

# Design and Make a Climbing Structure for the School Playground

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## Abstract

This project is based around an extension of a similar one undertaken last year, which involved pupils looking at ways in which the school's playground could be improved. Amongst the various ideas generated, one plan was to incorporate play equipment and climbing frames into the playground. The Whittington Agenda 22 Project (concerned with looking after the environment by using reclaimed materials) worked together with the school on this project. For this year's project David Stone from the Islington Schools Environment Project was also brought in to collaborate with the class on the design of and construction of the structures which will hopefully be built and placed in the playground when funding is available. One consideration to be taken into account whilst planning the project was that David was being funded by the Whittington Agenda 22 Project. Due to this we also had to incorporate other issues to satisfy those funding him as well as completing the project's criteria. This meant that time restrictions were automatically placed on the duration of the project before we could even get started and so each section of the project had to be carefully planned so that we did not exceed the time limitations.

## Introduction

The class undertaking the project are Years 4 and 5. Some of the pupils bring with them some quite complex needs and these were taken into account when planning the project so that they worked safely and that objectives and expectations were made clear from the outset of the project.

The project is a continuation of the scheme to develop the playground environment begun last year and involves the pupils designing and constructing a climbing structure following the theme of animals, which was a popular theme worked around last year. The benefit of the project is that the pupils know that they will be working towards putting the designs into a real context and so their enthusiasm will hopefully be maintained throughout the duration of the project.

In order to promote the issue of protecting and replenishing the environment the project will, on the whole, use reclaimed materials or materials which can easily be recycled i.e. reconstituted plastic, used Christmas cards, recycled wood. The pupils will be encouraged to bring in used containers and boxes so that they can be used during the building of the structures.

## Criteria for the project

The class were told that during the project they would have to:

- design and make a climbing structure for the playground
- incorporate the theme of animals into their design
- consider the scale of their designs and the actual size of the structure in the playground
- take into account the various ages and sizes of the pupils who will be using the structures
- visit a school where playground improvements have been made and structures put in place
- gather information on play elements before incorporating them into their designs
- use a combination of frames to build the structure
- use a variety of appropriate equipment to adjust and construct their frames in a safe manner.

At the end of the project the pupils should have produced a scaled climbing structure incorporating the theme of animals that has a variety of play elements for pupils of different ages in place. They should be able to join materials together using a variety of different methods and be able to use the appropriate vocabulary when discussing the techniques and processes that they have used when constructing their models.

The criteria set for the project as a whole were:

- to use a variety of methods to join materials in both temporary and permanent ways
- to use a variety of materials both stiff and flexible, and manipulate these according to the group's design criteria
- to use the joining methods they have used in focused practical tasks to produce a series of frames
- to be able to use various tools and equipment appropriately and in a safe manner
- to use skills and knowledge developed in other curriculum areas and apply them where necessary throughout the project
- to apply information gathered on field trips to design and make play elements which are then added to the climbing structures.



### Planning the project

Whilst other subjects such as history and geography can follow a determined weekly planning pattern relatively easily, this is not so simple with design and technology. Although the plans allow for two hours of work in each weekly plan there also needs to be the consideration that something extra may need to be included or extended upon. For instance, altering the size or shape of the structures or adjusting a specific element because of safety or building constraints.

Following the main body of the project undertaken over the half term, there will also be additional elements to the project that will follow on at a later date. An assembly will be given by the class to explain to the school what they have been doing and how they progressed over the last seven weeks. They will also undertake a survey throughout the school in every class to gather data on the most popular elements of the structures. Each of these additional elements contributes to the issue that whatever the groups produce is being produced for a specific 'real-life' context - producing a climbing structure for the school playground.

### Links to other curriculum subjects

The project lends itself well to links with other subjects within the National Curriculum because of the nature and themes of the work. The project bases itself mainly around the construction and use of structures within design and technology itself but also uses the subject area of art a great deal when any recording or observing is carried out. Morgan (1988) states that:

*'A significant proportion of our experience is assimilated through the senses of sight and touch, whatever the actual proportion; the whole matter of visual and tactile communication is, therefore, of crucial importance in the education of pupils.'*

It is here then that one can see at each stage of the structure's development that the pupils rely on both visual and tactile information to advance and develop their creations. Another advantage to the project is that by encouraging visual recording, the pupils with poor literacy skills are not put at a disadvantage.

A reasonably high proportion of the class have specific learning or literacy difficulties and through the high percentage of tactile work required in the project this would not present a problem or worry to them as is often the case in other curriculum areas.

Another curriculum area contributing to the project is the subject of mathematics. The

need to consider scale when designing the structures demands that the pupils learn about scale and how it is used when designers and architects are producing sketches. This will also need to be taken into consideration when the pupils approach the concept of using different levels and play elements in the structures. It would not necessarily be an initial concept to introduce but when the frames are being assembled, it will then become a consideration to be carefully discussed.

Geography and science are also additional curriculum areas included and touched upon throughout the project duration. The pupils are made aware of the local surroundings and how they affect the way that pupils, both in and out of school, play. They are encouraged to look at these influences and see how they can change them. This is also mirrored during the visit to other neighbourhoods and schools to see how their environments are different or similar to their own. Science is relevant when the pupils begin thinking about animal form and the way that they can represent animals in differing ways. Whilst not fully taken advantage of, the scientific aspect could run parallel to this by looking more in-depth at the bone structure and skeletal form of different animals and how the frames could be manipulated to represent these.

### Management and organisation

Due to the tactile nature of the project, it was essential to lay down both expectations and rules for each of the sessions surrounding the use of the tools and how to handle them safely. Many of the pupils had not used some of the tools before and so demonstrating their use had to be included in the session planning thus restricting the time allocated for the construction of the structures.

The classroom was separated into clear working areas that the pupils were familiar with so that they knew where they could use each tool safely. Amongst the different sections of the room there was a sawing/cutting area, a gluing area, a painting area and then general building areas. Both the cutting/sawing area and the gluing area were limited to only two pupils at a time. The designation of these areas was beneficial because it limited the amount of pupils in one area and thus the potential for accidents.

The pupils were organised into groups for this project and were arranged carefully according to ability so that the more able pupils would be able to support those less able. This would also mean that they could share the written requirements of the project and develop their collaborative and co-operative skills within a



given group. Spring loaded scissors were also made available for the dyspraxic pupils, just as left handed scissors were given to the left handed pupils to make it easier for them when manipulating materials.

Although there were two additional adults in the room, this was not always an advantage. As always, different people have different ideas of how things should be done, and how much freedom pupils should be given to make their own decisions and mistakes. It became essential that the adults had the same criteria for the sessions as well as the pupils having theirs, so that there were no contradictions between what different adults said to the pupils regarding their work.

Whilst the shared responsibility in the projects development was part of the arrangement, this also proved to be problematic in certain elements. On one particular occasion when one of the other adults was due to be leading the session for the afternoon, they did not arrive in the classroom until five minutes before the lesson was due to start. This meant that there was not enough time available to discuss the objectives of the lesson and the stages of development for the session. In this way it would have been more effective to organise the entire structure of the project singularly, thus ensuring that the classroom was organised and arranged suitably before the beginning of the lesson.

**Session plan outline for the playground project**

<b>Week one</b>	Discussion about the playground visit. Considering safety issues in playgrounds. Analysing 'What makes a good playground.'
<b>Week two</b>	Introducing the project. Designing a basic structure.
<b>Week three</b>	Using scale. Discussing design in groups. Teaching Jinx joints/How to use a glue gun. Safety issues. Constructing basic frames.
<b>Week four</b>	Building structures using the frames. Choose a favourite frame. Begin to make the structure look like an animal.
<b>Week five</b>	Continue the construction of the structures. Sketch the designs as they change or develop. Add card to the designs to enhance the shapes.
<b>Week six</b>	Visit to Vittoria School. Adding play elements to the climbing structures. Begin painting the structures.
<b>Week seven</b>	Finishing off the models. Evaluating their own and other models.

**Evaluating the sessions**

**Week one**

The activity during the last week of the previous term had been to visit a local playground and study the equipment within it, the condition of the equipment and the general appearance and safety of the playground. The pupils were given a sheet with question prompts on for them to think about and to write down their thoughts on. They worked in mixed pairs and took turns to scribe the answers. They then went into more detail, looking at the colour of the equipment, what they would do if they were inspecting the site and what play elements they would leave the same or change.

A disadvantage was that the visit was on quite a dull, blustery day and so the quality of the writing was not as productive as it could have been. However, the discussions that took place both around the play equipment and back in the classroom indicated that the pupils had considered their thoughts and feelings about the site in some detail.

It was pleasantly surprising to listen to how analytical the groups were about the general condition of the playground and the lack of maintenance and upkeep that it was given. They all expressed a general dislike towards the site saying it was 'disgusting ... dirty ... dangerous' and that some elements of the equipment 'could cause an accident if it was played on, on a wet, damp day'.

This was re-discussed during the first week of the project and the pupils then became inspectors themselves, each pair taking a photograph of a play area and then discussing and writing down their feelings and opinions about the area. Most of the groups took the activity very seriously and really began thinking about possible danger elements (an essential part of the project to follow).

The objective of the lesson was to involve the pupils in thinking about what they consider to be a 'good playground' and what it is that makes it this. They showed some awareness of the equipment being built with specific people in mind is developing.

One aspect that could have been changed slightly on the trip is that if the groups had either an adult to scribe for them or jot down their comments, or they had a dictaphone, the work would probably have been more detailed.

**Week two**

Week two saw the introduction of the design and technology project. The group was introduced to David and Beatriz and David gave an introduction to play and how elements



have changed/ remained the same over the passing years. Examples of David's work were then shown, and the theme of animals was gradually introduced by using more selective examples of footage from David's experiences in schools. Although the introduction was essential, the level of understanding needed to fully understand the context in which David was speaking proved to be quite confusing for some of the less able pupils and they began to lose attentiveness.

Following the introduction the pupils were asked to design some play equipment to be placed into the school playground based around the theme of animals. Some pupils had difficulty drawing an idea straight away and so, in order to develop the introduction further and to clarify the task, various animal/information books were made available to look through for ideas.

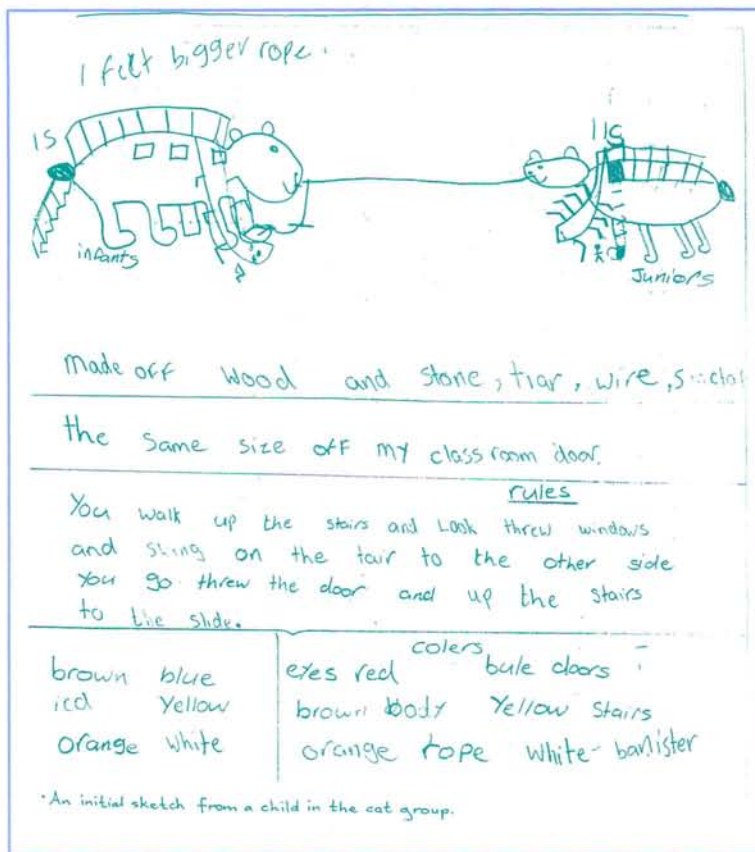
The input on animals could probably have been more in-depth and discussed more closely by linking the examples to relevant photographs. Most of the pupils however once they thought of an initial starting point, were able to incorporate some play elements. However, at this stage the elements being included were fairly limited and tended to be the common forms that they are familiar with e.g. swings, slides, roundabouts.

Some of the class immediately began with more detailed, advanced sketches and then began contemplating which materials they could use to construct their equipment and what types of colours they might use. At this stage the colours being chosen tended not to be related with the animal that they had drawn, and the sketches were very varied (Figure 1).

**Week three**

Due to the actuality that some of the pupils' experiences of design and technology and the tools used were very limited; careful demonstration and explanation was given about the use of different tools, how to use them safely and the issues of inappropriate behaviour and the possible consequences.

The class was shown how to use the hacksaws, bench rests, and glue guns. They were also given focused practical tasks to construct a simple rectangular/square frame by using jinx joints. A point to note is that because lynx frames were not available some of the frames were not made at perfect right angles and this then meant that the structures were not as accurate as they could have been. The pupils were then asked to make two frames of a similar size using the method they preferred e.g. jinx joints or the glue gun.



The main advantage of using the glue gun was that the frames could be constructed relatively quickly rather than having to wait for the joints to dry. Therefore the majority of the class chose to use the glue gun. On the classroom organisation side of the session it proved to be quite a demanding session. Not all of the groups could saw or glue at the same time and so groups had to be rotated in strict order. Whilst two groups continued designing different ideas together as one, one group sawed their wood, one group glued, and one group began to experiment with their frames by organising them into different shapes and then sketching them. The photographs (see Figures 2 and 3) highlight the variety of different activities operating at one time. This would probably have been impossible to execute had there not been three adults in the room supervising specific groups.

Given the complicated nature of the session it was quite surprising to see how organised and co-operative each of the groups were with each other during the allotted time. By the end of the session most of the groups had worked well together, although one of the groups had disbanded into two smaller groups. Whilst this was not what had been aimed for, the two groups had already decided which animal they were going to focus on, and had inadvertently

Figure 1: The initial structure designs incorporating the theme of animals to the structures.





Figure 2: Learning to use a glue gun safely.

Figure 3: Sawing the wood to specific lengths.



become the most organised groups within the class.

By the end of the session, all but one of the groups had decided on which animal they were going to use as the basis for the design. When the class regrouped for a plenary they offered suggestions to them as to which animal their structure represented, thus giving the group extra ideas. The photographs on the following page indicate how the designs were beginning to loosely represent animal forms.

What began to show was that each of the groups were quite willing to offer others suggestions to improve their designs rather than competing against each other. They were also very focused in terms of knowing exactly what they wanted to do next and additional triangular frames had to be built due to demand from a specific group that decided to make a crocodile. They began by using square frames but for efficiency, decided that using triangular ones would be better.

**Week four**

The session began with a focused practical task investigating how a strip of card could be manipulated in different ways for a variety of purposes. One group (see Figure 4) had already by this point, begun experimenting with these different techniques and were therefore able to assist others (in particular the EAL pupils) with their technique.

The main object of the session was for the groups to begin using a variety of joining methods to stabilise their structures. Whilst some groups who were definite about what they wanted to do used more permanent methods of joining, others preferred to use



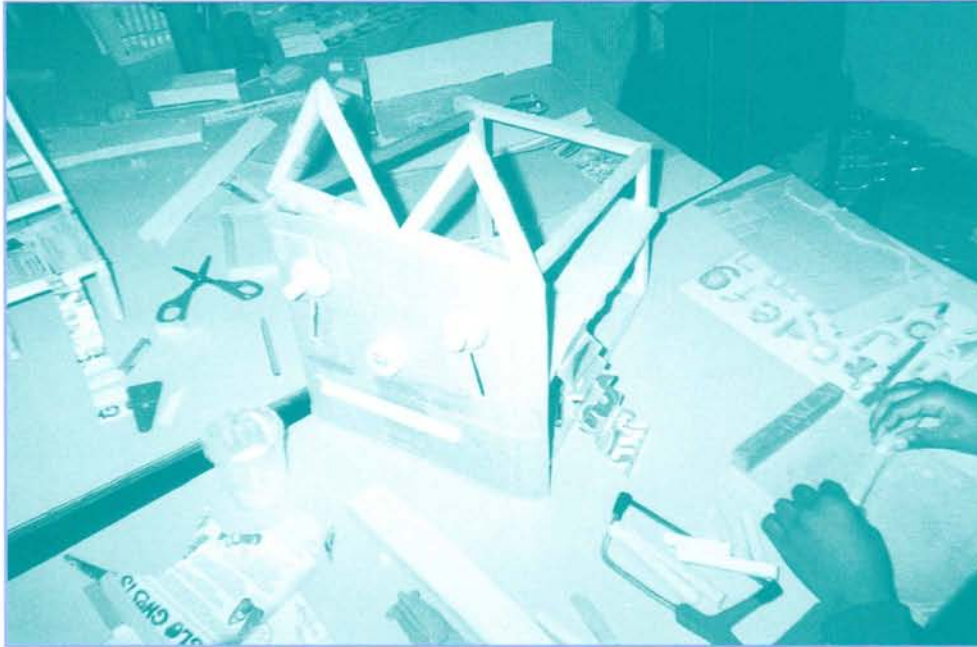


Figure 4: Adding card in different ways by manipulating it in various ways.

temporary methods such as string. The pair designing the frog seemed to know exactly what they were doing and immediately began working through the stages of development very quickly; adding certain play elements as they were constructing the basic structure of the frame. What did become apparent was the enthusiasm of some of the pupils with literacy difficulties throughout the session and the way that they came up with practical ideas with ease. In particular it was awe inspiring to watch a child working on the frog and the way that he found making different shapes and structures with the card with such ease.

By the end of the session each of the groups had decided on which animal their structure was to represent and most had begun to add some element of card cladding to their structure. However, one group decided to take their structure back to basics and reassemble it so that it looked more like a spider instead of adding more legs onto an already cluttered frame. Whilst this took more perseverance and patience on their part, they all worked together closely and allocated specific jobs to each member so that they could complete the main body of the structure before the end of the lesson. Because of this adjustment the group became a lot tighter and worked a lot more closely than other groups who were working on individual sections of the same model (e.g. the crocodile group).

The co-ordination and direction of the session seemed to be determined more by the pupils rather than being teacher dominated. Each group showed initiative and a clear sense of direction in the way that they worked and all rules were followed closely by each group,

and they were also quick to remind someone who was not following them.

Whilst at the outset of the project I was quite concerned at the amount of work that had to be fitted into such a short amount of time, by the end of the session it seemed quite apparent that this may not be such a problem. Each group knew exactly what their next stages of progression were, and what adjustments needed to be made the following week.

#### **Week five**

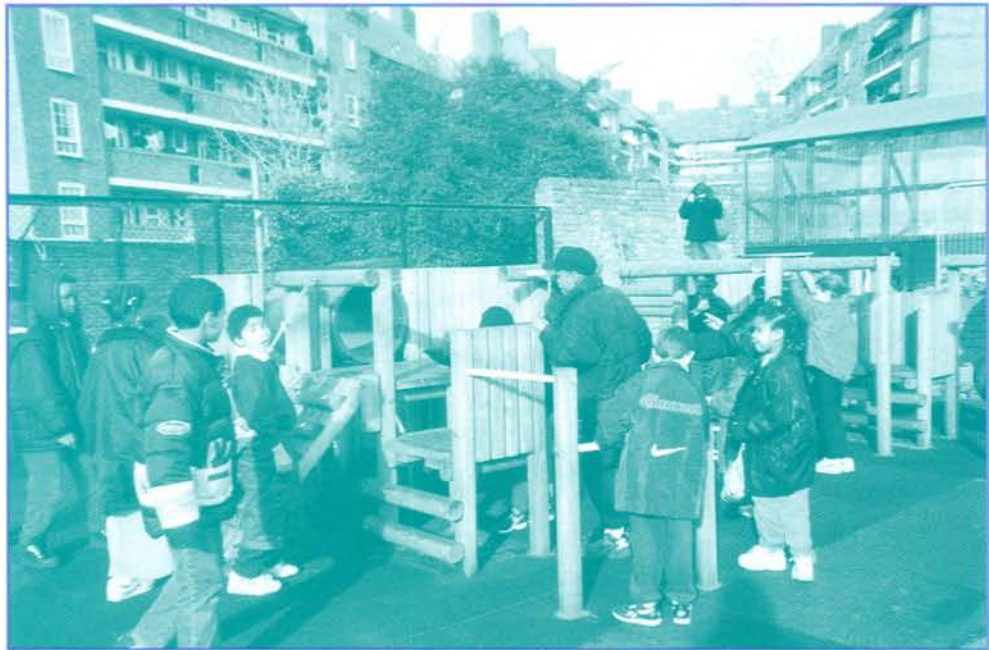
The focus of this week was the trip to Vittoria School to examine the improvements that have been made to their playgrounds. As well as looking at the play equipment designed for the junior department of the school, the pupils also visited the nursery section where the structures were a lot smaller but also maintained their appeal to even older pupils.

The main objective of the visit was to encourage the pupils to begin to consider the various possible play elements that could be incorporated onto one climbing structure. They looked at the different levels of the equipment and the different ways in which they could be linked together. One way which the pupils explored these structures was by using them. As the photographs indicate, one of the structures lends itself more to their age level and the comments of the pupils reflect this. One commented that 'It gets too crowded when lots of us are on it together.' Another commented that 'the smaller structure is like gymnastic equipment'.

The group also observed how some of the equipment was designed not to move (tube)



Figure 5: Exploring the nursery equipment at Vittoria School.



but that other pieces were given more opportunity to move slightly (climbing net). During the visit some of the pupils began to look more closely at the construction of the equipment and found that some elements of the structure could be dangerous to others.

On returning to the school it became apparent that the visit had influenced some of the choices that were made regarding the inclusion of play elements on the structures. Rather than the ordinary slides and swings that many of the pupils' designs had featured during the initial stages, the sketches and the structures began to include more inventive elements, details of which were similar to those seen on the visit, e.g. a spinning log which one can run on can be seen in the photographs of both the school playground and the frog structure. Other aspects of equipment similar to those in the playground are also visible in the photographs and the group structures.

It was interesting to see that whilst the groups were obviously influenced by the variety of play elements that they had seen, they did not directly use these ideas. Most of the groups either extended on the designs or took different aspects of a selection of elements and amalgamated them. Other groups were particularly pleased to see ideas they had already built onto their structures, used on the equipment at the school.

### **Week six**

By this session, the majority of the groups had managed to paint the base coat onto their structures so that any slogans, or details on the reclaimed cardboard, were no longer

visible. Other groups had also put on their structure and had begun to use information sources to decide on the colour of their structure.

During the addition of finishing touches to the models, David discussed issues about pupils' safety whilst on the structures with some groups. The spider had to be adjusted slightly so that a safety rail could be put in place on the head for when pupils climbed up to the top.

By this point in the project, the structures were almost finished and the resemblance to the animals they were based on became very clear to the eye. The models gradually developed and altered through each of the steps.

For the group who had completed their model, they began to consider the flooring beneath their structure should it be placed in the playground. After careful consideration they decided that they would keep it within the context of their animal and relate it to the animal's habitat. Just sitting with the pair whilst they discussed this was indicative of the amount of thought that they had put into each aspect of their design. They thought it through and used information sources which they sketched from first, before drawing out the actual flooring for their structure.

### **Week seven**

The last session was used to complete any outstanding work to the model and, primarily, to write an evaluation of the project as a whole. Each group completed their own evaluation of the project and included their personal thoughts and feelings about the



project before collaborating with the rest of the group to decide the easiest/hardest parts of the project.

They then studied each of the other design structures and wrote about their favourite structure overall and the specific play elements that they preferred. This proved to be quite interesting, whilst I thought that there may have been an element of 'mine is better than yours', this was not the case and each group was keen to praise different ideas and techniques used by the other groups. Each group also showed their own structure to the class with pride and could readily discuss any of the elements in great detail to anyone who asked.

#### Evaluating the project and its delivery

On the whole the criteria which were set for the pupils were achieved. The groups managed to design and make a climbing structure to be placed in the school playground. Most of the materials that were used by each of the groups were reclaimed or recycled and during the project the class became more aware of the importance of recycling and took responsibility for bringing in potential materials for the project.

Although two of the groups broke up into smaller groups early on in the project, this was not seen as being a failure, on the contrary, the work produced by the new groups was above average. It was also very interesting to see how the groups with a high proportion of less able pupils in them actually worked together as a whole better than the groups with the more able pupils in. There did not seem to be the competitiveness between which ideas were chosen and who did what. Instead, everyone worked together to produce one structure, thus generating a more solid idea of what the outcome should be.

Due to the time limits set, the project seemed to be quite intense and each week the pupils were constantly being pushed to move onto the next section of the project. Whilst this was valuable in keeping the groups focused and on-task, it also meant that most of the work being done was practically based. In this way, the recording site of the project was not detailed and did not record each step of the project, which had been one of the intentions to begin with. The delivery of the project over the six weeks did not really allow for adequate reflection time at the end of each session when recording and write-up time could have been allocated to each group. Evaluations were produced, however, whilst they detail what happened throughout the project they do not offer as much reflection and self-evaluation as a diary or weekly evaluation would have done.



Figure 6: The completed frog structure.

If the project was to be repeated I feel that it would probably have been better if the time available for each section was longer. In this way there would then have been more time to produce a diary of notes on each section of the project as it happened. Looking back on the project, whilst some excellent work was produced, and the co-operation and enthusiasm within the groups was commendable, there is now little written work to support this. I would also ensure that each session was thoroughly planned and the layout of the room discussed with each adult before the lesson commenced - in this way the objective of the session and the desired outcomes would be clear to everyone.

#### References

- DATA (1995) *DATA Guidance Material for Design and Technology Key Stages 1 and 2*, DATA: Wellesbourne
- DATA (1996) *Primary Co-ordinators' File*, DATA: Wellesbourne
- DATA (1997) *Planning into Practice*, DATA: Wellesbourne
- DATA *Designing Magazine*, DATA: Wellesbourne
- Jarvis, T. (1993) *Teaching Design and Technology in the Primary School*, Routledge
- Morgan, M. (1998) *Art 4-11: Art in the Early Years of Schooling*, Simon and Schuster
- QCA (1998) *Design and Technology - A Scheme of Work for Key Stage 1 and Key Stage 2*, QCA: London