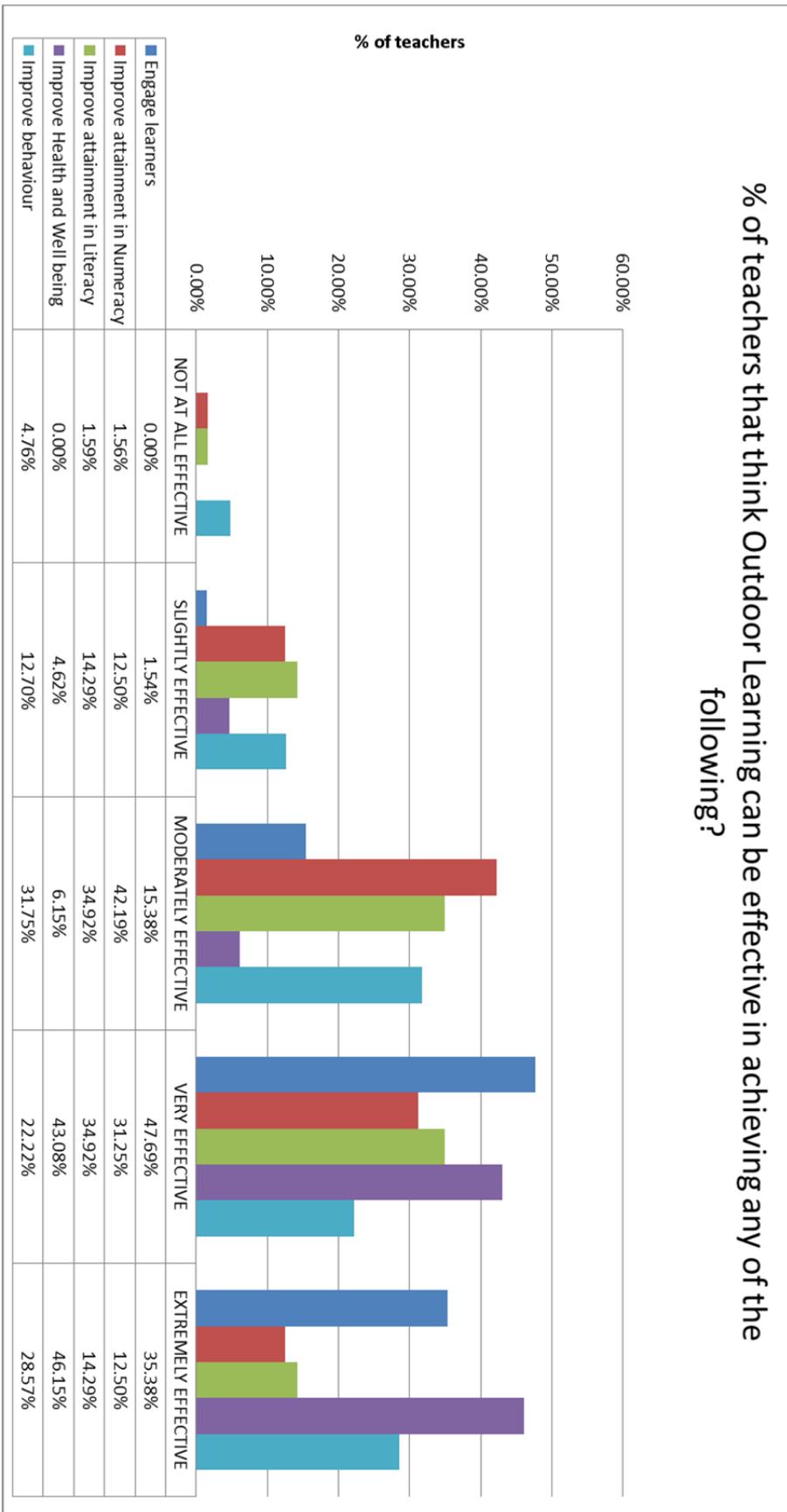


Appendix 4

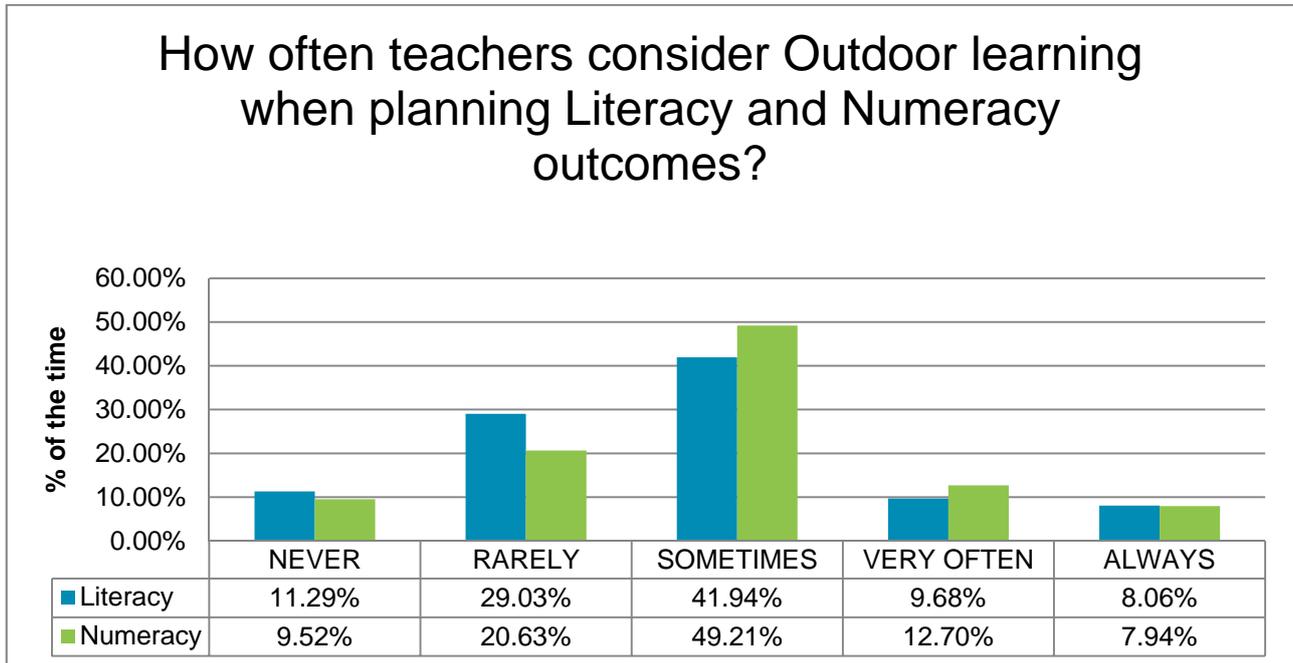


## Appendix 5 Teacher Survey results

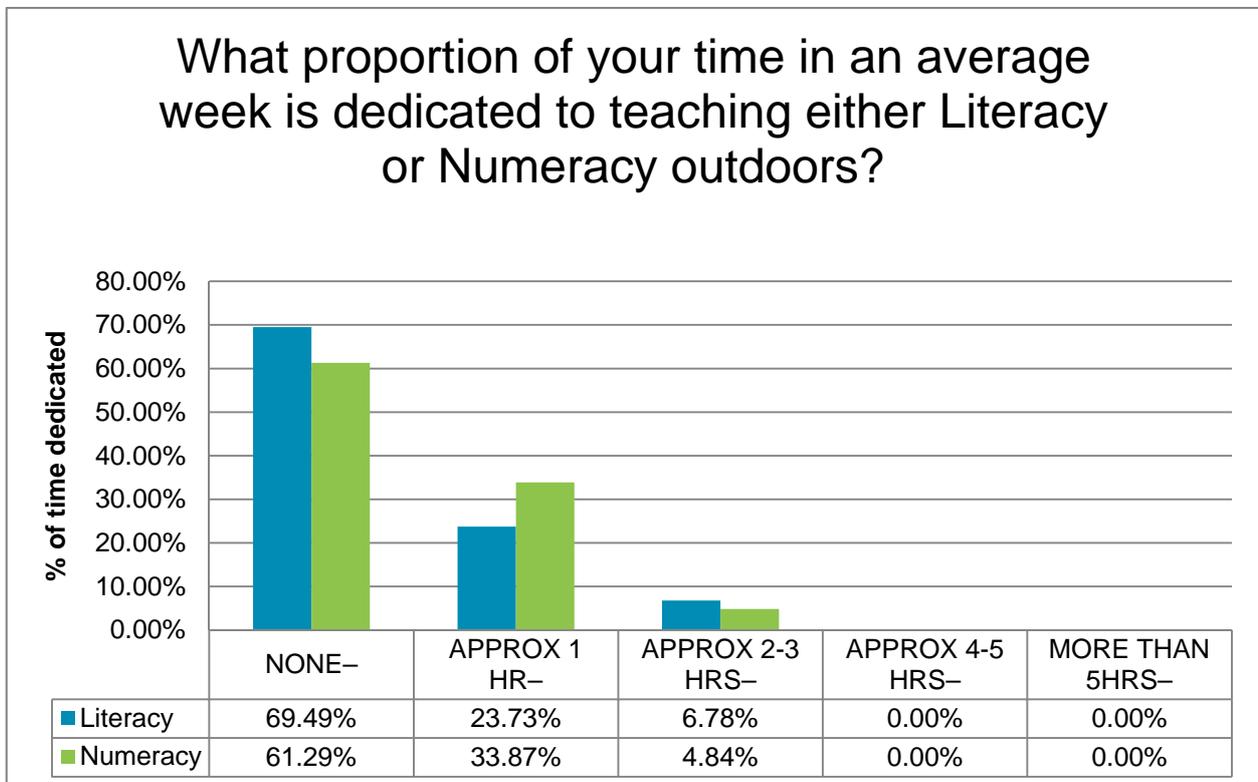
Graph 1



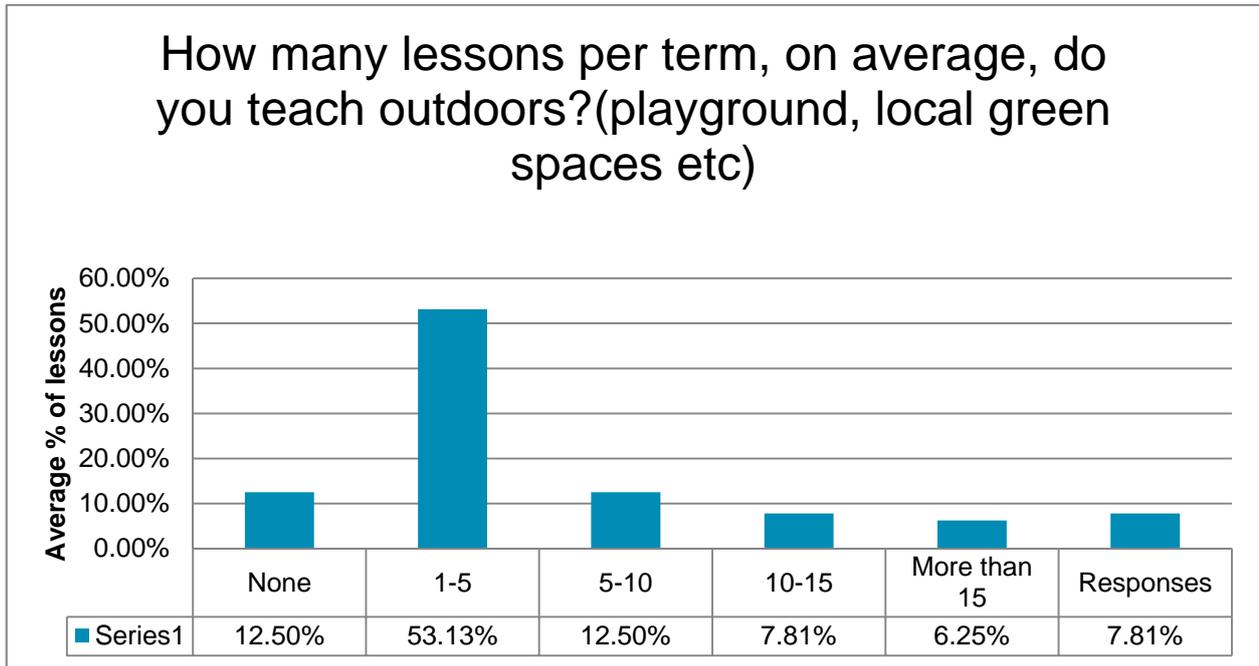
**Graph 2**



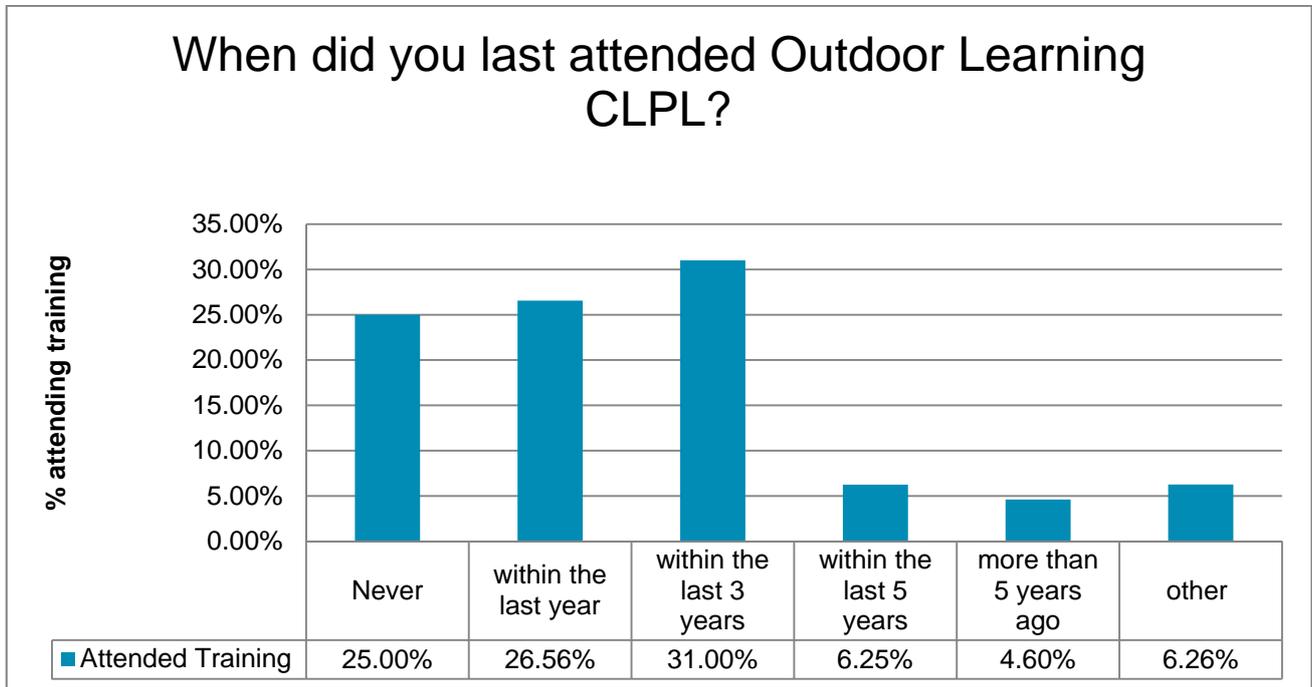
**Graph 3**



**Graph 4**



**Graph 5**



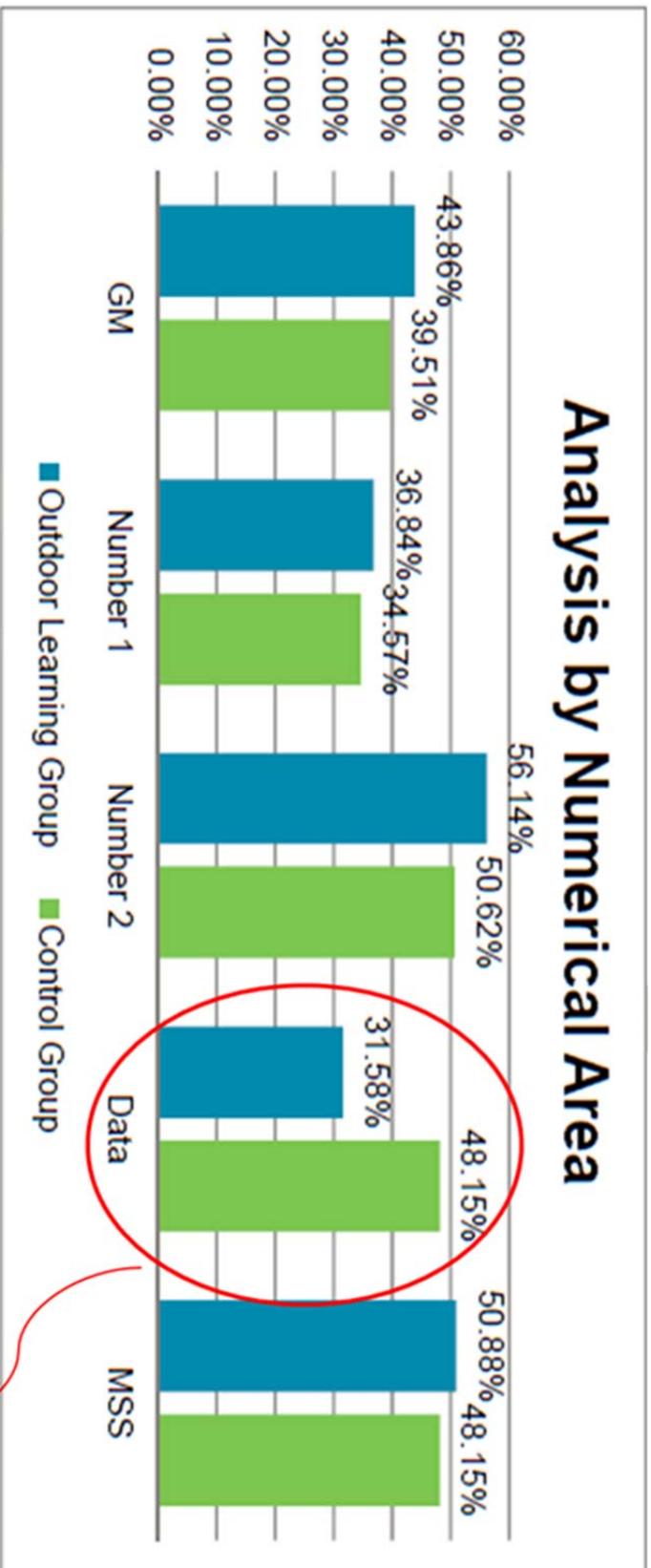
# Darren's Story



	Addition	Sub	Multiplication	Division
15/16 Darren P	8:6	4:7	*	*
16/17 Darren P	9:6	8:3	9:7	8:1

## Value Added for Mental Maths

	15/16	16/17
Darren P	4:7	9:0
		+53mths



this measures % of pupils who's age equivalency is within 0.3 of a year or better from chronological age