

Planning and Developing a Teaching Pack for a Unit of Work for a Primary Age Group

Abstract

This unit of work has been especially designed for a Year 3 class in Mitcham, South London. These children have had no prior experience with design and technology so I therefore had to think carefully when devising my unit of work. The National Curriculum and the QCA documents state that children in Year 3 should be learning about structures so I decided to focus my unit of work around this topic.

Rationale

As there was no record of the children's abilities in this area I engaged in discussions with my class teacher to find a suitable starting point. It was decided that although Year 3 children should be working with wood this would not be sensible due to their lack of structural concepts. The school also did not have the resources. Starting from the basics is essential in order for the children to develop their skills and build on them appropriately.

There are 25 children in the class and there are a large number of children with special educational needs. By teaching this unit of work I feel it has given the children an opportunity to recognise and develop skills that sometimes are missed in other areas of the National Curriculum.

The QCA document outlines a unit of work for Year 3 children learning about structures. This sees the children designing and making photograph frames using wood. I have followed the theme of designing and making photograph frames but instead of using wood we will work with reclaimed materials. This is more appropriate to the children's needs and it fits well with the school's resources.

Before the children start working on the DMA it is essential to develop some key skills and concepts. Paper structures and joining techniques. These are the two main areas the children will need to be aware of to enable them to successfully complete the unit of work. This is why my first two lessons of this unit of work have been chosen.

Lesson one sees the children experimenting with ways to strengthen paper/card to make a model. The children are learning about how to bend, fold and twist reclaimed materials to add strength to the product to enable it to form the desired structure. The children have the opportunity to experiment freely with the materials making their own discoveries as well as been shown some techniques.

This progresses and links very well with lesson two, joining techniques. As detailed in my unit of work the children need to learn

about joins as this will be necessary later in the project when joining the stand to the frame. Therefore the children had to learn about permanent and temporary joins so as to have the ability to select the most appropriate type of join for use on their photograph frame. This lesson saw the children working with a wide range of resources and some interesting discoveries were being made.

Now that the children were familiar with the above concepts we were able to start work on the DMA. This lesson was targeted as a designing session as I wanted the children to think carefully about what they intended to achieve and what methods they would adopt to do this. By selecting a person to design for prompted the children to think about that person's likes and dislikes to ensure that they were designing for a purpose. Structural concepts had to be considered and this was largely done by considering the size and shape of the frame. Triangular supports were used at the corners to strengthen the frame around the sides.

The children had to carefully consider what type of stand was going to be used and how it would be joined onto the frame structure. This required the children to think back to the previous lesson. Firstly they had to decide whether the join needed to be permanent or temporary and then whether it needed to be a rigid or flexible join. The materials were then selected according to the decision and were ready for experimentation.

"Rough, quick sketches have just as much value at the early stages of design as the more polished drawings displayed for parents or others." (Ritchie, 1995)

Lesson four gave the children the opportunity to put all their knowledge into practice. They were able to progress through this lesson successfully due to the previously taught

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concepts. Knowledge and skills were built upon and ideas were tried out and changed accordingly.

To complete the unit of work it was important for the children to apply their design onto their photograph frame. We discussed the importance of presentational skills and to consider the user and the products purpose before hand. This had been looked at when constructing the design sheet but I felt it was necessary to review the topic so the children were clear. A lot of designs were changed due to materials, too complex detail and time issues. I didn't mind as long as the children recognised and could justify why their design had changed.

It was necessary to evaluate the product as this drew the unit of work together. It looked at the stages that had been progressed through and gave the children a chance to reflect on their own work.

Classroom management needed to be carefully considered before any design and technology could take place. The key issues that I needed to consider were the amount of

space available, the convenient positioning of the resources, the classroom environment and safety aspects.

Space for design and technology

This was not too much of an issue for me as there are only 25 children in the classroom. I split the tables into five groups so that there were five children working on each. This gave them all room to work freely without the tables becoming too cluttered.

Positioning of resources

"Resources for design and technology need to be easily available." (Cross, 1998: 75)

So as not to clutter the tables I limited the amount of resources on the tables during each session. I then created two central positions so that if the children needed any more materials they could go and select them. Sample frames were located at two points so that the children could examine them and take them back to their tables if necessary. Two areas were created so that these would not become crowded with resources and so when the children came up to select their materials there was plenty of room.

Classroom environment

The classroom environment was kept at a calm level throughout each lesson. This was necessary for a productive learning environment to take place and clear expectations were set at the beginning of each session.

Safety

As one of the most popular ways to join was the use of a stapler/staple gun, the children needed to be aware of the dangers involved. Hence it was decided that the children who wanted to use this method would do so under an adult's direction. Children have to be sensible during design and technology so as not to break or injure themselves or anyone else. Again clear safety expectations were set.

"It is essential that we are clear about where we want children to go in design and technology." (Cross, 1998: 83)

It is important when devising a unit of work to think clearly about what stage the children are at and what you want the children to achieve over the set period of time. When conducting the individual lessons to accommodate for all the children's needs you need to consider the use of technical language. In some cases you may need to adjust this depending on the individual's language ability.

The use of questioning is very effective and can be adapted as necessary. As this subject is

very practical it gives all children the opportunity to express their thoughts without the worry of having to detail these onto paper. Questioning is an effective way of finding out exactly what each child has understood.

The use of record sheets and tick charts are a good way to evaluate and assess the children's on going progress and this will tell you what areas you may need to re-cover or identify any children who need extra guidance. It is also a good idea to involve the children in this process and set small targets or goals for them to meet that you have agreed on together.

"Giving children insight into how you assess enables them to make connections and to develop their own skills at self-assessment which in turn can move full circle and make a contribution to your own assessments." (Mitchell & Koshy, 1997)

This divides unit of work links well with the National Curriculum as it states that at Key Stage 2:

1. Pupils should be given opportunities to develop their design and technology capabilities through:
 - a) assignments in which they design and make products
 - b) focused practical tasks in which they develop and practise particular skills and knowledge.
2. Pupils should be given opportunities to:
 - a) work with a range of materials and components.
3. Designing skills
 - a) generate ideas, considering the users and purposes for which they are designing
 - g) evaluate their design ideas as these develop, bearing in mind the users and the purposes for which the product is intended, and indicate ways of improving their ideas.
4. Making skills:
 - a) select appropriate materials, tools and techniques
 - b) join and combine materials and components accurately in temporary and permanent ways
 - d) apply additional finishing techniques.

This unit of work proved to be very successful when taught in school. As the children were participating in a different area of the National Curriculum new and different talents were brought out and I observed the children working in a different manner.

Lesson 1

Learning intention(s)

Explore through practical investigation the strengths of different materials by changing their shape. To develop structural concepts using reclaimed materials.

Pre-activity organisation

Ensure that I have all the relevant resources – different strengths of paper, card, pipe cleaners, straws. Examples of structures – chair, table, music stand, wipe board. Sample of the paper dragon we will be making.

Individual provision

I will expect a different level of response to questions and will pose questions accordingly. I will encourage children to interact and to share ideas and make appropriate suggestions to help their own understanding.

Assessment

This will take place by listening to the children's conversations and observing them whilst working on the task. I will assist where necessary and respond to any questions encouraging thinking to take place to extend learning.

Lesson evaluation

This lesson went really well and was pitched appropriately. The atmosphere was created as soon as the children walked into the classroom as I had re arranged the room. "What are we doing Miss?" was the general remark.

I saw a completely different angle to the children and was very pleased with their approach to the task and the models that they produced. As the children had not covered this area before we spent a lot of time discussing structures before engaging into the practical sessions. I wanted to ensure the concept was clear so as to avoid any misconception that may have occurred. When I asked the children what they thought the term structure meant they were all very keen to answer. "Is it a sort of strong wind?" was one response. "Tuff stuff!" "Things that stand up!" "Models". These were good responses and provided me with a solid base to start my teaching from.

What went well and why

Some very good ideas were thought of including the playground slide, the different types of bookcases and the way that they stand up equalising the weight.

The children experimented with different ways to strengthen the paper and card and were keen to use various methods, twisting, folding etc. The use of appropriate language was good and structural concepts were being developed throughout the lesson. The children

Table 1: Design and Technology Lesson Plan.

Timing	The Teaching Strategies	Children's Activities
10 minutes	Find out what the children know about structures. What is a structure? Why do we need them?	Discussion on the carpet to familiarise the children with what a structure is and why they are necessary.
10 minutes	Brainstorm ideas on the board, why do they work? E.g. a table has 4 legs, what is its purpose? What would happen if it only had 3 legs? How could we make a stable table with only 3 legs?	Collect ideas as to what structures we can see around us and try and investigate what their purpose is and how they work, e.g. bookcase, chair.
1 hour	Investigate the strengths of everyday materials, e.g. paper, card, pipe cleaners etc. Design and make (experiment with) different materials to form objects that stand up. How can you change the strength of the given materials, fold, bend etc?	Using reclaimed materials select template to make paper product. Investigate how you can make that model stronger, give it more structure by bending, folding, twisting, scrunching etc. Justify and discuss what you are doing and why. Make predictions as to whether it will stand or hold its new shape appropriately.
10 minutes	Encourage discussion, justify ideas to improve the strength of reclaimed materials, think of ways to add extra support and to add strength.	Discuss and show models. Evaluate what we've done and the methods used for us to achieve the end result.

showed their models in assembly and explained what they had done and why. This was a good chance for assessment as this took place on the following day.

I felt this was a successful first design and technology lesson.

Action to be taken

Proceed to learn how to join using different techniques.

Lesson 2

Learning intention(s)

To experiment with different joining techniques. Introduce the terms 'permanent' and 'temporary' and discuss the meaning of rigid and flexible. Use a range of materials to demonstrate a clear understanding of these. Reinforce paper strengthening.

Pre-activity organisation

Collect resources – split pins, stapler and staples, blu tack, glue, paper clips, sticky tape. Photocopy the template of the robot onto card.

Individual provision

- Use of technical language to explain what has been learnt.
- Skills and concepts developed.
- Finishing techniques applied.

Assessment

Engage in practical discussions to find out ideas and their understanding. Evaluation of the finished robot and ability to explain the joins using relevant language.

Lesson evaluation

This was another pleasing design and technology lesson. The children were all looking forward to making a robot and came straight in from playtime and sat down on the carpet ready to start. They grasped the concept of permanent and temporary quite quickly and were able to give good examples.

One example was the wooden support on the literacy flip chart. This was a permanent join as the children expected that it had been joined with glue to fix it in place. At this point I introduced the terms rigid and flexible. I gave examples and although they had trouble with the pronunciation of 'rigid' good examples were given and the concept was understood. One example is as follows; "A brick is joined with cement. This makes a permanent join and it is rigid as it can't move."

What went well and why

I felt that the discussion flowed really well and the children managed to brainstorm a detailed list of permanent (fixed) and temporary (not fixed) joins. They then successfully went away and worked on their robots using a different join for each body part. As I went around the room I was able to successfully assess the children's learning through observations and using questions to find out their own level of understanding. I was satisfied that each child had made good progress and that their learning in this area had successfully been moved forward.

Table 2: Design and Technology Lesson Plan.

Timing	The Teaching Strategies	Children's Activities
20 minutes	Brainstorm what a joint is and where they are used. Introduce the vocabulary 'rigid' and 'flexible'. A flexible joint needs to enable something to move, rigid doesn't, i.e. a chair, the legs don't move. Talk about 'permanent' and 'temporary'.	Discussion about joints. Give examples – arm, leg – so they can move. Give examples of flexible and rigid joints. Body parts, objects from the classroom. Make predictions as to what permanent and temporary mean. Look at the lesson resources that the children will be working with and identify which category they fit into.
40 minutes	Encourage children to think about their robots and what movement they want from each body part. Discuss with the children what they have chosen and question to ensure the concepts learnt are clearly understood.	Make their robots using a different joint for each body part. Talk about reasons for choice and use appropriate language: permanent, temporary, rigid and flexible.
30 minutes	Encourage the children to think about what they want their robot to look like and what its purpose is.	Apply finishing techniques to the robot and ensure joints used are visible and are able to work.

Table 3: Design and Technology Lesson Plan.

Timing	The Teaching Strategies	Children's Activities
30 minutes	Introduce the design and make task. Talk about Christmas and how we are making our frames over the next few weeks as a gift. Recap prior learning. List criteria/ brainstorm what a frame needs to be successful. • How will you make your frame a stable structure? • How will the picture fit in? • How will you make it stable? • How will it stand up? • How will you join your stand?	Think about who they want to make their photograph frames and what the purpose is, i.e. I will make it for my sister as a Christmas gift. Create a brainstorm of what a frame needs to include in order for it to meet its needs and to work. Consider the following points and comment upon them. Look at the sample frames to gain ideas. Discuss the different features. Look at the sample design sheet.
10 minutes	Aid children whilst choosing materials.	Select relevant materials ready for making. This will help them to complete their design sheet.
40 minutes	Support the children whilst designing.	Answer the questions, Who am I making this photograph frame for and why? What materials am I going to use?
10 minutes	Encourage the children to follow the design sheet.	Start to make the structure of the frame using the design sheet.

Again the children showed their robots in assembly the following day giving me an opportunity to assess what concepts they had learnt and retained.

Action to be taken

Introduce the design and make task, photograph frames. Make their own design sheet according to the chosen specification.

Lesson 3

Learning intention(s)

To consider who they are designing for and what the purpose is. Also, to implement prior learning of structures and ways to join things together. Design the front and the back of the frame and use appropriate labelling.

Pre-activity organisation

- Materials for the children to select: paper, different types of card, straws, scissors, PVA glue etc.
- Samples of different photograph frames to look at for ideas.
- Example of a design sheet to show clear expectations.
- Clear questions for the children to consider.

Individual provision

- Level of detail on design sheet.
- Vocabulary used.
- Time spent preparing the design.

Assessment

Assess children's thoughts and contributions whilst working as a whole class. Observation throughout the lesson. Discussions and interactions between the children and myself. Assess the finished design sheet.

Lesson evaluation

I was very pleased with the outcome of this lesson. The children were all focused when we were discussing the different photograph frames and comparing them and evaluating their differences. They were able to recall their previously learnt skills. This was evident as before any prompting took place the children talked about strengthening techniques and ways to join things together using appropriate language.

What went well and why

As this was my first time developing a design sheet, I wasn't sure what level of designs to expect from the children. I was pleasantly surprised when the children spent 1 hour of the lesson designing what they wanted to make. They all thought about what they wanted to achieve and put a great deal of effort and enthusiasm into their work.

Some children started to make the structure of their frame but the majority spent the whole time designing.

What didn't go well and why

As this was the children's first time designing they needed a lot of attention, sometimes just for reassurance. As I was the only adult in the room the children had to be patient and wait for me to come around. This worked quite well though as there was always something the children could be getting on with whilst waiting their turn.

Action to be taken

Make the frame following the design sheet. Ensure the frame stands freely.

Lesson 4

Learning intention(s)

Use design sheet as a guide whilst making the photograph frames structure and its stand. Make the frame considering chosen specification, try out and change if necessary. Make frame so that it stands freely.

Pre-activity organisation

Ensure there are enough materials available for selection or for any alterations that may need to be made. Design sheets are laid out for the children so they know where they are.

Individual provision

- Support all children and provide extra where necessary.
- The use of the design sheet, ability to recognise the need to change something.

Assessment

I will assess the children's progress whilst observing and helping them to make their structures and stands. I will observe their abilities to try out their ideas and to make any changes to improve their photograph frame.

Lesson evaluation

The children produced some really nice designs during this lesson and the frames have taken good shape. Most children selected the strong card and because of this they found it hard to cut. After looking at some of the examples they decided to make a slot for the photograph to slide through at the top. This meant that they needed to cut a piece of card to the desired shape for the photograph to rest

Table 4: Design and Technology Lesson Plan.

Timing	The Teaching Strategies	Children's Activities
20 minutes	<p>Recap the objectives of the lesson to ensure everyone is focused and working on task.</p> <p>Show the children my design sheet and my made frame. Show how I have altered it due to the strength of the card and the strength needed to create a fixed join. (Stapler is used under the supervision of an adult, staple gun is used by an adult under the child's direction.)</p>	<p>Recall their skills and concepts learnt previously.</p> <p>Offer ideas as to why I have changed my original design.</p> <p>Talk through steps and consider how I have changed the slot to put in my picture. Compare to the sample frames.</p>
1 hour and 10 minutes	<p>Support the children whilst they are making their photograph frames. Question what and why they have chosen that method and ensure they have considered the size of the photograph.</p> <p>Staple gun the stands to the back of the frame if asked.</p> <p>Support, encourage throughout. Encourage the use of correct vocabulary.</p>	<p>Look though their design sheets and start to make their structure for the frame before enabling it to stand up. Look at the photograph they are using and make sure the chosen method of display fits accordingly.</p> <p>Prepare the stand and attach, ask adult where necessary.</p> <p>Discuss their designs and recognise changes that they decide to make.</p>

Table 5: Design and Technology Lesson Plan.

Timing	The Teaching Strategies	Children's Activities
45 minutes	<p>Remind those children who are leaving a slot at the top not to stick the decorations to the base otherwise the photograph will not fit in.</p> <p>Assist any children who need to finish making their stand or are making a relevant space for their picture to be seen.</p>	<p>Use the supplied materials to create an attractive finish to the frame thinking of the user and purpose it has been made for.</p> <p>Finish off any structural designs if necessary.</p>
45 minutes	<p>Introduce how we evaluate a product. Identify any changes that have been made throughout the DMA task and discuss why this happened and how did it change the end result.</p> <p>Pose the two key questions for the children to answer when writing their evaluations.</p> <p>Support and encourage the children to reflect over their work and compare to their finished frames.</p>	<p>Make predictions to what the word evaluation means.</p> <p>Identify key changes and offer explanations.</p> <p>What did I change about my frame? Why did I change it?</p> <p>Use the design sheet and finished frame to answer the two questions.</p>

on but it was decided that this was easier than trying to make a door that opens at the back. This technique required them to consider the size and shape of the photo and it was effective when complete.

Some children decided to use glue when fixing their stand to the frame and others opted for staples as they didn't want to wait for the glue to dry.

The idea spread to use string to ensure that the stand stayed in its required position. This idea was found by looking at a sample frame.

What went well and why

I was pleased that the children changed their original designs to accommodate the resources given. This showed me that they had the ability to think of their own ideas and they had the flexibility to adjust their designs and learn from the changes they made. I found that the children enjoyed experimenting and helping one another. An orderly atmosphere was maintained as the children were all on task.

What didn't go well and why

If the card chosen was not as stiff the children would have been able to carry out different ideas using scissors. This could not be helped due to the lack of resources. However all the children produced a successful photograph frame.

Action to be taken

Evaluate the finished product and apply finishing techniques.

Lesson 5

Learning intention(s)

To use and to develop good quality finishing techniques to link with their design. To evaluate the finished product against their original design.

Pre-activity organisation

Materials for decorating: corrugated card, glitter etc. Paper for their evaluations. Their design sheets and their frames for comparisons to take place.

Individual provision

- Ability to use finishing techniques according to the taste of the receiver.
- Use of technical language.
- Following the design/pattern specified on their original design.

Assessment

I will observe the children throughout the session watching the use of the design sheet and to see what they decide to change and why. I will also look for the interactions that are taking place and the support the children offer to one another.

Lesson evaluation

This was a good final lesson as we managed to finish off the photograph frames and evaluate them. As this was the children's first time evaluating using this method I was particularly interested in the verbal responses during the carpet session. This gave all the children the opportunity to recognise a change made to their work and a chance to explain why. A few of the children found it hard to put their ideas down onto paper and found it a struggle to put their ideas into sentences. This is why I decided to spend some time participating in a whole class discussion. The

KS 2	Year 3	Class 3L Miss Long	Medium Term Plan	Term: Autumn	Date Commencing: 8.11.99
Curriculum Area: Design & Technology		Title: Structures	Time Allocation: 7 hours 30 minutes		Lesson Time: 1 hour 30 mins
Date	Week	Learning Objective	Activity	Assessment	Resources
11.11.99	1	Explore through practical investigation the strengths of different everyday materials by changing their shape. To develop structural concepts.	Make a model out of reclaimed materials. Experiment with the different models to find a range of strengthening techniques in order to create a good structure.	I will assess the by listening to the children's ideas and their contributions to the task as well as the methods used to make the model.	Reclaimed materials: card, paper, straws, pipe cleaners, plasticine etc., chair, table, music stand, ideas and samples.
18.11.99	2	To experiment with different joining techniques. Introduce the terms 'permanent' and 'temporary'. Use a range of materials to demonstrate a clear understanding of these.	Make a robot out of reclaimed materials. Use a range of resources to experiment with different ways to join body parts. Select and apply examples of both temporary and permanent joins.	Throughout the practical session I will engage in discussions with the children to find out each child's ideas and level of understanding.	Reclaimed materials: card, paper of different strengths, blue tac, split pins, stapler, paper clips, hinges, sticky tape, glue, samples of puppets.
24.11.99	3	To consider who they are designing for and for what purpose. Implement prior learning of structures and joins. Design photo frame and use appropriate labels.	Discuss the purpose of this D&M task. Look at different frames and list criteria. On A3 paper produce a design sheet of how the frame will be made and how it will look. Select materials. Start making.	I will assess the children's thoughts and contributions throughout the lesson by engaging in discussions and through observation. Assessment of design sheet.	Materials for the children to select; different strengths of card, paper, straws and lollipop sticks. Scissors, glue, samples of frames, example design sheet.
1.12.99	4	Use the devised design sheet as a guide for making the frame. Make adjustments where necessary and recognise the need for any changes. Ensure the frame stands freely.	Make the photograph frame considering the chosen specification. Ensure that the photograph can be clearly displayed. Use structural knowledge and joining techniques.	I will assist the children by engaging in discussions about what they are doing and encouraging them to solve any problems if encountered.	Materials for constructing the photograph frame, card, paper, glue, staples, string. All the above materials are available for use. (Stapler is supervised)
8.12.99	5	To use and develop good quality finishing techniques to link with their design. To evaluate the finished product against their original design criteria.	Select materials and use chosen effects to finish of their photograph frame ready for the product to be wrapped up as a Christmas gift. Look at any changes made and explain the reasons why.	Assessment will take place through observation and discussions. Children are encouraged to think about the criteria they have worked against.	Materials are as above if needed and also include sparkly corrugated card, glitter etc. Paper for evaluations.

Plan.

children then found it easier to focus on one or two changes that they had made so as not to confuse themselves.

What went well and why

Splitting the lesson into two sections worked well as the children were so proud of their photograph frames that they were keen to talk about what they had been doing and why. They all managed to write a short evaluation and they then cut it out and glued it onto their design sheets to show a record progression.

The children have thought of some wonderful ideas and have all achieved very good results.

Action to be taken

Take photographs of each child, their design sheet and frame and glue to their design sheet as a visual record of their own achievements.

Design their own Christmas wrapping paper and wrap and label their frame ready to give as a gift for Christmas.

References

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