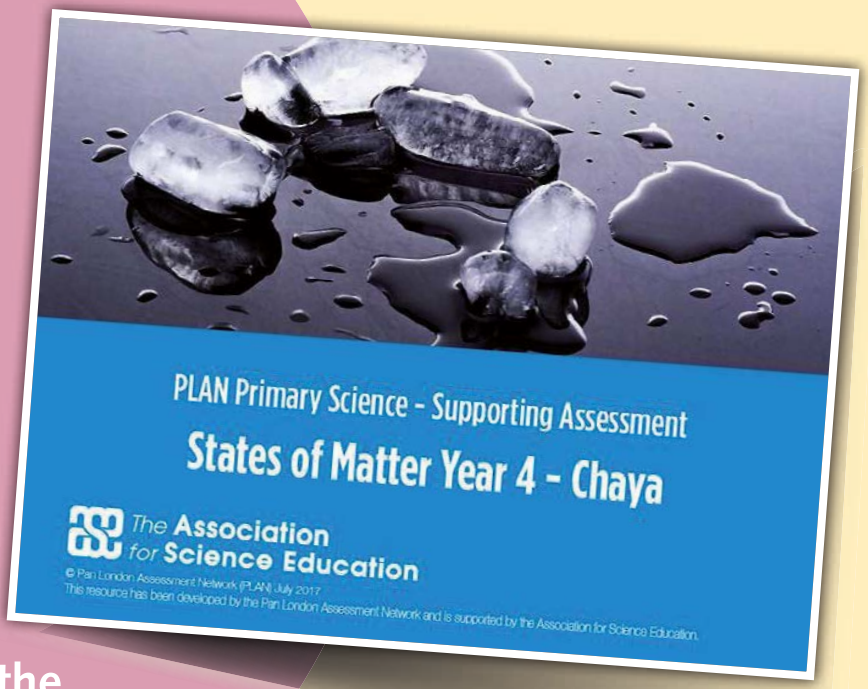
PLAN

What was the need?



Naomi Hiscock outlines the evolution of the PLAN support materials and shows how they can support teaching and learning

The new primary science National Curriculum in England (2013) goes a long way towards making progression through the primary phase much clearer than it was. It eliminates the previously common problem, where all children, irrespective of age and stage, were growing a bean seed or cress seeds. However, it was clear to us, as consultants working with teachers in schools, that the statements in the programmes of study were still ambiguous and therefore open to misinterpretation. This is where the PLAN (Pan London Assessment Network) came in.

Incorrect or incomplete interpretations of the new curriculum statements were leading teachers to plan lessons and enquiries that did not enable children to reach a standard that could be described as 'secure' in a topic.

Should children in year 2 (ages 6–7) be talking about carbohydrates and proteins? The simple answer to this is 'no', as this learning takes place in year 3 (ages 7–8) when they are learning about the nutrients that come from the different types of food (dairy, fruit and vegetables, breads, pulses, etc.) that they learnt about in year 2. Do the children need to know why these are important? No, this is in the key stage 3 (ages 11–14) curriculum, where pupils should be taught about the content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water and why each is needed.

Without an in-depth knowledge of both the primary and key stage 3 curriculum, it is very easy to unwittingly stray into content specified for a later year group and it is possible that this will contribute to two significant issues:

- **Content from later years is conceptually more advanced and we are therefore making it more difficult for children in earlier years to be secure in their knowledge than it needs to be, risking failure for some. We also create a more crowded curriculum, leaving insufficient time for children to demonstrate that they are 'consistently secure'.**
- **We risk children becoming disengaged if they feel they are repeating the same knowledge in subsequent years; there is plenty of interesting science to spread around all year groups!**

The challenge

So, this is the challenge we set ourselves: to produce materials that would make it clear to teachers what 'secure' actually looks like.

Firstly, we needed to determine for ourselves what we would use as a benchmark for security. We established two criteria that helped us to focus our attention, the first related to understanding and the second related to application:

- **Understanding of a concept. Children need to *show understanding***

Key words: CPD

of a concept by using scientific vocabulary correctly. **It was evident that we needed to provide further guidance on the National Curriculum statements in order to support the teachers in pitching the work appropriately. We felt that one effective way of doing this was to include a list of key vocabulary. If a word was included, the children should be confidently using it over a period of time. If a word was not included it is not necessary and is an indicator that the subject knowledge is too advanced. For example, the children need to use the word 'blood' but not haemoglobin and white and red blood cells (see Table 1).**

- **Application of knowledge. Children need to be able to *apply knowledge in familiar related contexts, including a range of enquiries.* It is not sufficient for the children to simply state their knowledge, they need to be able to use it in some way. Often they will use their knowledge when they are carrying out subsequent enquiry activities. For example, if they are observing how their pulse rate changes after they have been exercising, when they write their conclusion they will be linking this back to their understanding of the role of the heart in the circulatory system (see Table 1).**

We then produced one-page sheets for each unit of work, which could be used by teachers at the planning phase. The same sheets provide a guide to both summative and formative assessment by checking that children meet these criteria in their science lessons.

The process

Each consultant identified a strong school-based science subject leader with whom they would work. We supported them with their planning, ensuring that sufficient activities were identified to give the children several opportunities to encounter concepts, learn the key vocabulary and then apply and consolidate it in different contexts – in short, we helped them 'plan for secure'.

We later visited the teacher and reviewed the learning of a selected child to ensure they were secure and then looked at the evidence for this. We found that written work on its own very rarely showed that the child was secure in their knowledge, but when the teacher expanded on this with comments the child had made during activities or in response to questioning, there was sufficient evidence. It was therefore clear that it was very important to include various teacher annotations within the PLAN materials and we also chose to include videos of the children talking where these helped to show security.

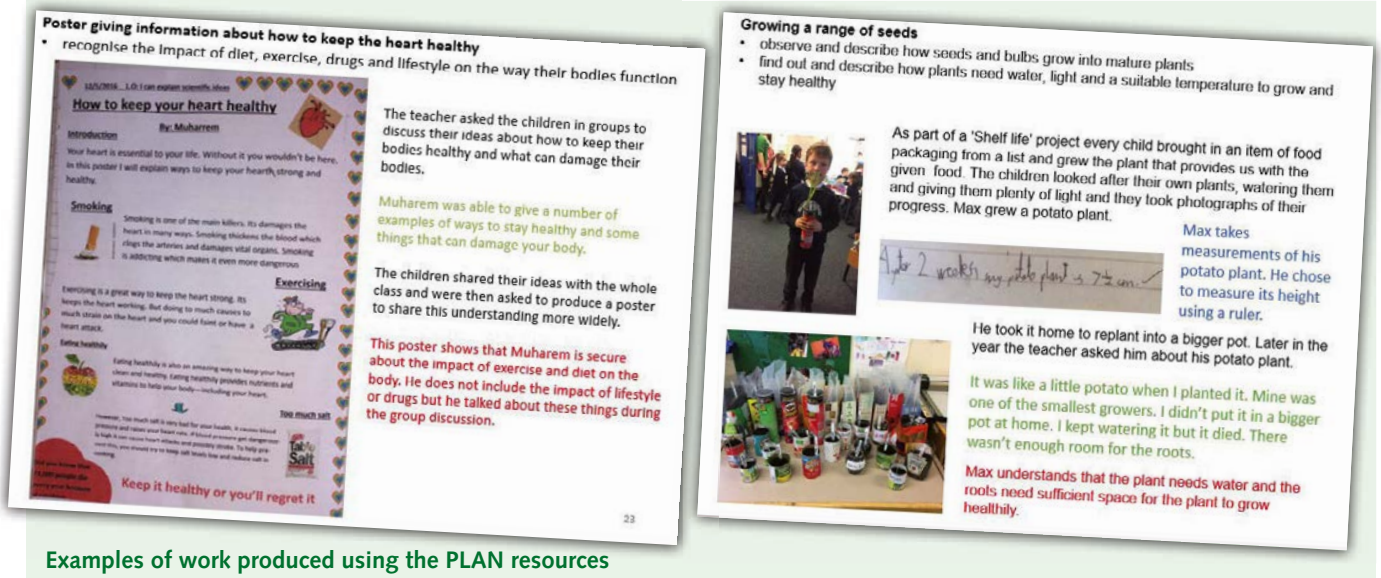
The outcome to date

At present we are close to complete coverage of the National Curriculum for England from years 1 to 6 (ages 5–11). We feel that it is important that teachers recognise this is just one way a child can show they are secure, based on one teaching sequence chosen by the teacher. There are many different ways to arrive at the same endpoint

> When working with a year 4 teacher I volunteered to carry out a quick electricity assessment activity with a small group of children. To ease pressure on her, I took my own resources in for the activity. It became clear straightaway that the equipment was different, as they grappled with how to connect the battery to the rest of the circuit. Also, when presented with a circuit that was not working and asked to identify why the bulb did not light, the immediate response from the children was because there was no switch in the circuit. In fact, the problem was that there was no battery present. This I found curious and when I mentioned it to the teacher she said it was probably because they had always included a switch in the circuit. This made me think about how easy it is to teach a misconception without realising it simply by not providing sufficient variety.
>
> ***Naomi Hiscock** – consultant involved in the PLAN development*

Table 1 Examples of what 'secure' looks like

Assessment guidance	Key learning	Possible evidence
Shows understanding of a concept using scientific vocabulary correctly	The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet, e.g. lack of vitamins. *Key vocabulary:* Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle	Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do. Can produce a piece of writing that demonstrates the key knowledge, e.g. explanation text, job description of the heart.
Applying knowledge in familiar related contexts, including a range of enquiries	Create a role-play model for the circulatory system. Carry out a range of pulse rate investigations: • fair test – effect of different activities on my pulse rate; • pattern seeking – exploring which groups of people may have higher or lower resting pulse rates; • observation over time – finding out how long it takes my pulse rate to return to my resting pulse rate (recovery rate); • pattern seeking – exploring recovery rate for different groups of people. Learn about the impact of exercise, diet, drugs and lifestyle on the body. This is likely to be taught through direct instruction due to its sensitive nature.	Can use the role-play model to explain the main parts of the circulatory system and their role. Can use subject knowledge about the heart while writing conclusions for investigations. Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body. Can present information, e.g. in a health leaflet, describing impact of drugs and lifestyle on the body.



Poster giving information about how to keep the heart healthy

- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function

How to keep your heart healthy

By: Muharrem

Introduction

Your heart is essential to your life. Without it you wouldn't be here. In this poster I will explain ways to keep your hearth strong and healthy.

Smoking

Smoking is one of the main killers. Its damages the heart in many ways. Smoking thickens the blood which clogs the arteries and damages vital organs. Smoking is addicting which makes it even more dangerous

Exercising

Exercising is a great way to keep the heart strong. Its keeps the heart working. But doing to much causes to much strain on the heart and you could faint or have a heart attack.

Eating healthily

Eating healthily is also an amazing way to keep your heart clean and healthy. Eating healthily provides nutrients and vitamins to help your body—including your heart.

Too much salt

However, too much salt is very bad for your health. It causes blood pressure and raises your heart rate. If blood pressure get dangerous high, you should try to keep salt levels low and reduce salt in cooking.

Take Salt

Keep it healthy or you'll regret it

The teacher asked the children in groups to discuss their ideas about how to keep their bodies healthy and what can damage their bodies.

Muharem was able to give a number of examples of ways to stay healthy and some things that can damage your body.

The children shared their ideas with the whole class and were then asked to produce a poster to share this understanding more widely.

This poster shows that Muharem is secure about the impact of exercise and diet on the body. He does not include the impact of lifestyle or drugs but he talked about these things during the group discussion.

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Growing a range of seeds

- observe and describe how seeds and bulbs grow into mature plants
- find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

As part of a 'Shelf life' project every child brought in an item of food packaging from a list and grew the plant that provides us with the given food. The children looked after their own plants, watering them and giving them plenty of light and they took photographs of their progress. Max grew a potato plant.

After 2 weeks my potato plant is 7½ cm.

Max takes measurements of his potato plant. He chose to measure its height using a ruler.

He took it home to replant into a bigger pot. Later in the year the teacher asked him about his potato plant.

It was like a little potato when I planted it. Mine was one of the smallest growers. I didn't put it in a bigger pot at home. I kept watering it but it died. There wasn't enough room for the roots.

Max understands that the plant needs water and the roots need sufficient space for the plant to grow healthily.

Examples of work produced using the PLAN resources

and therefore we are beginning to create complementary sets of materials for each topic from different schools to show alternatives in planning for secure.

Possible future outcomes

We aim to expand the collection to include examples of children that have been part of the same sequence of lessons but have not reached security. We hope these examples will form part of a continuing professional development package that schools can use to support with moderation.

PLAN resources have been invaluable for showing teachers how all the guidance they receive about curriculum and pedagogy, translates into the classroom. They give teachers a window into other people's classrooms, exemplifying secure learning. Although PLAN is intended as a tool for assessment and moderation, I have also used it as a way into planning. PLAN materials have been prepared with assessment in mind, encouraging teachers to create learning opportunities that are focused on what quality learning is going to look like within each unit. This shift in emphasis, putting assessment into the core of teaching and learning rather than at the end, means that lessons are more focused and that teachers are more mindful of assessment for learning, able to spot and sort out children's misconceptions as they arise.

***Claire Seeley** – consultant*

The value of understanding much more explicitly what 'secure' looks like for a child working through a unit of work in science has been the greatest benefit of the project, both for class teachers and subject leads, both for those involved in producing the materials but even more so for teachers who 'mine' the exemplified units for a great wealth of information. While not dictating a journey towards secure, the units often provide a good idea of what a planned sequence through that journey might look like, which often involves spending more time with any given National Curriculum statement than teachers might have previously done in order to be fully secure. The clarity of the learning in the units has given teachers a great deal more confidence in what is expected from them in the new curriculum.

***Julia Weston** – consultant involved in the PLAN development*

Keeping planning focused and on track is so much more achievable with these quality-assured exemplification materials. Teachers can learn so much more from viewing examples of the expected standard of a wide range of annotated examples of work from years 1 to 6. Planning guidance is included in the files, which include key learning notes, key vocabulary and, most importantly for me, suggestions for 'possible evidence' to help teachers gather evidence of attainment, e.g can name some trees and plants in a year 1. These time-saving, flexible documents have enabled me to deliver more effective lessons (where I no longer stray too far from the National Curriculum) and help me assess the children's work with more confidence and accuracy.

***Evelyn Clawson**, Brambleside Primary School – teacher using the PLAN materials*

The PLAN resources can be found at: **www.ase.org.uk/resources/primary/plan**

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