Using Frames to Support Learning in Science

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Background

Birley Community College is a 1200+ comprehensive school with an integrated resource (IR) for children with autism. It also has a personalized learning base (PLB) for students who for behavioural reasons cannot always access mainstream education. All of these students are entered for GCSE science but many will not have access to teaching by a science specialist. Despite this most will get a grade for their GCSE

In conversation most of these students declared that science was the subject that they found most interesting .We wanted to provide a resource that would focus their learning, targeting the areas that would hold their interest and would be most likely to maintain their independent work.

We hoped that our resource would also help support the staff working with the students.

The resource

The English department frequently use PEE (point evidence explain) but we have never seen this used in the science department. We had also spoken to staff from local primaries who have taken part in "talk for writing "and" talk for learning" training and now use these strategies in their whole school approach. It was felt that we wanted to provide a resource that could incorporate these methods; to encourage literacy in science and help non science staff deliver the material

We began by looking at sections of the curriculum that students are interested in and that overlap the KS3/4 boundary. It was not our intention to provide separate resources for KS3 and 4 as we felt that if it was a subject that they found interesting that this would put limits on a students learning.

The resource is made up of four parts:

1 A mind map to show how the topic linked with different areas in science

2.A PowerPoint presentation to provide an introduction and information for staff and pupils.

3. An A3 overlay sheet with an A4 space in the centre. This can either be clear to overlay images or hold a central image. Around the central area are different marked spaces containing:

- Key words
- Guided questions which are levelled according to Blooms taxonomy
- Spaces for the students to form their answers. It is intended that most of these questions can be answered by looking at the images provided. It is intended that the student answers these questions verbally before or as they write any answers down
- Further questions which will require more research

- Useful website addresses and books available in the department

4. The environment was our first choice and we began with 'adaptation'. We put together a collection of interesting and varied images animals and plants that fit in the centre of the overlay. The students comment on these images and can choose the ones that interest them the most

Practical details (template provided in appendix)

The overlay is made by cutting out a rectangle from the centre of an A3 sheet of printer paper. Flip chart paper could also be used. Laminating the overlay allows students to rub out their answers until they are confident in what they have written.

Using different coloured paper can help with specific reading difficulties. We used white, yellow, blue and green and allowed students to choose the colour that helped them most.

The overlay can also be produced as an A4 page for the student's notes.

Implementation

The resource was used in three different scenarios

First it was used by a Year 10 IR student whose involvement in mainstream lessons is sporadic .He used the resource as part of core science (sectionB1b AQA) GCSE. He maintained his interest and his concentration and although his writing skills are poor he could bullet point the main points of his verbal answers onto the overlay. His input into his learning was far more positive. He particularly felt happy that he could rub out any mistakes

The second use was in a mainstream class with many supported students. The students used the paper version of the overlay in pairs with the image of the rock cycle in the centre. It was a new resource and so the use of it and the reasoning was explained. Students felt confident that they could use PEE, a method they were familiar in using and when reviewing the overlay at the end they felt that they had benefited by using it. In particular two boys that had previously always struggled to stay on task worked supportively together and completed the entire lesson. The paper format was photocopied so each student could retain his or her work. One student wrote his information on staff laptop; this also kept him on task, which again was unusual.

The third time it was trialled with more able Year 9 students. They had a variation which involved video clips as well as relevant images on the overlay. This time the overlay was used as a research-gathering tool to collate information so students could produce a newspaper article on 'the bends'.

Initially during the first lesson the class use of the sheets was much less independent than we had intended. However, once the group began writing their article they used the sheet and its information to work entirely independently.

Further Developments

Many dyslexic/dyspraxic students favour science, as they perceive it requires less writing and they can succeed in the subject despite their usual avoidance tactics. We intend to introduce this format in other areas in science.

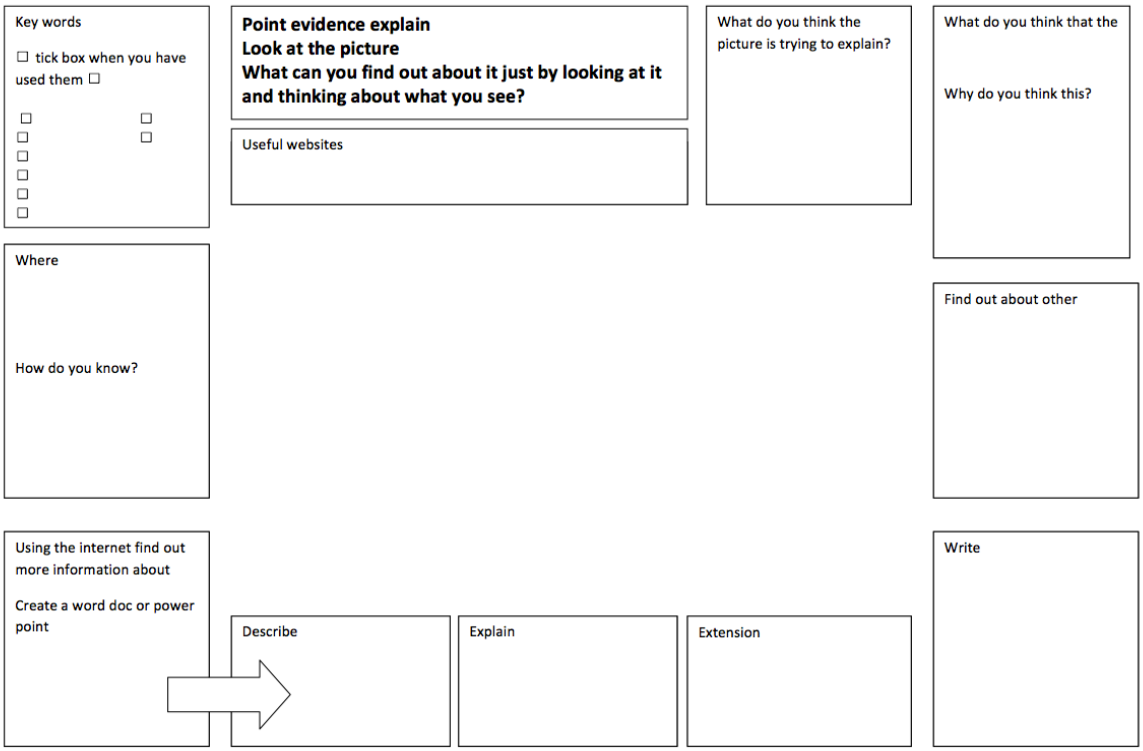
All the students were positive about using the resource but there was an audible sigh when we mentioned PEE. In order not to over use a good idea it is imperative that we are careful that we use the topics that lend themselves to this method

In Y8 our format has helped these students have confidence to think and speak about their ideas before they commit their ideas to paper. It can also be designed to make sure the student gets the minimum information needed to ensure progress is being made.

We will develop its use in other areas where there are strong images that hold a great deal of information that needs to be explained and understood such as the periodic table of elements or the electromagnetic spectrum.

Appendix

Template



‘Rock Cycle’ example

Key words

☐ tick box when you have used them ☐

Rock cycle ☐
sedimentary☐
igneous☐
metamorphic☐
erosion☐
weathering☐

Point evidence explain Luke
Look at the picture
What can you find out about it just by looking at it and thinking about what you see?

Useful websites

bbc bitsize British geological survey website bbc science and nature

What do you think the picture is trying to explain?

What happens to rocks when they start to corrode.

How rocks are made from volcanoes

What do you think happens to the mountains and hills? There are crakes in them so water gets in and expands .

Why do you think this?

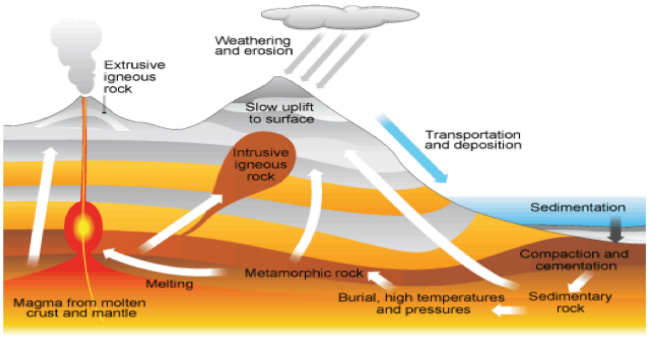
Water expands when it freezes to give it more space

Where do igneous rocks come from?

The middle of the volcano

Can you explain how they happen?

Find cracks in the earths surface



How are sedimentary rocks .

made?

How do you think fossils are made?

Animals get crushed by the sand .

Using the books provided find out more information about

Fossils or

Volcanoes or

Earthquakes

Describe What they are

A diagram might be useful for showing the .

Explain

How do they happen? Where do they happen?

Extension
Find out more information eg.
How do we use fossils?
How do earthquakes and volcanoes affect us?
What is the Richter scale?

There are three different types of rock

Can you name them and find some uses for each different

type?sedementary, igneous

metamorphic

‘The Bends’ example

Key words

☐ tick box when you have used them ☐

The bends ☐
pressure☐
nitrogen☐
decompression☐
symptoms☐
spinal cord☐

Point evidence explain
Look at the picture
What can you find out about it just by looking at it and thinking about what you see?

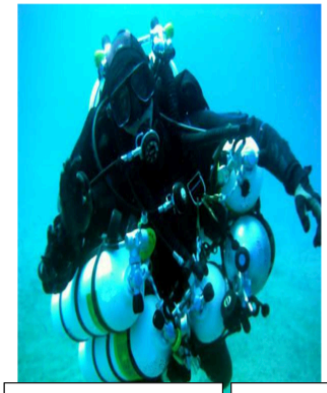
Useful websites

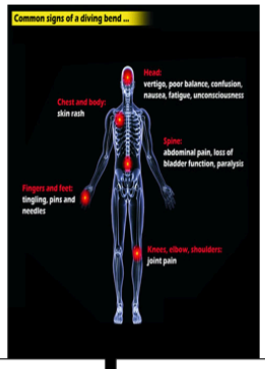
Youtube diving and the bends

Describe what the pictures are showing you

What are the symptoms of the bends?

Why do divers have” the bends”?





Find out about other places that people might get the bends

Using the information here and from the video clips write a newspaper article aboutthat has been rescued

Describe how the problem happened and what happened

Explain why the diver got the bends

Extension

Write about the divers treatment in a decompression chamber

Why did you watch the lemonade bottle being opened?

And the “can” exp?