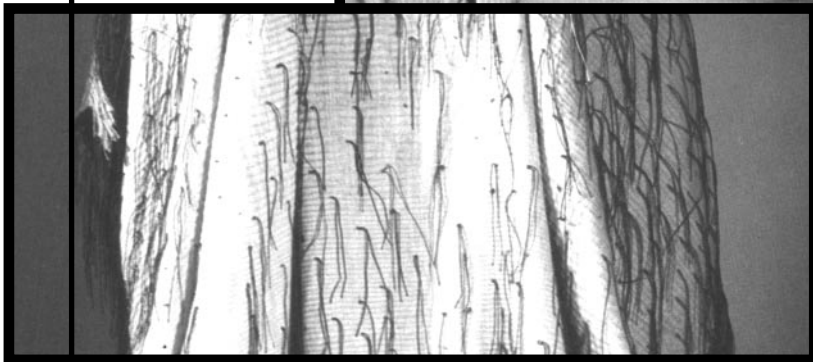
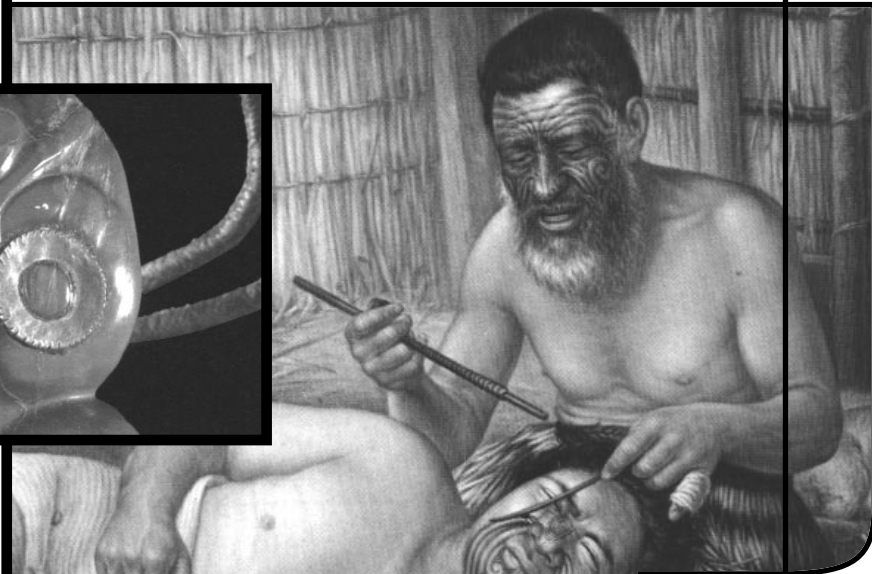
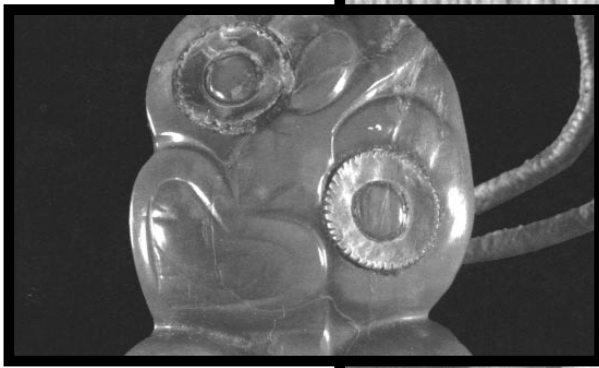


Auckland Museum

Maori Technology
TE AO KOHATU

e d u c a t i o n k i t

Te Papa Whakahiku



Auckland Museum
Te Papa Whakahiku

YEARS 1 - 10

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ABOUT THIS RESOURCE:

This resource is designed to support Social Studies classes of all levels, and may also be used by teachers of science, history and technology.

Further resources are available, dealing with:

- Te Mahi Kai (Maori Foodgathering)*
- He Taonga Maori (Maori Treasures)*
- Te Ao Turoa (Maori Natural History)*
- Whakaraka (traditional Maori games and pastimes)*
- Whakairo Tuturu Maori (carving)*
- Tukutuku Tuturu Maori*
- Kowhaiwhai Tuturu Maori*
- Raranga Tuturu Maori (weaving)*

Adult/child interaction is important to maximise your museum experience. Group leaders need to have some background knowledge of what the students are expected to cover and they are advised to participate in the introduction on arrival.

BOOKING INFORMATION:

All school visits to the museum must be booked. We advise booking 2-3 months in advance.

Numbers:

He Taonga Maori Galleries

90 maximum (including adults)

Sessions Hands-On

35 maximum students.

Adult/child ratio:

Y 1-4	1:6
Y 5-6	1:7
Y 7-8	1:10
Y 9-10	1:30

Booking:

Contact the Museum School Bookings Officer at:
Private Bag 92018 Auckland
Phone: (09) 306 7040
Fax: (09) 306 7075

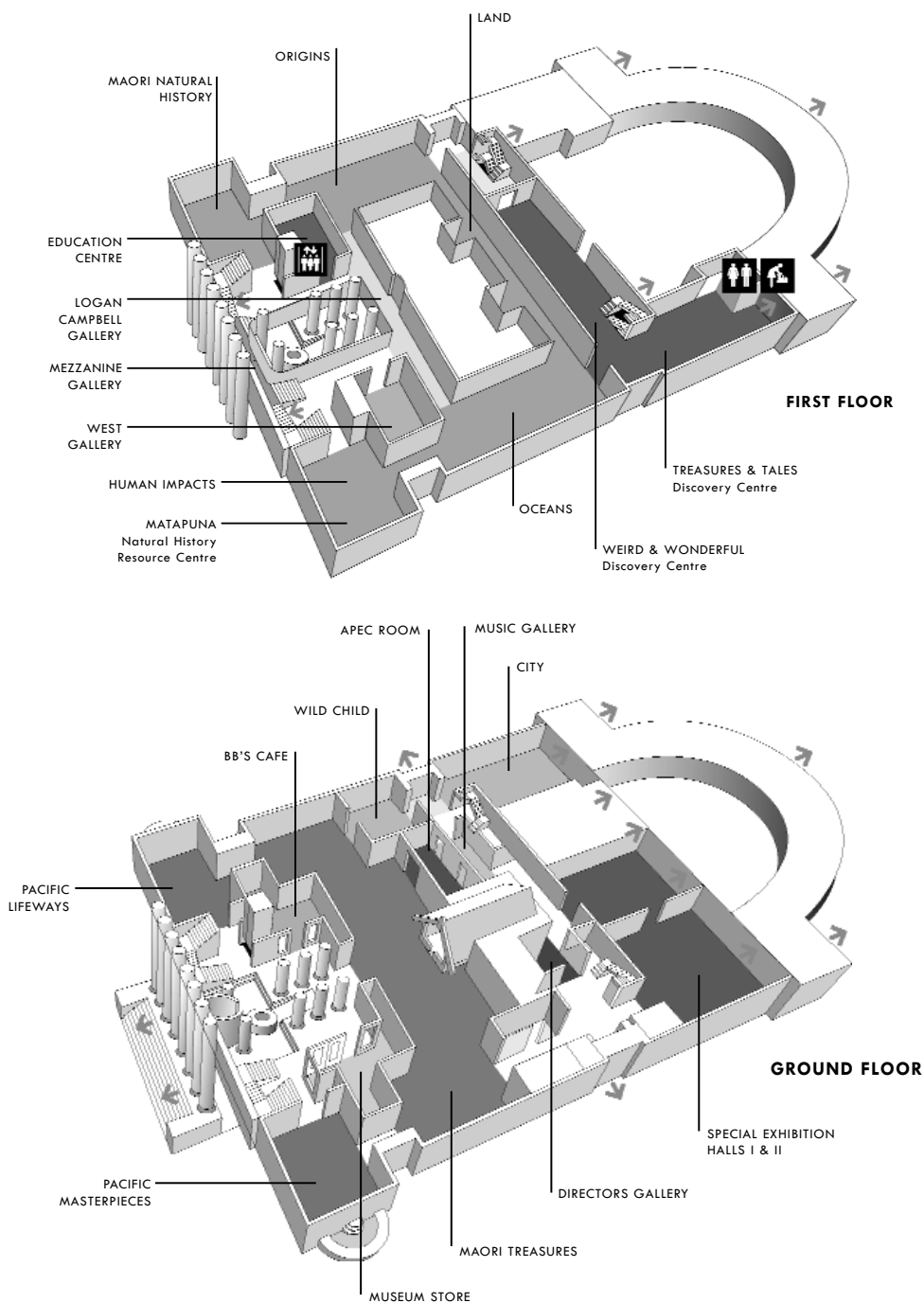
Introductions and Hands-on Sessions facilitated by Education Staff are available. Please ask the School Bookings Officer for more information.

Auckland Museum Education kits may be downloaded free at www.akmuseum.org.nz

Introduction

AN INTRODUCTION TO TE AO KOHAU

The Maori who first came to New Zealand had to adapt to a colder climate with unfamiliar natural resources. Warmer clothes had to be made, new horticultural techniques had to be developed and food had to be stored. New materials such as flax and pounamu (greenstone) were readily taken advantage of.



TE AO KOHATU

Maori Technology

The Maori who first came to New Zealand had to adapt to a colder climate with much more marked seasons. Warmer clothes had to be made and food could no longer be cultivated and collected all year round. New horticultural techniques had to be developed and food had to be stored.

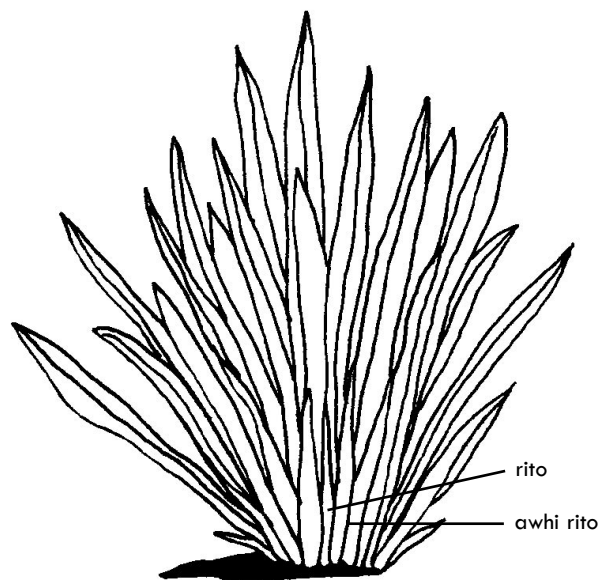
Many of the plants that were brought over to New Zealand did not survive the colder climate and had to be replaced with already existing plants. New materials such as flax and pounamu (greenstone) were readily taken advantage of.

FLAX

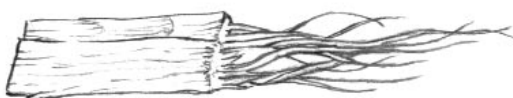
The first people to arrive in New Zealand wore clothes made from the bark of the Aute tree (paper mulberry). The New Zealand climate was too cold for this plant to survive and flax (harakeke) was used as an alternative. Flax had many other uses including: kete (baskets), whariki (mats), ra (sails), and taura (rope).

Certain conventions were and still are adhered to in collecting flax, much of which is to ensure longevity of the plant. The rito (young shoot in the center) and the awhirito (two leaves either side of the rito) are not cut, as it weakens the plant. Any trimmings and waste material are returned to the flax plant to rot, helping the growth of the plant by returning it to papa and enriching the soil.

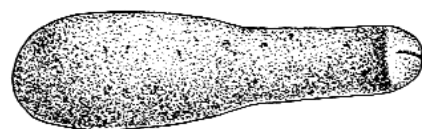
The different types of flax plants were used for different purposes depending on their properties. The flax leaf itself could be woven, or the muka (flax fibres) could be used from flax rich in fibre. The muka was extracted by removing the outer green layer from the leaf with a mussel shell.



Muka could be soaked in water and pounded with patu muka (flax pounders) to make it soft before plaiting or weaving. Feathers could be incorporated into the weaving of muka to make a feathered cloak. Muka could be dyed using mud or an infusion of boiled bark. The mud was chosen for its black or dark gray colour. It would be fed with particular combinations of decomposing leaves to enrich the colour. The colour was set by rolling the dyed fibre in hot white ashes.

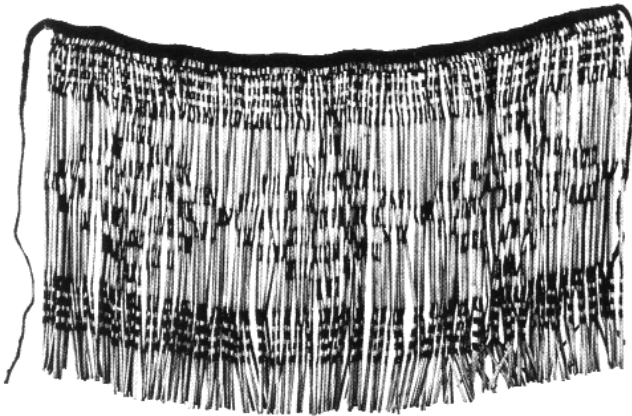


Extraction of muka.



Flax pounder.

Piupiu are made from strips of flax leaves that have been dried in the sun. Drying causes the leaves to curl into the tube-like strands that make up the piupiu. The black stripes are made by scraping off the outer part of the leaf to expose the muka which is then dyed by the mud.

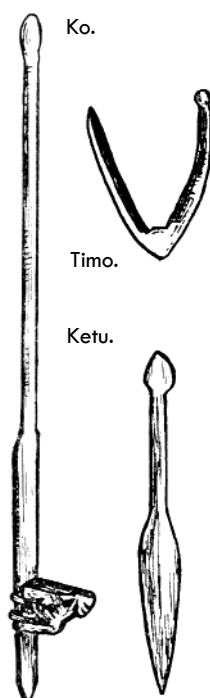


Piupiu.

GARDENING

The plants that were brought to New Zealand and successfully survived were kumara, gourd (hue), taro and yam (uwahi). Kumara was successfully cultivated at latitudes well south of its normal growing range. This was achieved by keeping the tubers alive in storage pits over the cold winter months and maximizing the sun's warmth in the growing season. They were planted in mounds of earth and stones. The stones absorbed the heat of the sun, providing warmth for the growing kumara.

To prepare an area for cultivation, the scrub was first burnt and the ashes used as fertilizer. The ground was loosened with ko (pointed digging sticks) and sand and gravel was scattered over heavy clay soils to break it up. Windbreaks

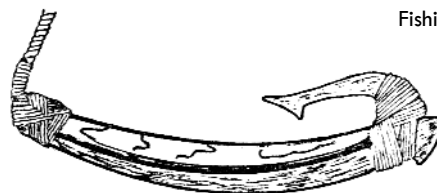


were built to protect the young plants and a smoke insecticide was created by burning kawakawa leaves or kauri gum to rid the plants of caterpillars. Timo and ketu were used to weed the crops. All gardening utensils were made out of hard wood such as matai and manuka. They were lashed together with aka, the tough pliant stem of climbing plants. Timo were fashioned from a forked branch and therefore required no lashings.

The stars and moon were carefully observed for each stage of cultivation. The appearance of certain constellations showed the coming of a new season and indicated when to begin planting or harvesting.

FISHING

Fishing techniques were already well developed throughout Polynesia by the time Maori reached New Zealand. The first settlers brought with them established technologies including nets, hooks, lures, spears, traps and dredges.



Fishing lure.

Flax replaced coconut fibres and other plant material to make fishing lines and nets. Paua shell replaced mother of pearl shell on fishing lures to attract fish. Traps were made from flexible branches such as vines or manuka branches.

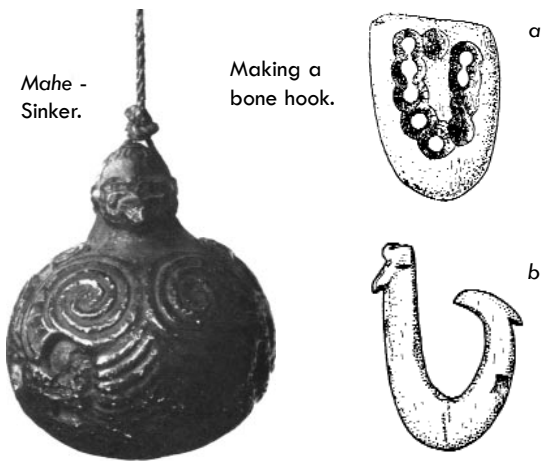
Fishing Nets

Fishing nets varied from tutoko - small hand nets, to kaharoa - huge seine nets more than a kilometer long and ten meters deep. Kaharoa may have caught several thousand fish in one haul. The bottom of the larger nets were weighed down with mahe (stone sinkers). Whau and houama, particularly lightwoods, were fashioned into poito, (floats). Gourds and pumice were also sometimes used as floats.

Fish Hooks

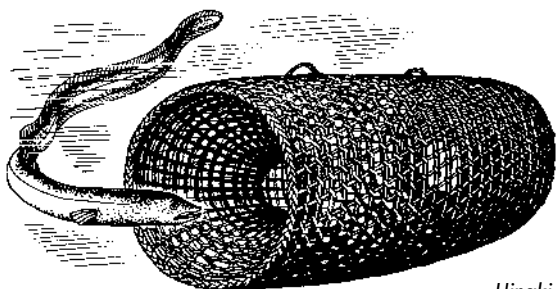
Hooks were fashioned from wood, bone and shell. Wooden hooks could be made by coiling a growing branch and securing it so it would continue to grow in the desired curved form. Once cut from the tree, the hooks were buried in the hearth beneath a fire to render them inflexible.

Bone hooks were made by drilling out the central part of the hook and filing smooth with sandstone.



HINAKI

Hinaki were used to trap eel (tuna). The entrance of the hinaki narrows like a funnel. Eels could enter the trap by forcing their way through the funnel. Once inside, it was difficult for them to exit the narrow end of the funnel. In the north of the North Island, they were made of the strong flexible branches of mangemange (climbing fern). In the south, mangemange was not available and stronger traps had to be made for swifter flowing rivers. Split aerial roots of kiekie were used.

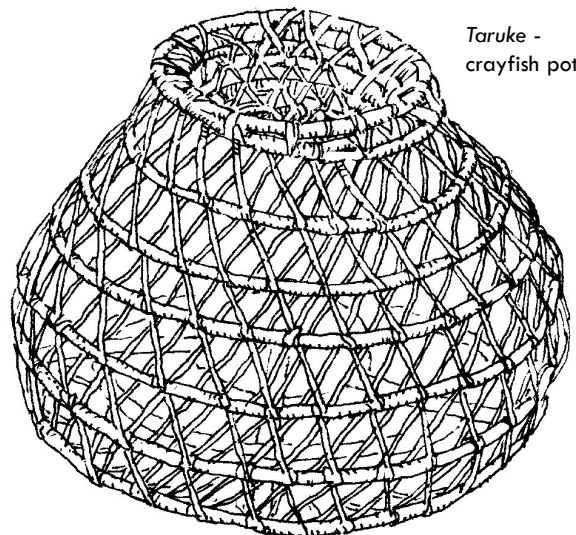


Hinaki - eel trap.

Eels migrating seaward in autumn were directed into hinaki by barriers (weirs) built of posts driven into the riverbed.

Taruke

Taruke were used to catch crayfish. Crayfish would fall through the opening and the flax net at the mouth of the opening prevented them from escaping. They were made from young manuka stems, bent round a supplejack and manuka frame and tied together with flax and vines.



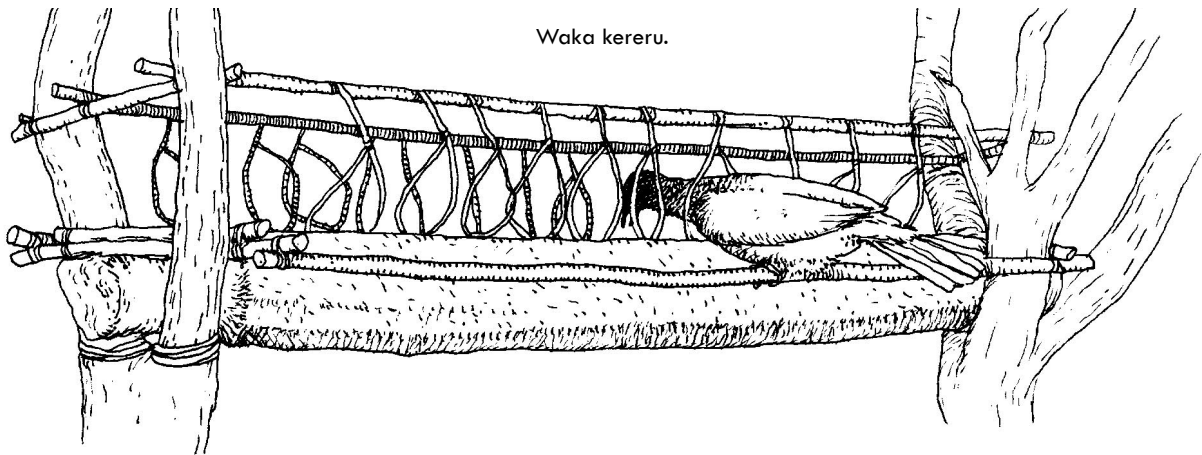
Taruke - crayfish pot.

BIRDING

The extensive forests of New Zealand teemed with bird life. Maori developed birding techniques that were unknown in the rest of Polynesia. Methods of catching birds utilized knowledge of their feeding habits on various trees when flowering and producing fruit. Domesticated birds were sometimes used to attract prey to traps. Some of the snares used included:

Waka kereru

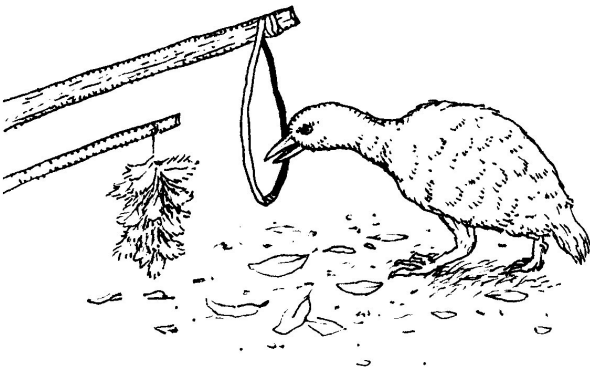
This trap was filled with water and was set out when the miro berries were in season to catch kereru (wood pigeon). The berries made the birds very thirsty and they were attracted to the troughs of water. If they put their head through a noose, it tightened when the bird attempted to fly away.



Waka kereru.

Taki weka

While the inquisitive weka was attracted to the bundle of feathers the noose was slipped over its head.



FOOD STORAGE

Much of the food was collected in the warmer months and needed to be preserved for winter. Fish were dried in the sun. The removal of water ensured bacteria could not survive in the flesh. Birds were cooked and placed in gourds sealed in their own fat. Cooking killed any bacteria present and the fat seal prevented contamination by subsequent bacteria. The gourds would be decorated with the feathers of whatever bird was inside to label its contents.



Decorated gourd.

Kumara, unable to grow all year round, were stored in rua kumara - low roofed storage pits in the ground. Soil, an effective

insulator, maintained an even temperature necessary to keep the tubers alive over winter. The location of the pits were carefully chosen in sloping ground to ensure good drainage. Once dug, the pits were disinfected using fire. They were lined with decaying wood and ferns to absorb moisture and aid insulation.

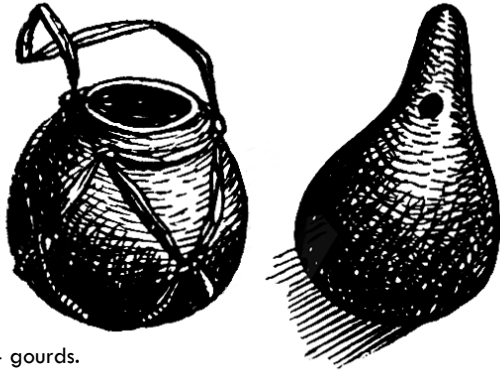
HANGI

Hangi are earth ovens that cook food using steam generated by water and heated stones.

A fire is started in a pit, using slow burning hardwood such as manuka, kanuka or puriri. Stones are placed in the fire. These stones are chosen for their ability to hold heat without shattering. Once the fire has burnt out, shellfish (if available) are first placed on the heated stones. They release salt water to provide steam and flavour. Mats are layered on next, followed by meat and lastly vegetables. The food was traditionally wrapped in leaves of particular plants to add flavour and prevent drying out. Water is sprinkled over the food to provide steam. Lastly, topsoil covers the hangi to insulate the cooking food and prevent loss of steam.

VESSELS

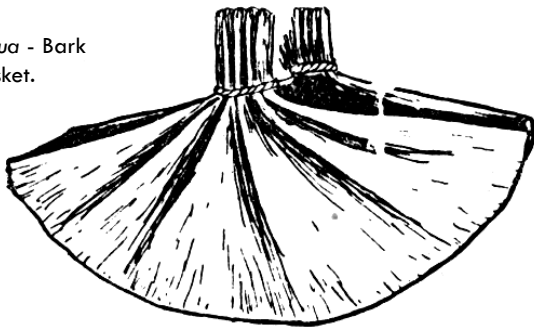
Hue (gourds), patua (bark baskets) and kumete (carved wooden bowls) were used for storing liquids. When ripe, the rind of hue becomes very hard and the inner flesh dries into a spongy matter that adheres to the inside of the gourd. Small stones were placed inside and the vessel shaken to loosen the desiccated flesh from the rind.



Hue - gourds.

Patua were made from a single sheet of inner bark from totara or manuka. The bark was generally steamed, aiding pliability so it could be bent into shape. The ends were tied to maintain the desired form. Apertures were filled with vegetable gum or clay.

Patua - Bark basket.



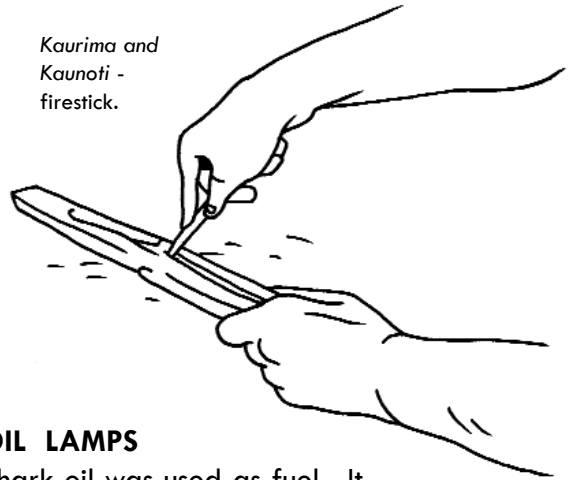
BOILING WATER

Without metal or pottery, Maori did not have the materials to make containers that could be directly heated by fire. Water was boiled by placing stones heated by fire into a vessel filled with water. Wooden tongs were used to transfer the heated stones.

MAKING FIRE

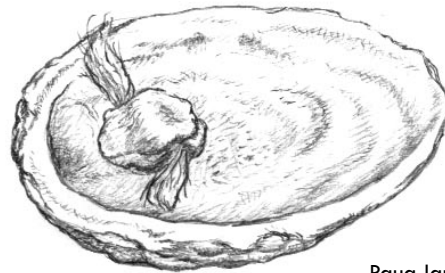
Fire was made using a fire plough. Kaurima (sticks) were rubbed briskly against kaunoti (grooved battens), producing both sawdust and heat. When smoke appeared, the charred sawdust was placed on kindling and blown until it caught alight.

Kaurima and
Kaunoti -
firestick.



OIL LAMPS

Shark oil was used as fuel. It was extracted by placing heated stones on minced shark livers and then placed in shells such as paua. Clay was used to plug the holes in paua shells and attach a flax-fibre wick.

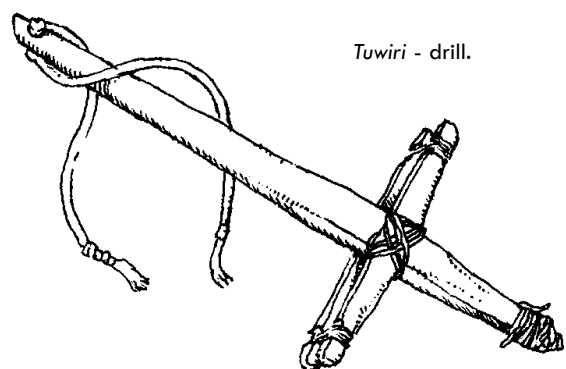


Paua lamp with wick.

STONE TOOLS

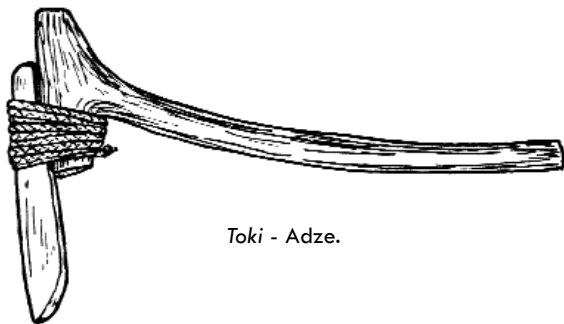
Chips struck from blocks of obsidian (volcanic glass) and chert gave sharp edged, ready-made knives. Sandstone was used as a grindstone to give a smooth surface and sharpen blades. Sharp-edged flakes were struck off greywacke boulders to saw through bone and stone.

Holes were made using a tuwiri (drill) that was manipulated with two cords. A hard sharpened stone was used as a drill tip and sand and water was added as an abrasive to aid the process.



Tuwiri - drill.

Toki (adzes) and whao (chisels) were used for chopping and carving wood. The blades were made from fine-grained rock such as argillite, basalt, greywacke and pounamu (greenstone, jade). Most stones were first roughly shaped by removing chips with a hard round rock (hammerstone). The roughly shaped tool was then ground against sandstone to give the finish blade. Flax cord was used to lash the blade on to a wooden handle.



Toki - Adze.

Pounamu was prized amongst all rocks. It was treasured not only for its beauty and rarity, but also its toughness and the thinness to which it could be cut, making it perfect for sharp hard-wearing implements and weaponry. Pounamu is difficult to chip, a property that is ideal for blades but makes it difficult to fashion. It was first sawn with greywacke before being worked with sand stone. A pierced gourd filled with water provided a continuous drip of water to aid the sawing.

Since so much labour was put into making such a tool, they were generally passed down from generation to generation. Pounamu tools and weapons were most treasured and gained value through the contact of the great ones of the past. Fame of a pounamu mere could be so great that prisoners of war asked to be killed by it.

CARVING

Toki (adzes) were used to roughly shape the outline of a wooden carving. Whao (chisels) were then employed for the finer detail. Wooden structures were lashed together with flax rope. Red and white ochre mixed with shark oil, provided paint of the respective colours. Carvings

could be stained black by soaking them in a rich black mud or using paint made from charcoal.

Bone and stone were carved using various stones to chip, saw, drill or file them. (See stone tools).

TA MOKO (TATTOOING)

Uhi, a fine bone comb, was employed to make perforations in the skin. Blood was wiped away with wisps of soft flax fibre and pigment was inserted in the cut groove. Pigment was made from burning kauri gum, resinous heartwood and a wheto (vegetable caterpillar). The resultant soot was moistened into a fine black pigment. When the face was too painful for chewing, the person would be feed finely prepared food through a korere, a carved wooden funnel.

Uhi - Bone toothed comb.



Pigment pot.

Gallery Activity Sheet Y1-3

te ao kohatu

MAORI GALLERY (GROUND FLOOR)

1. Tools

Find a tool that would be good for chopping down a tree.

2. Pa Model

Find:

- people chopping a tree to make a canoe
- children flying a kite
- something to catch fish with

3. Fishing

You are going to catch fish for the tribe. Find something you would use to catch a really big fish. What else could you use to catch fish?

4. Gourd

You are going to collect water for the tribe. Find something that would be good to carry water in.

5. Canoe - Te Toki a Tapiri

This canoe could fit one hundred warriors.

Find something to paddle the canoe.

Find something to scoop water out of the canoe.

6. Flax

Maori made many things from flax such as baskets, mats and piupiu (flax skirt). Find some things made out of flax. Write down some of the names.

7. Feathered Cloak

Find a feathered cloak. What made this cloak warm to wear?

MAORI NATURAL HISTORY GALLERY (TE AO TUROA - MIDDLE FLOOR)

1. Gardens

You are going to help work in the kumara gardens. What tools could you use to dig in the ground?

2. Fire

Watch the video on fire. You are going to make a fire for the tribe, how would you make it?

3. Hangi

Find the hangi.

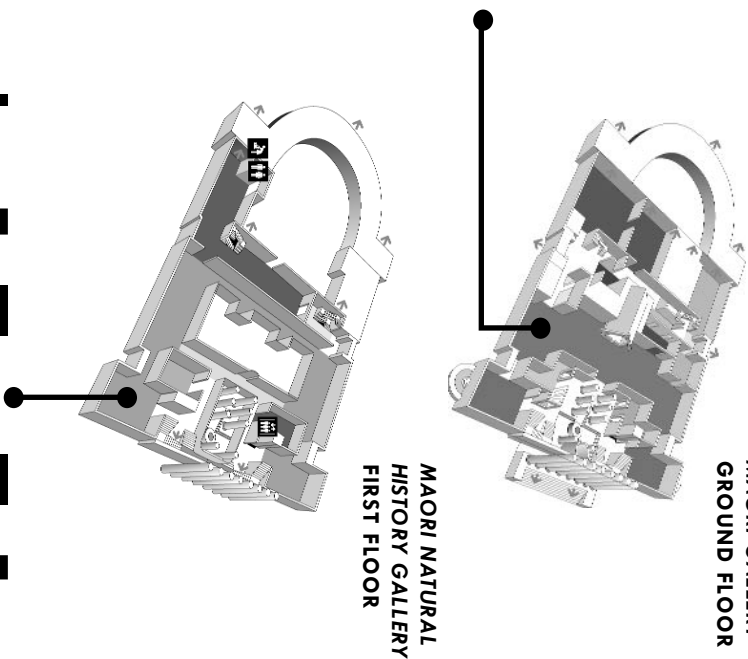
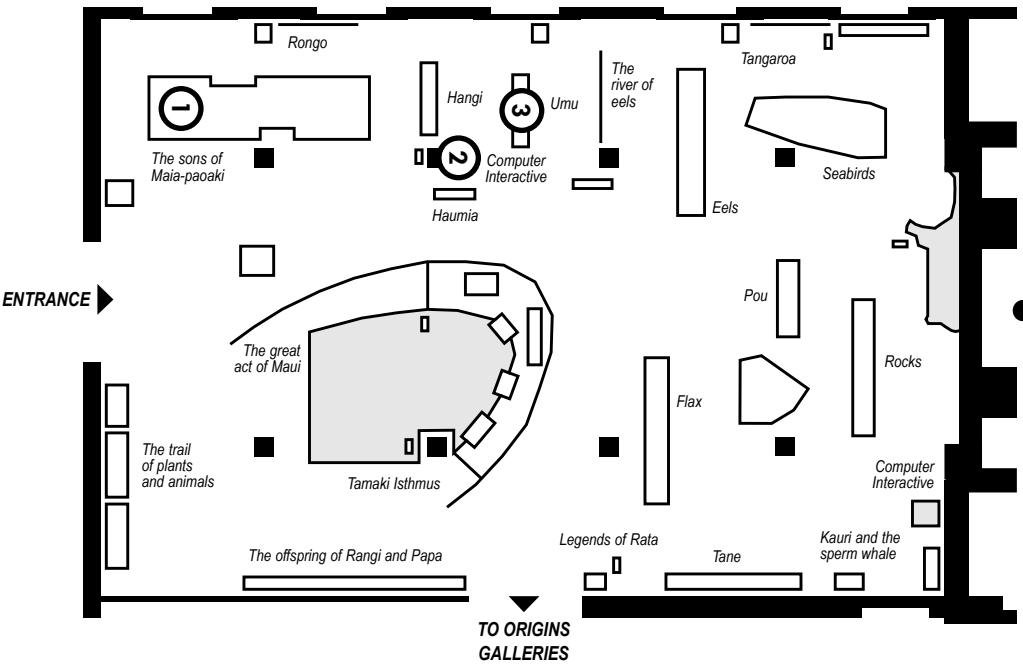
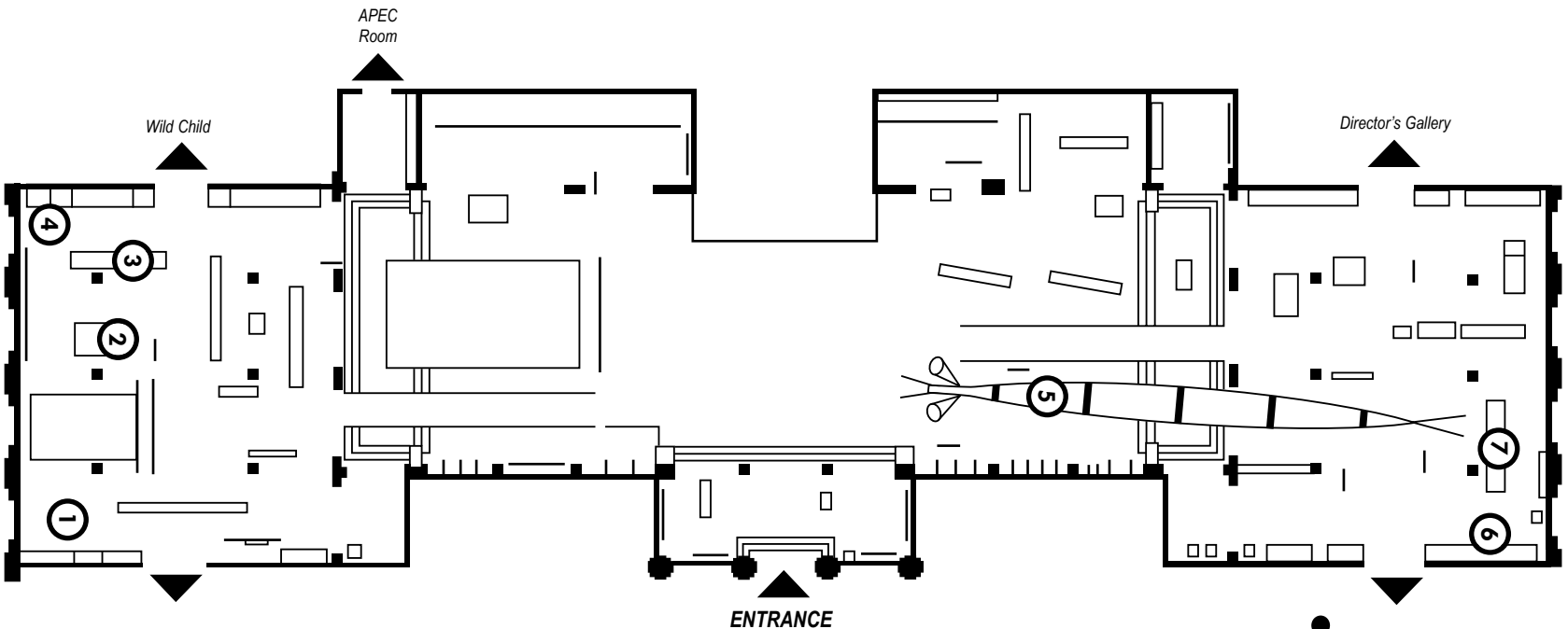
You are going to make a hangi to cook the food for the tribe. First you dig a big hole in the ground. Then you light a fire in the bottom of the hole. What other things do you put in the hole to make the hangi?



Te ao Kohatu

Gallery Activity Sheet

Y-1-3



Gallery Activity Sheet Y4-6

te ao kohatu

MAORI GALLERY (GROUND FLOOR)

1. Tools

Find a tool that would be good for chopping down a tree. What is it called?

Find a stone that is very sharp and would be good for cutting flax.

Find a tool that could be used for making holes. How do you think it works?

Find some holes that were made with it.

2. Pa Model

Find

- people collecting stones to make tools
- a canoe being made
- equipment to catch fish

What is being done to the fish to preserve them over winter so they don't rot?

3. Fishing

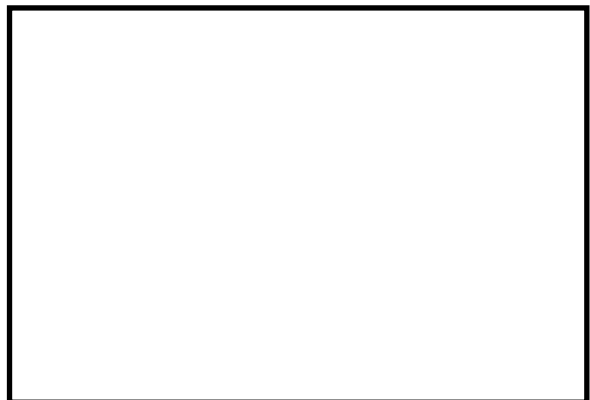
Draw something used to trap fish. What is it called?

Describe how it works and what it was made from.



4. Birding

Draw a bird trap, name it, describe how it works and what it was made from.



te ao kohatu

Gallery Activity Sheet

Y 4-6



5. Gourd

Gourds were used to store birds in.

How was the gourd decorated to show what bird it contained?

What else could a gourd be used for? _____

6. Buildings

Maori did not have metal, so there were no nails or screws to hold the buildings together. Look at the buildings and canoe. How are they held together?

What other things in the gallery have been made out of flax? _____

MAORI NATURAL HISTORY GALLERY (TE AO TUROA - MIDDLE FLOOR)

1. Kumara storage pit

Kumara were stored in pits in the ground over winter.

What stops the rain from entering the pit? _____

What was used as bedding to stop the kumara getting too cold and dying? _____

2. Fire

Watch the video on fire. How did Maori make fire? _____

What was used for lighting at night? _____

3. Hangi

What heats the hangi? _____

What covers the hangi to keep the heat in? _____

4. Flax

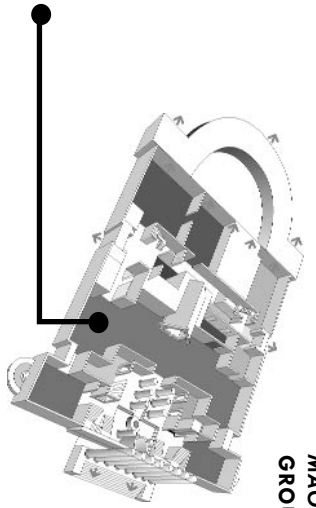
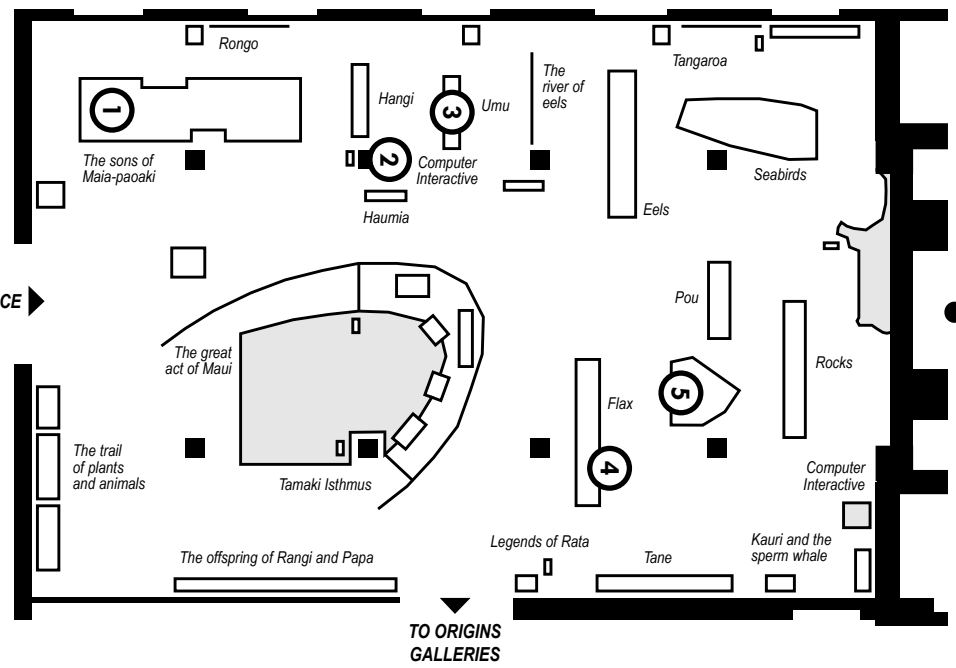
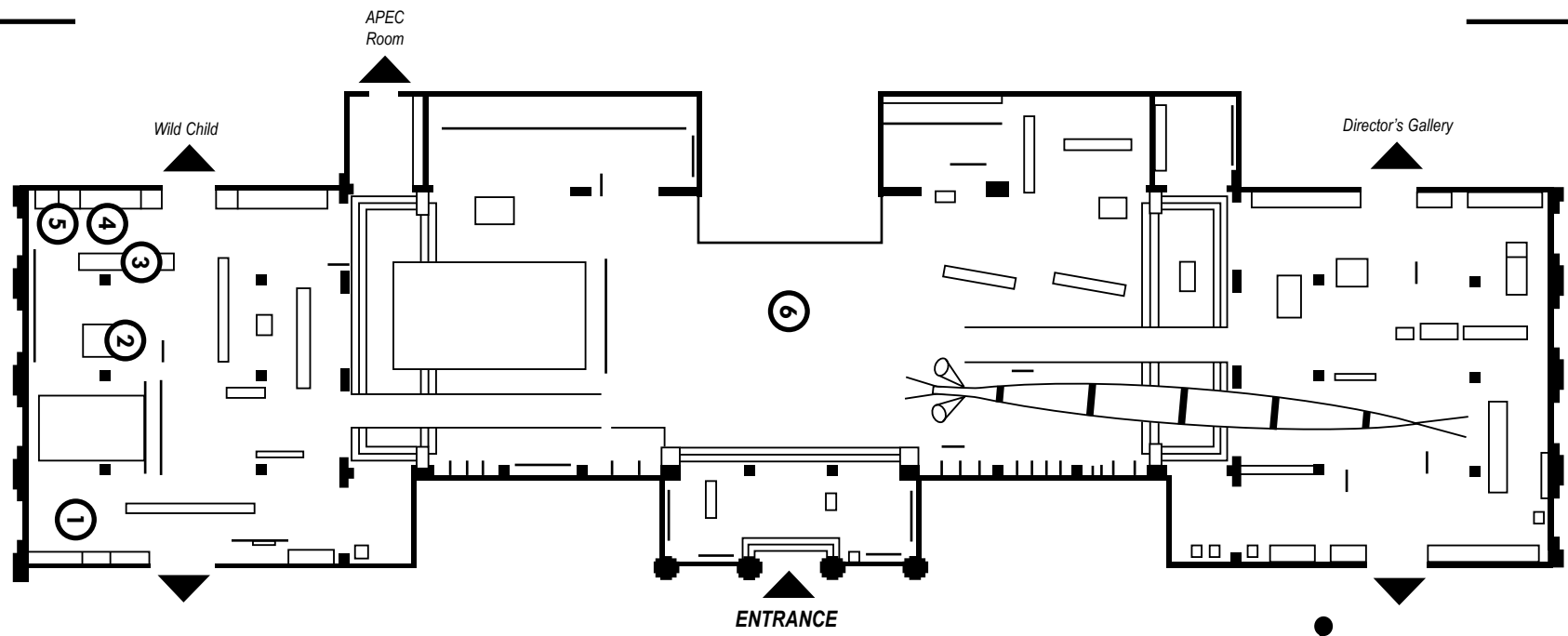
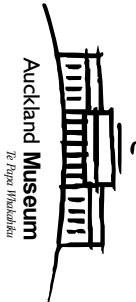
Flax was very important to Maori. Find some things it was used for.

Inside a flax leaf there is something that looks like hair, called muka. Find some muka. What can muka be used for? _____

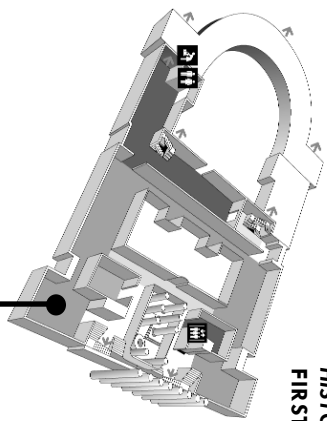
5. Making stone tools

Stone tools were made sharp by rubbing them on a rough stone called sandstone. Find a big piece of sandstone that has big grooves in it from sharpening tools.

Find some tools that would have been sharpened on a stone like this one.



MAORI GALLERY
GROUND FLOOR



MAORI NATURAL
HISTORY GALLERY
FIRST FLOOR

te ao kohatu

Gallery Activity Sheet

Y 7-10

MAORI GALLERIES

1. Tools

Find a tool that functioned in a similar way to an axe.

Describe how you think the stone blade was made. _____

Find a stone that would be good for cutting flax.

Find a tool that was used for making holes. How do you think it worked?

Find some holes that were made with it.

2. Pa Model

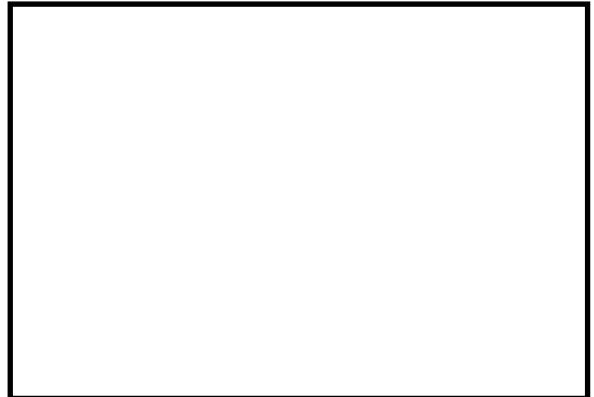
What features help defend the pa? _____

Why are fish being dried in the sun? _____

Find a place where stones are being collected to make tools.

3. Fishing

Draw a fish trap. Name it. Describe how it worked and what it was made from.



4. Birding

Draw a bird trap. Name it. Describe how it worked and what it was made from.



5. Gourd and bark basket

Gourds were used to store birds in.

The birds were first cooked, why was this important before storing them?

How is it labelled so you can tell what bird is inside? _____

Find a basket made from bark.

How do you think the bark was softened to bend it in the desired shape?

Gallery Activity Sheet

Y 7-10

te ao kohatu

6. Buildings

Maori did not have metal, so there were no nails or screws to hold the buildings together. Look at the buildings and canoe. How were they held together?

What other things in the gallery have been made from flax? _____

MAORI NATURAL HISTORY GALLERY (TE AO TUROA - MIDDLE FLOOR)

1. Kumara storage pit

Kumara were stored in pits in the ground over winter.

What was used as insulation and to remove moisture? _____

Why was it important that the kumara did not become damp? _____

Find the mounds of earth where the kumara are growing nearby. What has been placed in the soil to absorb the sun's energy and warm the growing kumara?

2. Fire

Watch the video on fire. How did Maori make fire? _____

What was used as lighting at night? _____

3. Hangi

The food in a hangi is cooked using steam. How is the steam made?

The stones used in the hangi were chosen for particular properties.

What properties were important?

What stops heat and steam escaping from the hangi? _____

4. Flax

The inside of a flax leaf is filled with hair-like fibres. The outer part of the leaf can be scraped off and the inside fibres can be used. What were these fibres used to make?

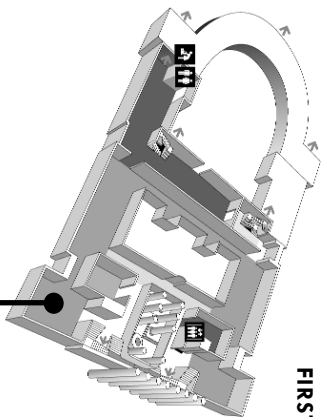
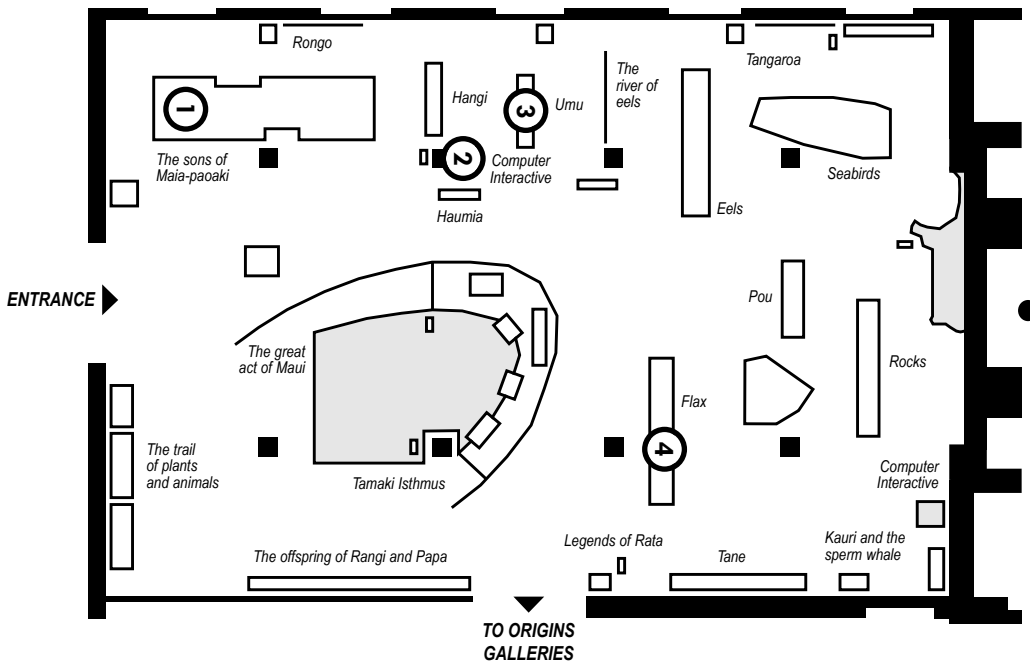
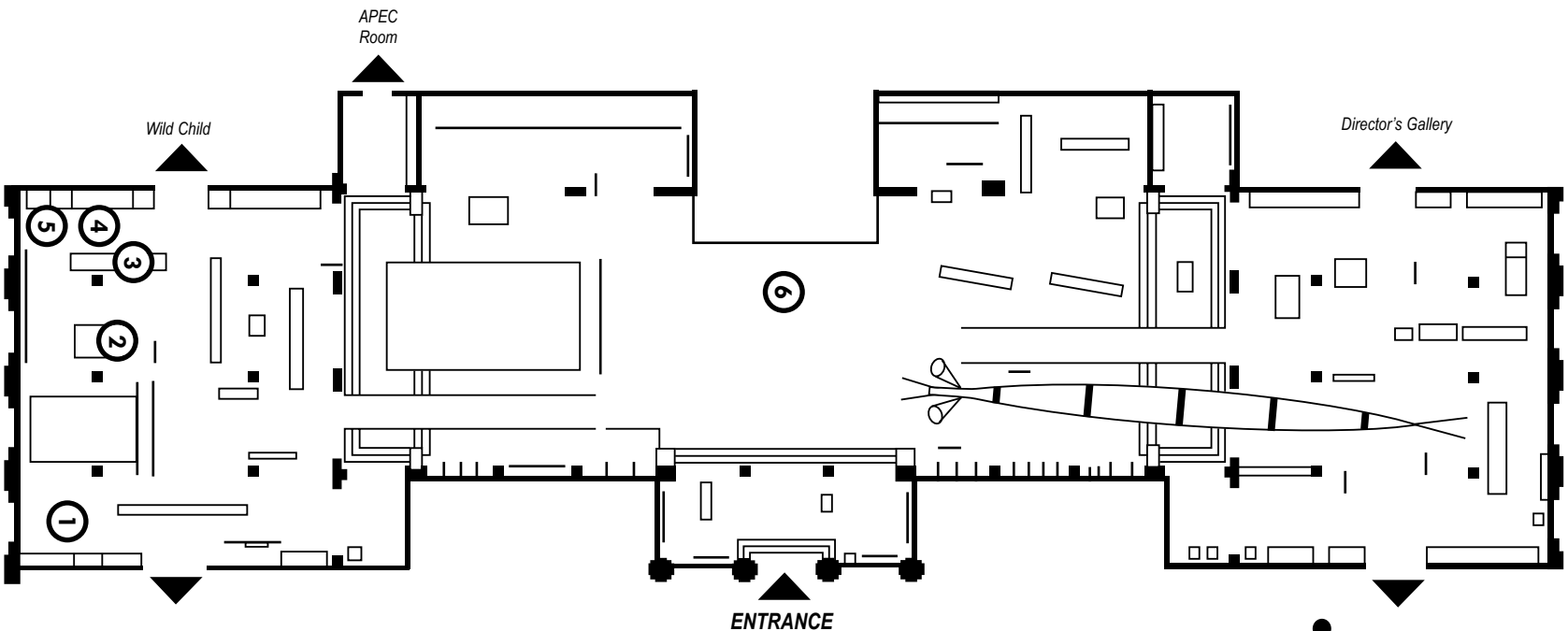
Some flax has been dyed. How was it dyed? _____



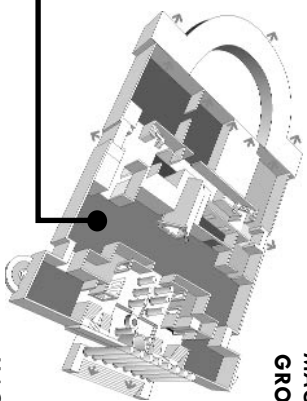
Te Ao Kohatu

Gallery Activity Sheet

Y7-10



MAORI NATURAL HISTORY GALLERY FIRST FLOOR



MAORI GALLERY GROUND FLOOR

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