Developing an Innovative Technology Programme for Year 7 and 8 Students

One School's Journey of Change

Sabbatical Report

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Original Intent:

To investigate innovative technology programmes for year 7 & 8 students in full primary and intermediate schools which offer higher levels of learning engagement and empower students with their own learning.

Abstract:

Students in year 7 and 8 have traditionally had as part of their learning programme a course of instruction in technology utilising specialist teaching often in specialist facilities. The original Technology Curriculum statement published in 1995 was the first attempt in real terms to address the new curriculum area and was designed to form the basis for technology programmes years 1 – 13 (Maris O'Rourke, Secretary for Education – Foreword Technology in the New Zealand Curriculum, 1995). This new document also replaced the Forms 1 – 4 Workshop Craft Syllabus for Schools (1986), and in doing so identified that technology should now be considered a learning area at all ages, rather than from defined periods. Additionally, it signalled for primary schools the expectation to cover technology at all year levels meaning the beginning of a change to the "traditional" way technology had been done over many years in the form of manual training. Gone was a more skill based set of criteria and in came a range of objectives divided into strands and levels. These were dovetailed with indicators of progression, but allowed technology to be introduced and taught in a wider range of contexts than had previously been considered.

As our world began to change exponentially with the advent and expansion of the internet so came the need to update and modernise our curriculum statements. Following a review and development process a new curriculum was unveiled to schools in 2007, after a draft format and trialling had occurred. There were a number of changes from the original but with a common feel about it, albeit in a different format and with new names for the strands.

This report looks at the journey one school undertook to deliver an innovative technology curriculum at the year 7 and 8 level. It offers insights for other schools considering the same process and looks in some detail at how this might work if the school provides its own specialist technology teaching rather than outsourcing it to another school. As well as this it

looks at ways this technology can be provided, the process to obtain permission, what others may be doing, and finally the way this school has decided to deliver the technology curriculum for its senior students. It should be noted that this is part of a continuum and through ongoing review will no doubt change and morph over time.

Background

For many years Pongakawa had been part of a cluster of schools that travelled to another school to undertake what was colloquially known as "Country Tech" for their senior (year 7 and 8) students. This had been in place for a number of years and allowed smaller schools to utilise the teacher skill and the facilities of a larger learning organisation. Students would leave and travel by bus to ten or so minutes before the normal start of the school day returning around 11.20 am in the morning. Students would cover several curriculum areas although not all were technology based, with art being included as part of the agreement with the contracted school. Traditional areas like hard technology (woodwork and to a much lesser degree metalwork) were included as was food tech, however soft tech (sewing etc) was not offered. This system worked satisfactorily for many years with teachers at Pongakawa in senior rooms utilising the non-contact time for release purposes.

As year 7 and 8 numbers continued to increase at Pongakawa the staffing generated for technology purposes also increased. This is based on a formula of 1 full time equivalent (FTTE) for every 120 students and for Pongakawa this had gone from around .5 to .75 FTTE, while other who linked with us for Country Tech had fewer students meaning less generated staffing. The contracted school provided around .24 of technology teaching to the schools and were unable to change the programme because of pressure on time and facilities for their own students. This meant that in fact the country tech schools, particularly Pongakawa gifted staffing to the contracted schools while this could have been gifted back through a staffing transfer however this was not offered as an option.

Over the past ten years Pongakawa had been able to upgrade campus infrastructure through a range of Ministry of Education (MOE) funding programmes and this enabled the school to develop some facilities to support technology and the arts on site. Through 5ya modernisation and an SPG (school property guide) the school built a multipurpose kitchen, an Arts and Music block and upgraded its ICT facilities and equipment. This prompted

parent suggestion to the Board of Trustees to consider as an alternative that the school run its own tech programme on site. The Board made the decision to survey the community outlining what we currently did and what the alternative was. The overwhelming mandate (around 98% in favour) was that we should further explore running our own tech programme and, that if feasible we should move to make this happen. This meant that if successful Pongakawa would be able to integrate technology realistically into learning programmes more effectively rather as tended to happen as a one size fits all, stand alone curriculum which was at odds with inquiry based work we were now utilising.

We were aware that the change we were considering would impact our own school, neighbouring schools, especially those who were part of the country tech programme who relied on us to support them as they were now generating less staffing, and also the contracted school, in particular those staff who worked in the technology area. From our own schools point of view we knew there was a process to go through before we would be permitted to run our own programme, and that acceptance was by no means a foregone conclusion. In addition we there was still a need to develop infrastructure and to explore the financial viability of taking this on both in terms of property but also in relation to provision of staffing, resources etc.

Providing your own Technology – the application and change process

Making a change is not as simple as letting the MOE and the current provider school know you intend to run your own programme and then starting. For the reasons already stated there is a change process to go through. MOE provide useful detail in this area and are supportive in assisting a school to make an application, while not pre-determining what a likely outcome may be.

The information below is lifted directly from the application form and provides a quick measure for determining a schools positioning in relation to an application.

Advice Regarding the Technology Staffing for Year 7 & 8 Students – Provider Change Application Form

The following procedures apply for setting the 1:120 technology staffing entitlement for schools providing technology instruction for Year 7 and 8 students:

- *Current Memoranda of Understanding for students from client schools remain in place unless new arrangements are agreed in writing between the school(s) and the Ministry's Resourcing Division.*

- *All applications for change must be made through the Resourcing Division.*

- *The final date for receipt of applications at the Resourcing Division is 22nd August.*

- *Changes will be approved only where no additional costs, such as transport, property or surplus staffing costs, are incurred by the Ministry as a result of the change in provider.*

- *Once approval is granted a new Memorandum of Understanding will be required before staffing may be allocated.*

- *The Year 7 and 8 rolls used to calculate technology staffing are those used to calculate the provisional, and later the confirmed, staffing for each of the client schools. Details will be included on school staffing entitlement notices.*

(Ministry of Education Technology Staffing for year 7 and 8 students – provider change application, August 2011)

These guidelines may come as a surprise to some schools but actually make some sense especially in a financial sense for the MOE. In short a school intending to provide their own technology at year 7 and 8 will be expected to;

- Show MOE they can provide a programme that meets the requirements of the NZ Curriculum
- Provide facilities to support the programme without the provision of extra funding from MOE and without compromising any current building needs etc the school may have through 5ya
- Utilise any staffing for given for technology appropriately and meet any perceived shortfall
- Provide resources (tools, stoves, sewing machines etc) from BOT funds without compromising other learning in the school. MOE do provide a consumables grant if an application is approved)

- Gain a release from the current provider. It would be wise to signal any change ahead of time but as it may affect the provider school they are within their rights to refuse. This may be because they could lose staff, lack of future funding may compromise ongoing programme effectiveness
- Complete the application by the due date on the application form

The process for change is time consuming and can seem pedantic, however it is necessary to ensure in the end student learning is not compromised and, that it will not be something a school will try for a short period of time and then give up on.

Observing and learning what others are doing.

Once approval was given Pongakawa had a limited period of time to decide not only how our facilities might look, but more importantly, how our interpretation of the curriculum would be in a teaching and learning sense. We had of course spent time undertaking some preliminary investigative work as part of our decision making process and this assisted us in creating some formative assumptions about where we might head. The Techlink site is superb and offers many insights and examples of technology in action. We found what others were doing to be a real inspiration, as well as providing something of a blueprint for us, in creating a pathway forward.

Visits to other schools were also arranged so that we could observe programmes in action, facilities and have discussions with other technology teachers and leadership teams in relation to the way things happened in their schools. This was a very informative process and allowed us to clarify more deeply our own thoughts and use this to develop our own local curriculum and to drill more succinctly into how this might look. Below is a brief summary of the five schools we spent time in.

1. ***Very Large Urban Intermediate***
    - Offers a large variety of traditional and non-traditional technology options including hard and soft tech, food tech, electronics, ICT, art, music and science. The school has very modern facilities constructed over the last 10 years and has specialist staff and others released to develop and run programmes. Students work in six week blocks meeting all options twice over their two year stay at the

school. Teachers contribute to Techlink and are active in the ongoing development of technology particularly on a more regional and national scale. Programmes appear to be stand alone and not directly related to units of work being undertaken. Opportunities exist for extension and for those students with particular interests to spend extra time out of class time in a favourite area. Cultural events in the school utilise the expertise and knowledge of the teachers for such things as school productions and a school television show.

2. ***Contributing School providing Technology for other schools***

- A modern (constructed in last 12 years) technology centre linked to a contributing primary school. Schools with year 7 and 8 students utilise the centre and come for varying lengths of time depending on availability and the schools needs. Buildings replaced an old centre when the school was remodelled. Areas include spaces for hard tech, food tech and a soft tech and design space. While modern and functional the spaces seemed a little full especially in the hard technology room. Equipment was adequate and certainly on a smaller scale than the centre described in number one above. Use had been made of second hand and donated equipment for example sewing machines and a programme even existed to loan these out to students with a particular interest. Two teachers worked in the centre to provide an integrated programme and students own school was able to have input into what was being covered. The centre was proud of the way it could dovetail what children did in technology with a particular unit being undertaken when the students were back at school.

3. ***Large Urban Intermediate***

- Facilities have been modernised and added to over time to include art, ICT, science, music and arts areas. Traditional technology areas have also been modernised however these are more recognisable as the rooms' common in intermediate schools over a number of years. Indeed the workbenches, tool storage and general layout of major equipment reminded the writer instantly of his own intermediate days, some thirty-five years ago. Time was spent observing ICT and a science area, however as our focus was largely on technology we spent the remainder of the time in the hard technology area. Again we found a far more traditional approach to woodwork with a class of year 7 students

undertaking a project which taught them a set of skills and techniques. Limited opportunity existed to expand the project (which was one undertaken by many schools over a number of years). The teacher explained in relation to this that the children were having their block of time at intermediate in hard tech and skills learnt at this early stage would assist in later projects. This made sense to those viewing and showed there are many ways to reach a successful outcome. The group did not observe other technology rooms at this school as the school was breaking for lunch and agreements to see other schools meant we needed to move on.

4. ***Full Primary School with Food Technology Area***

- School was visited as part of an Enviro Schools visit and as part of this we were invited to view a commercial style kitchen established on site to allow all students to make use of the extensive vegetable and fruit plantings at the school. Finance for this had been sourced through fundraising and successful grant applications and was perhaps more suitable for groups rather than a half or whole class lesson. The kitchen was also used by children to cater for school events such as a father and son breakfast. We did not observe it in action however students spoken to enjoyed the learning opportunities presented by this area and were able to link it to the horticultural gardens in the school. Other traditional facilities were not present on site other than equipment in a shipping container.

5. ***Intermediate providing technology to outside schools and its own students***

- School has modern facilities upgraded within the last ten years. Food technology, hard technology alongside art and ICT are offered to outside schools with the host school offering an increased number of options for its own students. Hard technology is based around an inquiry model albeit at the lower end of Blooms Revised Taxonomy in real terms and this is continuing to grow and develop. The possible casualty of this was that observations and conversations with students indicated little in the way of skill development or tool and instruction. Additionally materials used tended to be in the nature of cardboard, MDF and strips of wood, things one could use in a normal classroom without a) the need to travel elsewhere and b)contract specialised staff to lead. The food technology

teaching appeared formula based with all students following the same recipe. This had a benefit in terms of skill development, although it allowed for little in the way of experimentation or inquiry. The recipes seemed familiar to the writer of things experience while at school himself and also over a period of years teaching year 7 and 8 students. This could of course be because they are useful standard that has "stood the test of time", but to us it seemed greater opportunities existed to develop exciting and interesting outcomes.

Thinking about Facilities

A school taking on its own technology programme will often feel the need to replicate what students have already been exposed to presuming the students previously attended another provider school. Being able to develop purpose designed and built buildings is often the dream but not always achievable, and funding from MOE is unlikely. Recent changes to the 5YA formula does provide some latitude and facilities could form part of a modern learning environment (if you are lucky or clever). The five books issued by the MOE in 2007 provide excellent guidelines for schools, but are fairly exacting and rigorous in their expectations for building development of a school site.

There are other alternatives to consider which may provide a more cost effective solution while still providing quality outcomes. Thought should be given to;

- How many students will need to access things at any one time? For instance will small group release work? Are there enough teachers on staff to provide additional personnel – walking deputy principal etc
- Do you have unused areas in your school.
    - A class currently not in use. (Under current regulations you should not be obligated to lose a room until you have 5 vacant, although it will be suggested at a lower number if needed by another school, or your school is quite small.
    - A multi-purpose space that could be used for technology
    - An old dental clinic etc
    - The caretakers shed – can it be extended or added to?

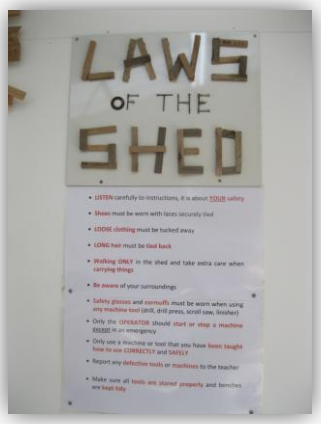
- Creating mobile units suitable for cooking – portable elements with storage underneath. Utilising electric fry pans, slow cookers, microwaves etc
- Sewing machines can easily be got out and put away as needed
- Electronics can easily be done in class.
- Can the PTA support your programme through fundraising?
- Apply to a local trust for assistance
- The hall kitchen – if you have one is always of use, if not the teachers tea room is vacant most of the day and a morning tea or two from the kids will soon convince other teachers of its worth.

Pongakawa was able to use a combination of the above to produce facilities that are both workable and in some cases reasonably innovative, especially considering the limited funding we had available to use.

- Hard Technology/ Electronics – construction of a large shed which was then lined and furnished using caretaking staff expertise (we have a qualified welder and cabinet maker on staff). This was linked to the other caretakers shed by a large carport with concrete pad underneath

Inside "The Shed". interior, shelving, tables etc by Pongakawa property staff.

Tool racks, there are four in different locations. Also safety gear near drills and scroll saws.



How the shed works – "laws" developed in collaboration with students.

- Soft Technology – sewing fabric design etc – Use of a spare class, we were given tables left over from the defunct census, built some of our own units using the onsite staff. Other furniture was donated.

General layout of soft tech room. Tables house sewing machines in side pod, taken out when needed.

Ironing area (there are two). Pattern making table

- Cooking – Use of a multi-purpose space with a kitchen already installed, mobile cook tops and tables, fry-pans etc. Outside summer focus using barbeques etc. School has large vegetable gardens for supply of produce.

View of the vegetable gardens. A larger more commercial plot is behind this view. Note the rubbish bins are not for rubbish but have been modified with holes etc and have herbs, strawberries etc growing from them. Hard tech shed is in background.

- Electronics – use of the shed or senior block if it is being used for Hard Tech.
- The school also has a music/arts block which can be used for a variety of purposes.

Considering Staffing

Staffing for Technology is currently allocated on a 1 teacher for every 120 student's basis. If you have less than this amount then the formula delvers you a percentage or point amount. As an example 85 year 7 and 8 students equates to approximately .7 of a teacher. This is about what Pongakawa gets and has provided us with some flexibility in the way we use the staffing to benefit the learning and teaching programmes we implement as part of technology curriculum. We thought about and pursued a number of options before settling on the current system and these are included below;

1. Employing part time specialist staff
2. Releasing one staff member to take everything – with support from people with skills or qualifications in particular areas – cabinet maker, chef etc
3. Teachers taking their own technology with groups using specialist time to provide release and thus reduce numbers
4. Outsourcing to another school under a contract arrangement with us keeping staffing not utilised to expand the technology aspect in house
5. Releasing one teacher to plan and guide the programme with other teachers in the year 7 and 8 teaching, also with support from parent volunteers alongside other qualified adults

There are no doubt many other scenarios and combinations others would come up with however the scenario used by Pongakawa is option 5. The deputy principal was given full time release and the management and development of technology programming was added to leadership duties already undertaken. In addition to this a teacher was employed on a .2 basis and allowing the school to run 5 option programmes with groups of 16-17 in each one.

What does the Technology Curriculum say?

Technology Defined:

Technology is intervention by design: the use of practical and intellectual resources to develop products and systems (technological outcomes) that expand human possibilities by addressing needs and realising opportunities. Adaptation and innovation are at the heart of

technological practice. Quality outcomes result from thinking and practices that are informed, critical, and creative.

Technology makes enterprising use of its own particular knowledge and skills, together with those of other disciplines. Graphics and other forms of visual representation offer important tools for exploration and communication.

Technology is never static. It is influenced by and in turn impacts on the cultural, ethical, environmental, political, and economic conditions of the day.

(The New Zealand Curriculum, 2007, Learning Media Ltd. Page 32)

Why Study Technology?

The aim is for students to develop a broad technological literacy that will equip them to participate in society as informed citizens and give them access to technology-related careers. They learn practical skills as they develop models, products, and systems. They also learn about technology as a field of human activity, experiencing and/or exploring historical and contemporary examples of technology from a variety of contexts.

Technology is associated with the transformation of energy, information, and materials. Technological areas include structural, control, food, and information and communications technology and biotechnology. Relevant contexts can be as varied as computer game software, food products, worm farming, security systems, costumes and stage props, signage, and taonga.

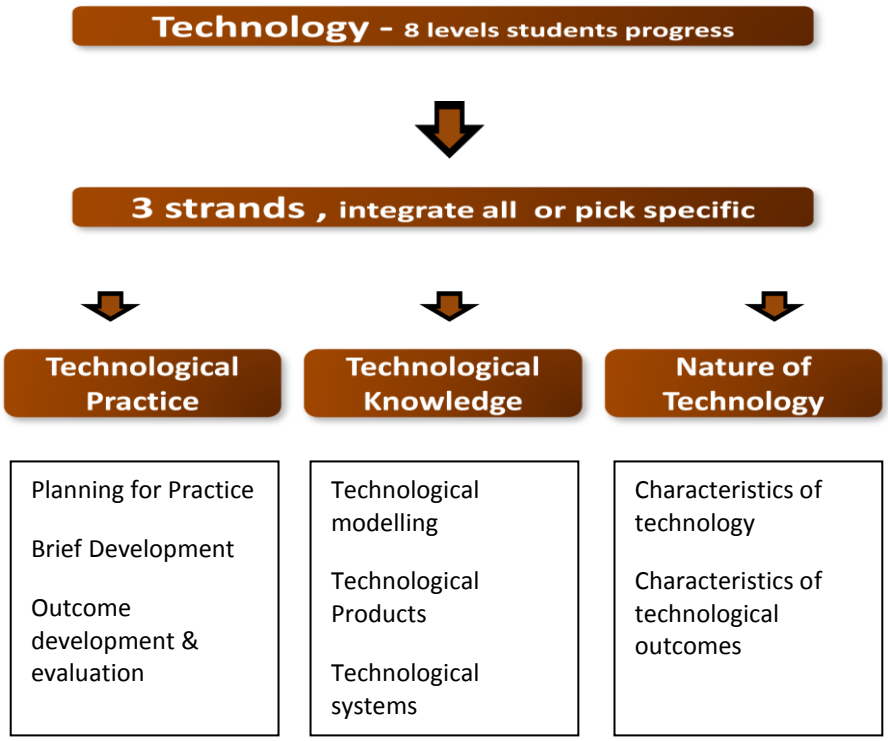
(The New Zealand Curriculum, Learning Media Ltd. Page 32)

How Technology is structured in the curriculum

The learning area comprises three strands: Technological Practice, Technological Knowledge, and Nature of Technology. Teaching and learning programmes will integrate all three, though a particular unit of work may focus on just one or two.
Knowledge and skills are learned in context. By offering a variety of contexts, teachers help their students to recognize links and develop generic understandings. Students should be encouraged to access relevant knowledge and skills from other learning areas.

- In the **Technological Practice** strand, students examine the practice of others and undertake their own. They develop a range of outcomes, including concepts, plans, briefs, technological models, and fully realized products or systems.
- Through the **Technological Knowledge** strand, students develop knowledge particular to technological enterprises and environments and understandings of how and why things work.
- Through the **Nature of Technology** strand, students develop an understanding of technology as a discipline and of how it differs from other disciplines.

These areas and their relationship to the document as a whole can be illustrated in a simple flow diagram.



Flow Diagram - Pongakawa School – Our second home – Local Curriculum. Craig Haggo. 2010.

Information adapted from: (The New Zealand Curriculum, Learning Media Ltd. Page 32)

Interestingly, those teachers looking to the document for a specific set of skills and outcomes in relation to the various strands will not find them as it tends to look more globally at what is expected. Many will find the wording somewhat “highbrow” as you sift and drill down to find a more explicit and more accessible understanding. The good news is that post the document a large variety of material including indicators of progression have

been created to assist teachers developing their local curriculum and to plan learning programmes in their school. The progressions are not necessarily skill specific (or in simple language) but they do provide a pathway forward.

The Techlink site, the Technology area of the NZ Curriculum online and TKI web based Links provided in the appendix of this document) all have a plethora of information in regard to beginning a programme, pedagogical understandings, teaching snapshots, as well as units of work, articles, assessment and evaluative material. These will require a good deal of sifting and some fairly careful search engine work if the reader is not to be sidetracked by some very interesting and innovative work being done by teachers and students in schools all over New Zealand. The writer also found that teachers involved in specialist technology teaching to be extremely willing to share and assist in any way to encourage more teachers to have a greater degree of involvement in technology.

Home economics, or cooking as it was known in the manual days is one subject area that does feature explicitly in the New Zealand Curriculum, although not as part of the technology under whose banner it is often taught. This clearly illustrates the need for integration and shows the diversity through which the technology area can be taught. Home Economics can be found as one of the seven key learning areas of Health and Physical Education (HPE) under the banner of food and nutrition. HPE is fairly explicit in its expectations stating;

*It is **expected** that all students will have had opportunities to learn basic cooking skills by the end of year 8.*

(NZ Curriculum, 2007, Learning Media Ltd. page 22).

The document then provides even greater detail in a section specifically titled, Home Economics which outlines in some detail the expectations;

In home economics, students develop an understanding of the factors that influence the well-being of individuals and families within the home and community and of the actions people take to enhance and sustain those environments. In the context of food and nutrition, students evaluate current issues and theories of nutrition, identify and reflect on factors that influence people's choices and behaviours, and use this knowledge to make informed

decisions. Through the processes of selecting, preparing, cooking, and serving food, students develop their creativity and experience a sense of accomplishment. At the same time, they develop personal and interpersonal understandings and skills that contribute to well-being.

(NZ Curriculum, 2007, Learning Media Ltd. page 22).

In viewing this, the reader will see this is an area that can be covered from the beginning of a child's time at school, however as students grow they become more ready to utilise the more complex kitchen utensils and equipment. The statement above also provides quite specific information in regard to what should be covered. This is something many teachers may like to see in other areas of the curriculum rather than the wider and fairly wordy statements contained in some other subjects including, in the writer's opinion, technology.

Developing Programmes/ Timetables and option variations

The flexibility created by our staffing choices allowed us to potentially run with a variety of programming options;

- Hard technology – woodwork, metalwork, plastics and electronics
- Soft technology – sewing and design
- Food technology
- Music/Science
- Art/ICT

It may seem fairly straight forward to identify the various mediums by which we decided to deliver our technology programme. Facility and expertise in the school almost predetermined what we would do, but this is only part of finding a solution. A major point in undertaking technology teaching in the first place is to address those strands and objectives but making this the major driver may well be a mistake. This may seem a strange thing to say however rather than making your situation fit the curriculum; make the curriculum fit your story. Those looking for this report to provide a definitive local statement will be disappointed because it does not contain one, rather it provides you with the direction and impetus to create one that will fit your environment and while challenging, the end result will be far more powerful (and fun). Over time, as teachers we have become more and more accustomed to searching for a document or plan to enable us to meet the ever increasing

demands of teaching and in doing so we have lost a little of our own “mojo”. Readers should be encouraged to trust the many bungee cords that make up their skill and knowledge set; pedagogy, experience, creativity, passion and enthusiasm and a sense of innovation as these are the very things this latest New Zealand Curriculum has enable us to do.

By considering what the curriculum expects with what we, (meaning teachers, students and parents) would like to learn alongside what the curriculum suggests is needed to be learnt a more cohesive result will occur. Thus, in developing your local curriculum you may wish to think about some of the following (and a number of other matters pertinent to your school situation.

1. What is your schools niche, what makes it unique, vision, mission, values etc?
2. How have you consulted with the parent community about changes, what did they say they would like to see students learn, how can they help?
3. What does the Technology curriculum say and how does this fit your school and how will the wider NZ Curriculum play a part in what your students learn?
4. Look at your local curriculum statement (if you have one) will technology teaching at your school mean this needs to be changed? A little, a lot?
5. How will you make the transition to specialist technology teaching and learning in your own school? Who will drive it, teach it, assess and evaluate it, review it?
6. Can your school afford the ongoing costs?
7. After making a change will your programme be more effective, more educationally stimulating, pertinent and worthwhile than students receive currently?
8. Just what will you teach, what will students learn and why?

Note: The triggers above are in no particular order of importance, but are all considerations and matters to be addressed. In many schools particularly those in rural or less central areas the competition for students is a significant issue and while often not a topic for professional discussion it certainly sits at the back of many principals and boards minds. Taking your own technology could be seen as a way to offer something different to those around you but equally it could, backfire, if the community have not been consulted and don’t see the value. It could become a millstone round the schools neck if costs are not considered carefully and this becomes the major talking point rather than the success of students.

Once the decision has been made to proceed, a major factor in the delivery of any specialised technology teaching will be amount of staffing a school generates. This of course defines how much you will able to do, when you do it and more than likely how you do it. How this funding is arrived at was outlined near the beginning of this report and for most schools will have been at the heart of any decision you make. In the writers opinion anything less than .2 (one day) as a minimum would make this hard to sustain and a lot of work that may be better spent in other areas. To gain even this amount would mean a school would have 24-25 year 7 and 8 students. Below is outline a couple of options using firstly .2 and then a larger amount of generated staffing.

Using a .2 staffing amount generated from 24-25 students (yr. 7 and 8)

Number of teachers	Subject Option	Number in group	Time available	Note
1	1	25	1 day	Working on using additional teacher. If class teacher included then still have a day plus one more involved. In other words you get the second option, but only need to employ one teacher*
2	2	12-13	Half day	See notes below
3	3	8-9	1.5 hours approx	See notes below.

- This plays out for all groups. If a separate teacher(s) is employed then the options are as above. However once the normal class teacher is included it adjusts group totals etc. Explained is the first of these.
- Included is generated staffing used as a one day option? You could use option one but go for two half days – one group of 25 but covering one or two options over two half days but still only using .2. Inclusion of the class teacher and the extra teacher then give an option of two groups for two days still only using the .2.
- Other scenarios can come be offered depending on a schools need, size or situation

Using a .5 staffing amount generated from 60 students (Yr. 7 and 8)

Number of teachers	Subject Option	Number in group	Time available	Note
1	1	30x 2 classes	12.5 per class	Using one option programme with two class groups
2	2	30x2 classes	12.5 per class	Providing a two option programme using two teachers
3	3	20 in group	4 hours approx	3 options, or one and two the same etc
4	4	15	3.5 hours approx	4 different options, 2 the same doubled etc

- Option information as for first scenario is for separate personnel to be employed. If class teachers are used as well this allows for an increase in options, the need for less teacher to be employed thus more hours can be utilised.
- At this level given the note above consideration could be given to a teacher being released part time to oversee the programme and its ongoing development.
- If class teachers are utilised this could enable staffing to be transferred to cover teacher sickness relief etc. If this is being covered by the school's bulk grant then in turn this funding could be moved to cover a specialist to work alongside the teacher who may not be a qualified teacher. This should not present any concerns as there is still a registered and suitably qualified teacher in charge of the group with the "expert" there as a guide. Many schools do this in other areas of the curriculum – music, art, ICT.

The challenge for many schools who choose to employ extra teachers is that they will often be people who provide day relief, (unless you are very lucky) and this may determine when, how often and for how long you undertake specialist technology teaching. By using the class room teachers you are able to generate flexibility in programme, increase options and lesson the class/group sizes. This last point is hugely important as the larger the group is the more difficult the process can be to manage, and as you may be dealing with quite specialised equipment there are added health and safety considerations. Experience has shown Pongakawa that teachers do not need to have a huge personal skill base to draw from, as long as they are well supported by an expert or activities are pitched at a level that is easy to cope with while still being relevant, challenging and fun.

Running the Programme – first steps.

The time frame between having an application accepted and beginning your own programme is obviously something to be negotiated between you and any other parties who may be involved. This will include your previous provider school who will have needed to accept and agree to you leaving them. You may be lucky enough to work out a timeframe that allows you to set up your own facilities (if you intend to have them), resources, upskill personnel and of course work out in more detail what you are actually going to do.

For Pongakawa this change process was reasonably rapid with acceptance from MOE for the school to undertake its own technology programme near the end of one year, with the expectation we would begin the next. While this meant we needed to work at a reasonably frentic pace we had worked on the assumption we would be successful, and therefore had planned how we thought things would unfold in the New Year. In our case we decided to begin toward the end of the first term once we knew we had our work areas in place and ready to go.In addition, because we have a fairly intensive aqautics programme and the usual raft of assessments, this made sense time wise as it was felt we needed to make a real impact both with the students and our parents to really cement the idea in place.

The first six week technology programme was fairly structured and as I watched on I could see that it was very similar to the intermediate model staff had probably expereinced and knew well. As principal this caused me frustration as I had hoped teachers would immediately leap into an entirely new way of teaching technology, but quickly came to see this was an unrealistic expectation. As adults we tend to stick with the known especially under pressure and so it was completely natural that the staff involved would largely mirror what they had either seen or been part of. As principal, I learnt the need to step back, to allow those at the “coalface” to experiment and grow in a curriculum area that was largely new to them; at least in the way they were now required to use it.

I became more and more impressed with what I was seeing as teachers tried those first few units, constantly relfecting on what they were doing, asking questions, gathering feedback especially from the students who were able to tell them what was working and what wasn’t from their point of view. They were able to offer ideas about what could be covered and how, the types of things they were interested in and how we might go about it. This was

was excellent as it showed learning in real and meaningful contexts inside a co-constructed curriculum.

Were we making sure in these early stage that the technology curriculum was being covered in a detailed way? Not really, and no there wasn't a years programme mapped out to make sure every possible area could be dealt with. We learnt this was about creating a technology culture, changing not just the way this aspect was taught, but how it fitted within the greater learning week, term and year; and this takes time. In our second year these things are only now coming together and it is being done with care to ensure the experimentation and innovation that has made it such fun is not lost.

It is important to take time with this aspect of developing a technology programme in a school and allowing, accepting and encouraging the constant change that will inevitably take place to happen. What you do, and what you decide to lose will change on a weekly basis, be included, be dropped and then return again in a different form. Things you are sure will work, won't and those that were a little seat of the pants may turn out to be the best idea ever – but not always. In other words, it is for the most part just like other subjects we teach, sometimes it works, other days, with other students a disaster and then at a different time the greatest unit ever taught.

So what sorts of projects and concepts have we looked at?

We chose early on to take the approach where all staff teaching year 7 and 8 would be involved, with the technology generated component being used to employ extra staff to expand opportunities and support. This has changed a little in our second year as we have released our deputy principal who previously took one of the senior rooms to oversee and lead the tehnology progrmamme and employed a new teacher in her place. The deputy prinipal is still one of the teachers involved in guiding one of the technology aspects meaning, in effect we have 4 teachers all employed full time by Pongakawa, and another who comes one day a week (5 options in total).

Included in our programme are;

- Hard technologies – wood, metal, plastics and electroinics
- Soft technology – sewing, quilting, fabric design etc

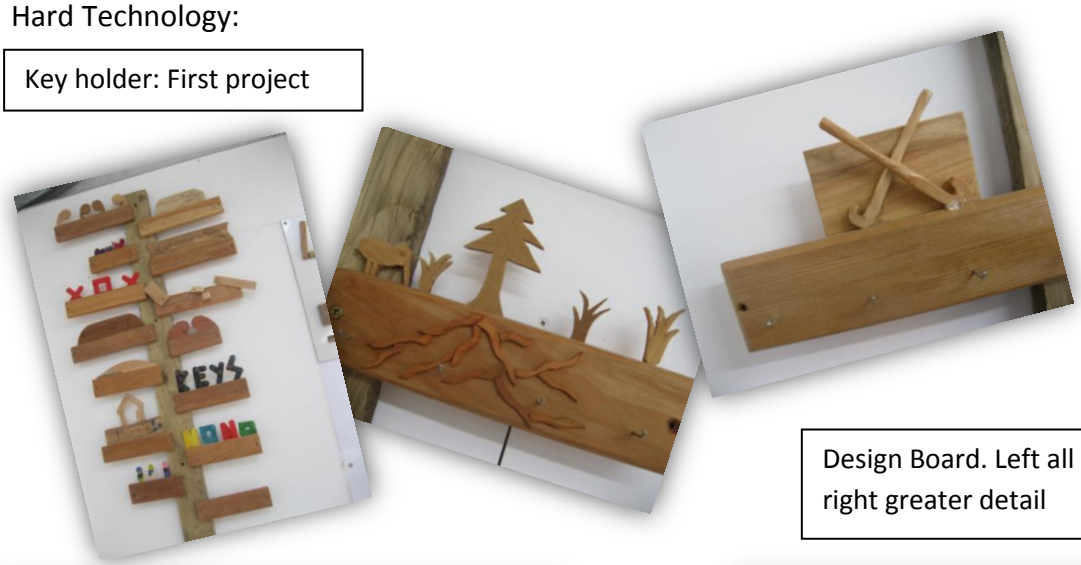
- Food technology – cooking, horticulture etc
- Music
- Art
- ICT

The reader will note in fact six options listed and this is because from time to time we have ICT as a separate subject but on many occasions it will be integrated with another area which makes sense as it cuts through most of what we do in our daily lives in any case. Included in the appendix section of this report will be some unit plans to assist anyone else undertaking a similar journey to ours, but for the most part all teachers are well able to develop their own model as they do for any other subject.

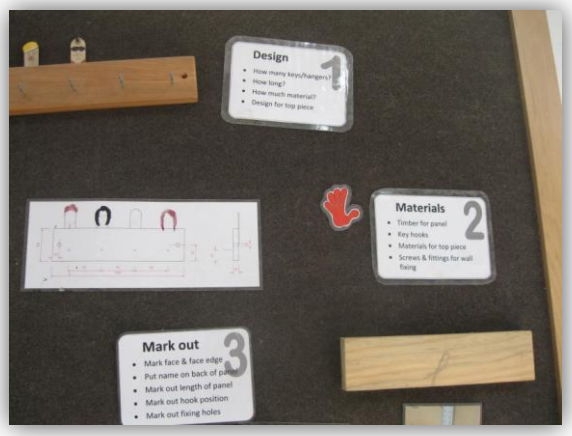
Following are photos of various projects undertaken over the year or so since we have begun taking our own technology. Also included in the appendices the reader will find some assessment detail including success criteria etc.

Hard Technology:

Key holder: First project



Design Board. Left all steps and right greater detail



Wooden Spoon and partial design board

Jewellery, trinket,

treasure box

Special projects, lunch and after school student developed ideas, challenges

Soft Technology:

Quilted wall hanging	Sock Monkeys	Puppets

These sock monkeys were produced not only as a learning activity but also as a way to raise funds for the senior camp. They were sold for $15.00 per monkey and have proved so popular the shop has now asked for further supplies. An excellent activity as students can see the real life application and outcome of their efforts and are able to analyse which sell first and reflect on why.

Food Technology:

Various images from a wall display.

Students have learnt practical skills and used these to produce meals at home etc. In addition they have taken food from the garden to the plate showing sustainability and ways to minimise waste. In addition jams, pickles etc have been sold to support the cost of the senior camp.
Lastly the senior students have begun to cater for outside groups and school visits. This has included providing morning tea and lunch for two Fonterra meetings (number around 100 each time) and a local principal lunch with approximately 15 guests.

Senior Students purchased their own bbq's utilising funding they get from cleaning their own learning studio block. This enabled them to request a specific cooking module around this area. Handy for lunches too.
Produce from vegetable gardens and orchard.

The school is able to utilise the learning studio block for ICT and the art/dance/music suite for music and art. The school has dispensed with a dedicated ICT room as we have pods of laptops (both Apple and Windows based) and this has proven to offer far more flexibility than a stand-alone base. Our pods are arranged in five computer lots per box and this enables them to be used in multiple venues for different subjects at the same time. For example, hard tech can be using some for goggle sketch-up while art may be using them for multi-media and ICT could be editing movies.

Last thoughts:

A school considering hosting its own specialized technology teaching would be advised to use at least some of the processes outlined in this report, as it will have a marked impact on the culture of a school. In the first instance the school needs to be assured it could realistically run a viable, exciting and pertinent programme that meets the needs of the NZ Curriculum and perhaps even more importantly is fun to teach and learn. Additionally, a school needs to be confident it could provide a place to undertake the various parts of the programme they would choose to offer. Not necessarily buildings, although this would be ideal in the writer's opinion but places, units or mobiles that are fit for purpose.

The most important consideration though is to identify the various stakeholder groups of people who without the buy in will stymie any attempt to get things off the ground, parents, students and teachers. Parents will need to see the potential of this and handled incorrectly it can become quite a political football complete with the withdrawal of students. Setting up meetings, exploring the idea, surveys are all sound ways of testing the waters. Parents will be influenced by the thoughts and opinions of their children, so drawing them in will go a long way to gaining parent approval. Teachers too will clearly need to feel part of any exploration into a huge change in their teaching life. Some teachers love this challenge, while others may find giving up the extra release time or a perceived addition to their workload as sound reasons not to proceed. These are not necessarily factors to stop making the shift rather than are roadblocks that can be avoided with careful strategic planning.

Lastly, it has become apparent something many schools may not have considered has also become an important consideration and that is a change of government policy. It is important that schools understand the longevity of a proposed change may only be for as

long as funding structures remain the same. Therefore, burning ones bridges with your previous provider is not advisable as it could be embarrassing going back cap in hand at alter date asking to be included once more.

For Pongakawa it has been an excellent change, challenges yes, but the chance to grow and develop our learning culture in new directions has been fantastic. The support from all stakeholder groups has been far greater than we had expected and the outcomes for students vast. High levels of engagement, new knowledge and skill, excitement and a high degree of owner ship of learning only begin to paint the picture. Most of all for us, it is fun, and that is just how school should be.

Craig Haggo

2012.

Acknowledgements:

I would like to thank the following for their support during and in relation to my sabbatical:

- Pongakawa School Board of Trustees, staff, students and parents
- New Zealand Educational Institute (NZEI)
- New Zealand Principals' Federation (NZPF)
- The Ministry of Education (MOE)
- Various schools and people I visited (you know who you are)
- My wife and children who had to put up with me being at home

Bibliography and References:

1. The New Zealand Curriculum – published Learning Media on behalf of Ministry of Education 2007.
2. Various websites including Ministry of Education, Te Kete Ipurangi (TKI) (www.tki.org.nz) and Techlink (www.techlink.org.nz)
3. Pongakawa School – Our Second Home – Craig Haggo 2010
4. The Quality of Teaching: Good Practice Music, Reading and Speaking, and Technology June 2006, Education Evaluation Reports

Appendices:

1. Hard technology: Jewellery Box Unit plan, lesson flow and evaluative sheet
2. Soft Technology: Wall Hanging Unit Plan, lesson flow and evaluative sheet
3. Food Technology: Sample Unit plan and evaluative sheet
4. Electronics: BeetleBot Unit, Student Inquiry Sheets

UNIT PLAN

Level: **3/4**

TECHNOLOGY

Duration **First rotation**

<table>
<tr>
<td>Achievement Objectives

To investigate and understand the properties, use and development of wood as a natural renewable resource with many everyday uses in our world.</td>
<td>Curriculum Links

Mathematics
English
Health & PE
Science
Social Studies
The Arts
Technology</td>
<td>Key Competencies

Managing self -
Being organised
Taking responsibility
Actively involved in a safe way
Able to cope with challenges
Shows self confidence</td>
<td rowspan="2">Learning Intensions

*Understand and learn the rules for The Blokes Shed
*Know about the care, storage and routines of the Blokes Shed.
*Know the names and uses of the shed tools.
*Learn to use tools accurately and safely.
*Able to listen carefully to instructions and follow through accurately.
*Understand the design and build process.
*Experiment to discover some of the properties of wood– strength etc
*Have some knowledge of the trees to timber process.</td>
</tr>
<tr>
<td>Specific Learning Objectives

*Workshop safety and etiquette
*Care and respect of tools and others while in the workshop
*Following instructions
*Measuring accurately
*Materials are accurate correct
*Safe and correct use of basic hand tools and machine tools
*use the display board to self guide through the project.
Pride in finishing standard</td>
<td colspan="2">Strand: Hard Technology

Context: Jewellery Box

Introductory Activity: Basic plan and routines in this shed</td>
</tr>
<tr>
<td>Assessment

On going feedback as project is developing
Personal pride in finished product
Portfolio</td>
<td colspan="2">Resources

Preparation of the task board
All materials needed</td>
<td>ICT

Research the steps involved in Tree to Timber</td>
</tr>
<tr>
<td>Evaluation</td>
<td colspan="2">Purchases

Work shop has all we need at this point</td>
<td>Green Filter

Wood used is off cuts from a local cabinet maker</td>
</tr>
</table>

Jewellery Box

1. **Design :**
   - What will it be used for?
   - What size does it need to be?
   - What properties does the timber need to have?
   - What would be the most appropriate finish?
   - What standard of finish is required?
   - Create a design

2. **Model :**
   - Create a template of the job on paper
   - Resize if necessary
   - Cut out template

3. **Mark out :**
   - Select appropriate material for the job
   - Name your work-piece
   - Mark face & face edge
   - Identify best order of construction
   - Transfer measurements from template onto work-piece
   - Trace outside shape onto timber

4. **Machining :**
   - Drill pilot holes in all corners and tight curves
   - Cut out inside shape then sand
   - Cut outside shape then sand
   - Mark out & cut lid locator
   - Check locator for correct fitting
   - Mark out inside & outside of box onto lid and cut outside shape
   - Mark out and cut base

5. **Assembly :**
   - Glue locator to box lid
   - Glue base to box
   - Trim lid & base to match the shape of the box
   - Shape lid to suit design

6. **Finish :**
   - Sand work-piece ready for finishing
   - Finish as per design

Tool Tips

Coping Saw :

- Fit Blade with teeth pointing toward handle & tighten firmly
- Cup **BOTH** hands around handle
- Use thumbs to stabilize frame
- Cut **SLOWLY** & **CAREFULLY** keeping blade square to work piece
- The **MORE** careful you are cutting the **LESS** time you will spend sanding

Hard Technology

Context : Jewellery Box

Level 3/4 **Name :** .....

Objective : Technological Practice. To further develop basic hand-tool skills and knowledge and introduction to machine tools

Teacher's comment :

List the tools/machines you have used and what they are used for :

Tool/Machine	What it is used for

Specific Learning Outcomes	Developing	Achieved
Workshop safety and etiquette		
Care and respect of tools and others whilst in the workshop		
Followed instructions		
Use the display board as a guide for the project		
Measured accurately		
Use correct materials		
Safe and correct use of hand-tools and machine tools		
Pride in finishing		

Student comment : **Effort :** 1 2 3 4 5 6 7 8 9 10

What I enjoyed : .....

What I learnt for next time : .....

UNIT PLAN

Level: **3/4** **TECHNOLOGY** Duration **First rotation**

<table>
<tr><td>Achievement Objectives

To investigate and understand the properties, use and development of fabric/textiles as a resource with many real-life uses in our world.</td><td>Curriculum Links

Mathematics
English
Health & PE
Science
Social Studies
The Arts
Technology</td><td>Key Competencies

Managing self -
Being organised
Taking responsibility
Actively involved in a safe way
Able to cope with challenges
Shows self confidence</td><td rowspan="2">Learning Intensions

* Able to work confidently and safely in this environment.
*Able to follow through instructions
*Able to name at least 50% of the sewing machine's working parts
*Able to thread the top and bobbin
*Have knowledge of the variety of stitches and how they work.
*Able to measure accurately
*Able to sew straight with a seam allowance
*Learnt a variety of sewing techniques
*Finished work with pride
*Followed the timeframes.</td></tr>
<tr><td>Specific Learning Objectives

Name and know about the working parts of a sewing machine
Know how to thread and activate a bobbin
Experiment with the variety of stitch options</td><td colspan="2">Strand: Soft Technology

Context: Sewing - wall hanging

Introductory Activity: introduction to the sewing room and establishing positive behaviours</td></tr>
<tr><td>Assessment

On going feedback as project is developing
Personal pride in finished product
Portfolio</td><td colspan="2">Resources

Materials and equipment—wadding/ fabric
Check consumable resources ready to purchase if necessary
Newsletter for donations of fabric</td><td>ICT</td></tr>
<tr><td>Evaluation</td><td colspan="2">Purchases
Cottons and threads
Finishing/backing materials</td><td>Green Filter
Fabrics used are recycled—eg donations from home. Curtain samples etc</td></tr>
</table>

YEAR 7.

Day 1. Sew sampler of stitches for portfolio. Sewing machine test on parts of machine.

Morning tea

No. 2 Check bundle of fabric for centre fabric and press Vilene on the back of it and cut fabric to size of vilene.
Do all cutting for log cabin square and sewing with ¼ inch seams.
Decide on which fabric you can use for the tabs at the top of your hanging. They need to be 2& 1/2inch x 6 &1/2inch at least. Cut 4 of them and put aside for later. Sew,

Lunch

No.3 Third Square crazy patch work. Cut a pentagon for the centre of this. Then with at least 2 to 2& 1/2inch wide pieces make them long (full length of your fabric) start sewing from the shortest side of your pentagon and follow in a circle around the pentagon in the same direction.(pentagon does not need to be even)

HOMEWORK sketch a picture you want in the middle square make it at least 10cm x10cm eg. Heart, flower, dice, boat x 2

Day 2. Have your picture checked and trace it onto vliesofix and cut out to press on your square. Top stitch around your appliqué (your picture) with stitch no. 14 and width on no. 3 length on no. 2.5 =

Morning tea

No.2 Tack your three layers backing wadding and wall hanging together and have your binding sewn on by teacher. parent help.

Lunch

No.3 Making tabs for the top. Find the tabs you put aside they are 2&1/2 x 6&1/2. Sew together and do button holes and add to top of your hanging.
Lastly hand sewing and sewing on of your buttons.

SOFT TECHNOLOGY

Sewing

Name: Level 3/4

Objectives	Develop	Achieve
Develop an extended vocabulary around sewing		
Use a sewing machine confidently and correctly		
Show pride in work		

Key Competency: THINKING

Teacher Comment:

SEWING VOCABULARY	
Bobbin	
Thread	
Overlocker	
Tips for using an iron	1.
	2.

The thing I enjoyed the most with sewing:

The thing I found the hardest

Student Comment:

UNIT PLAN

Level: 4 / Year 7&8 TECHNOLOGY—Food Tech Duration: Term 2

<table>
<tr>
<td>Achievement Objectives

Tech Knowledge-
Understand and use safe and reliable processes for producing, preparing, presenting and storing food. May include development, packaging and marketing of food.</td>
<td>Curriculum Links

Mathematics
English
Health & PE
Science
Social Studies
The Arts
Technology</td>
<td>Key Competencies

Relating to others
Able to work in a group cooperatively
Respectful/supportive of others
Able to share workloads fairly—eg cleaning up etc</td>
<td rowspan="2">Learning Intensions

*How to work in a kitchen safely and follow the rules
*Work co-operatively with a partner/s
*Know the tools and vocab specific to a kitchen
*Able to follow a recipe accurately
*Able to speak about cooking experiences using specific vocab
*Research background to food prep, etc etc for different times and cultures
Know how to create food for oneself—basic ingredients and using the garden!!
*Know some of the conventions when preparing food for others</td>
</tr>
<tr>
<td>Specific Learning Objectives
*Know the real life context
*Know the safe habits of a kitchen space.
*Know the hygiene practises needed in food preparation.
*Know the kitchen tools and how to use them.
*Understand the difficulties when working with food—it spoils, must be handled hygienically, personal likes/dislikes etc.
*Know some of the sources of common foods.
*Able to look in our garden and use this produce
*Know about some aspects of catering
*Know how food fits in differing societies</td>
<td colspan="2">Strand: TECHNOLOGY

Context: Food Tech

Introductory Activity: Discussion -
What we know about kitchens - what experiences we have had in home kitchen
Learning about the kitchen space and collectively create some appropriate rules</td>
</tr>
<tr>
<td>Assessment

Self Assessments—taste, look and smell test!!
Feedback from others -students and family
Check sheet by teacher
Portfolio</td>
<td colspan="2">Resources
Recipes sourced and ready
Shopping
Check equipment</td>
<td>ICT
Research on www
Sourcing recipes</td>
</tr>
<tr>
<td>Evaluation</td>
<td colspan="2">Purchases

Weekly shop!!</td>
<td>Green Filter
Using produce from our garden where possible.
Making things from stratch rather than packets</td>
</tr>
</table>

FOOD TECHNOLOGY

Name: _____ Level 4

Teacher comment:

Relating to Others

Objectives	Achieve	Develop
Has a good understanding of health and safety issues related to food technology		
Can follow recipes confidently, work tidily and clean up independently		
Recognises a range of vocabulary specific to our time in the kitchen.		

1. List 5 health and safety rules we followed during our food technology time

1.
2.
3.
4.
5.

2. Name 3 recipes you made

1.	2.	3.

Write which recipe you would make at home and why

Explain:

3. Vocabulary – Explain the following "cooking" vocabulary

hygiene	
Dough	
Knead	
Sift	
breadcrumb	

Write out 4 interesting things you will remember from cooking this term.

1.
2.
3.
4.

Student General Comment:

Electronics: Beetlebots

(original concept from a unit online)

UNIT PLAN
TECHNOLOGY - HARD

LEVEL 4 **DURATION 6 WEEKS**

ACHIEVEMENT OBJECTIVES To research, design & build a product from a brief, in the process of which, learning how to use & manipulate a range of materials & gain some knowledge on control systems.	**CURRICULUM LINKS** Mathematics English Health and PE Science Social Science The Arts Technology	**KEY COMPETENCIES:** Thinking Using language, symbols and text Managing Self Relating to others Participating and contributing **MAJOR FOCUS** Creativity, communication & quality of finished product.	**LEARNING INTENTIONS** (what the students will learn) • Research & discuss in a group situation ideas about robotics • Outline what a brief is and how it is used • Time management and project planning • Research and develop ideas for the project , use modeling • Discuss and collect materials required • Manipulation of hard materials • Draw and understand Circuitry diagram • Methods for Assembling for components • Build • Connecting circuits, basic soldering • Testing prototype to modify and refine • Build shell / body of bot • Presentation of finished product • Design and build obstacle course • Evaluate project
SPECIFIC LEARNING OUTCOMES (Success Criteria) Students will be able to : • Understand & work from a brief • Research, model & prototype to explore & refine products • Manipulate various materials • Show some knowledge of control systems • Understand how technology draws on knowledge from all areas of life • Display knowledge of possible alternative uses for the product &/or components	**STRAND :** Hard Technology **CONTEXT:** Beetlebot **INTRODUCTION :** show and discuss beetlebot prototype		
	RESOURCES Laptops, internet, recycled materials & all other materials needed		**ICT** Research simple robotics & circuitry
ASSESSMENT Portfolio booklet	**PURCHASES** DC motors, lever switches, toggle switches, AA battery packs, heat shrink, solder, wire, terminals		**GREEN FILTER** Use recycled materials where possible

Beetlebots – Students Inquiry Sheets

Hard Technology Yr 8

Name : ..... **Room :** .....

BEETLEBOT

Scenario

You are to plan, design and build a product within the 6 lessons of this technology programme.

To help you achieve your goal the lessons will be divided into ***6*** parts :

1. Research and Design
2. Modelling
3. Ways to use various materials and assembly
4. Building Circuits
5. Testing and modifying
6. Finished product

Initial Brief

You will be doing hands-on tasks that will enable you to plan, design and create an electronic product

My Product

Prototype

Week 1

Brief

What will I make?

.....
.....
.....
.....

Who am I making it for?

.....
.....
.....
.....

Why am I making it?

.....
.....
.....
.....

Week 2

Materials & Components

What materials & components do I need for this project?

Materials	Components
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

Week 2

Modelling & different ways to use materials

Week 1

Research Ideas

Where did my ideas come from?

.....
.....
.....
.....
.....
.....

Week 3

Assembly

In what order did I put it together?

1. .....
   .....
2. .....
   .....
3. .....
   .....
4. .....
   .....
5. .....
   .....
6. .....
   .....

Week 4

Simple Circuit

(Using International symbols)

Week 4

My Circuit

(My Beetlebot)

Week 5

Circuitry

What are the inputs, controls & outputs of this electronic system?

1. Inputs :
   .....
2. Control system :
   .....
3. Outputs :
   .....

Week 6

Attributes/Specifications

What makes my beetlebot unique?

.....
.....
.....
.....

What things must the beetlebot have in order for it to work?

.....
.....
.....
.....
.....

Week 6

Evaluation

Did the final product end up as I planned according to my brief? **Yes/No – Why ?**

.....
.....
.....
.....

What other ways can this product be used ?

.....
.....
.....

How could these components be used to create something different?

.....
.....
.....

Effort
1 2 3 4 5 6 7 8 9 10

Teacher Comment
.....
.....
.....
.....
.....

Photo Gallery