Manu tukutuku

Kites are collectively called manu tukutuku and feature in Māori life, especially at Matariki. Mike Stone (Pākehā) and Mere Manning (Kahungunu ki te Wairoa), explore the cross-curricular possibilities of this Mātauranga Māori.

#### Whakapapa

While their origin is uncertain, kites were used by people of the Pacific Islands for fishing, with bait attached to the tail of the kite. It is believed that Māori brought these kite traditions with them from their Pacific homeland Hawaiki. The atua Rongo was thought to be the kaitiaki or protector of kites and kite flying, and the atua Rehua is thought to be the ancestor of all kites. Named after birds, manu, there are three main types of manu tukutuku.

Manu aute are large birdman kites. One in the Auckland Museum, below, has a wingspan of 3m and a body of 1.2m. These kites were named after aute, the paper mulberry plant, the bark of which was made into a fibrous cloth to cover the kites.

The frame of manu aute was made of manuka sticks bound by diagonal lashings of flax muka, covered with raupo, then plain cotton. The kite is topped with a head with a highly decorated mask. A manuscript written by Te Rangi shows these huge kites often required five to 30 men to get them in the air and to control them.

Manu taratahi have an A-frame of four toetoe stalks, with raupō leaves laced on by finely twisted flax cord. Raupō are ideal for this because the leaves have a curved surface and a flat surface – shaped like an airfoil. The flower plume pointing up helps keep the kite balanced, while the downward pointing plumes create a tail that provides drag. On average, manu taratahi were 70cm wide and 75cm tall.

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Ūpoko tangata are children's kites shaped like a square bird. They were so named from their covering of this sedge, also known as cutty grass. Ūpoko tangata were small, about 35cm long and 28 cm wide.

Other kites include manu pātiki (shaped like a flounder), manu kākā (parrot), manu totoriwai (robin), manu kāhu (harrier hawk); manu whara (large and tapu, used by tohunga for divination); and rākau-he-whaka-maro, used by Ngāi Tahu in kite-flying competitions.

### Significance to Māori

Ancestrally, larger manu tukutuku were used as a way to communicate with tūpuna and atua, by attaching a karere or messenger to the string and sending them up to the kite. These could be made from a ring of light manuka twigs or toetoe covered with feathers – the wind caught the feathers and forced the karere upwards.

Only tohunga could make and fly these larger tapu kites, eating no food for the duration. The movements of manu tukutuku in flight were closely watched as portents of future events. The making and flying of smaller manu tukutuku, while open to others, were still accompanied by tikanga such as waiata and karakia at each stage.

Manu tukutuku were flown for many purposes

• To celebrate the start of Matariki – kites were seen to connect the heavens and earth.

• To communicate with atua, especially Rongo, Tāne and Rehua.



Illustration from The koroua and the mauri stone, courtesy Robyn Kahukiwa.  To communicate with the next village, for example, that a meeting was needed.

• To summon the support of Tūmatauenga, the atua of war, if the pā was under attack.

For recreation, e.g., kite flying competitions in Temuka, children's toys.

Kites feature in some pūrākau:

When a Ngāti Porou chief, Porourangi, died on the East Coast, a kite was flown and his brother Tahu, a Ngāi Tahu chief, was able to see it from the South Island.

Ngāti Kahungunu tell the story of a chief who was unable to capture an enemy pā. He constructed a large raupo kite in the shape

of a bird with wide-spread wings, fastened a man to it, and floated him off a cliff and into the pā below at night. From inside, the man opened the gates, allowing the warriors to enter and sack the village.

• The Whitianga pā of Hei was sited on a tall coastal rock. Under attack warriors, escaped by hanging onto kites to reach the water below safely.

 Tāwhaki trying vainly to follow Tangotango to heaven on a kite.

 Several stories tell of women marooned on islands making and using a kite to signal to whānau for a rescue.

Several iwi, including Ngāpuhi and Ngāti

Hāua, tell stories of releasing a kite and following it, claiming and occupying the place where it landed.

Manu tukutuku feature also in whakataukī: He taonga tuku iho, ko te manu tukutuku, kua ngaro atu kē ki ngā hau e whā, kua whakamīharo ā tātou nei ngākau kia puta ake ki te whaiao, ki te ao mārama. (A treasured kite lost to

the winds brings much joy when found again.) This whakatauki portrays manu tukutuku as precious gifts handed down, as knowledge to nurture us.

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Manu tukutuku were clearly an integral part of te ao Māori. Not only was skill required to build and fly these amazing taonga, but they helped people in guiding, communicating, celebrating and having fun.

## Making manu tukutuku

The easiest type of kite to make with students is a manu taratahi. When Mark Dashper taught at Te Aute College, he made manu taratahi with students for Visual Art. They used dried toetoe or haraheke flower stalks for the frame and woven raupō for the body.

> The toetoe was collected later in the growing season, when many stalks had broken, leaving mörehu (survivors), which would be drier and stronger. A few morehu stalks from each plant were cut, leaving some behind for sustainability. Pampas grass looks very similar to toetoe and works just as well. Raupō was picked green, six months before use. Mark's class said a karakia before cutting plant leaves and stalks and returned all offcuts to the ground under the bushes.

Both raupo and toetoe were gathered into bundles, not too big or the middle stalks fall out. Mark explains, "These were tied with harakeke, but just tearing strips of leaves is no

> and don't work well. We scraped off the green with a shell edge, leaving just the muka fibres. These are rolled into twine and used as a tie for the bundles." But the bundle shrinks as it dries, so slip knots work best. The bundles were stored out of the way.

"We researched and experi-

manu taratahi, poring over images, looking at shapes and proportions. When kites are flown they lose bits to the wind, and when they crash they can break. A lot of the kites in

good because they dry and stiffen Beach School.

mented to find out how to make

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An NGHS

student

finished

taratahi.

Vanessa

with a

manu

Photo,

Fraser.

the museum collections looked too pristine; we weren't confident they had ever been flown. Perhaps they had been made specially for museum curators, like Augustus Hamilton early last century, and may not have been flyable. So we looked at those pictures with a grain of salt."

The frame was made of toetoe and tied with muka, and the cross slats were raupō leaves. Students worked in pairs, one holding and one tying. Tight ties ensured no slippage as the plant pieces dry.

"We didn't worry too much about trimming," Mark explained, "so long as it was fairly symmetrical. The tail was a stalk of toetoe in flower. For it to work as a stabilising tail, we found that it needed to be at least as long as the body, or the kite would crash."

While string from a hardware shop would work, if you have the time, the aho (flying line) can be made from muka by rolling several strands together, and then plaiting them.

"Then we took it out to fly," Mark said. Before flying the manu taratahi they gave a waiata or karakia, and some also accompany the ascent with a chant or karakia. "These kites work differently to those I flew as a kid. If we run with manu tukutuku the pressure on string is too much, and it destroys the kite. These are made to fly as the string is let out – the word tukutuku means paying out a line. Instead of pulling on the string, let it go and it will rise, then let it go again and again in stages, so it flies in a series of steps like a poutama pattern. To bring the manu taratahi back to earth, gradually rein it in in stages."

Napier Girls' High school (NGHS) make kites with all their Year 10 students, and Vanessa Fraser and Kate Harding shared their experiences. Taking two weeks within the forces and

Lift is a force <u>generated</u> <u>by turning</u> <u>in a</u> <u>moving</u> <u>fluid</u>. NASA.





motion unit, students made and flew their kites as part of the school's Matariki celebrations. This activity successfully engaged their students, with lots of positive comments and all submitting work for assessment.

This is a work in progress, as next year the teachers want to extend the physics but also focus on collecting the materials – finding the appropriate tikanga, collecting the raupō and flax earlier and allowing them to dry.

Primary schools such as Lyttelton Primary and Tokanui Primary, as well as Silverdale School and the Northern Health School, have also made kites with students.

# **Teaching links**

The forces involved in aerodynamics are lift, weight, thrust and drag. As air is forced over a surface it generates lift, and this force increases with the speed of the wind, the steepness of the kite's angle to the wind, and the area of the kite. [Try sticking your hand out the window of a moving vehicle (safely!). If you tilt your hand slightly the wind force pushes your hand up (due to lift) and back (due to drag).]

This lift force is balanced by weight, the force due to gravity. Friction against the kite surface will create drag, which slows its speed. As a manu tukutuku creates no thrust, it acts as a glider or a dart. Instead of thrust the kite is held in place by the tension force in the string.

Kites provide cross-curricular links to Visual Art (design, creative themes in 2D and 3D), Maths (measurement, geometric shapes), English (write up the experience, creative themes for writing), Te Reo Māori (mātauranga Māori, waiata, karakia, whakatauki, kupu tuku iho),



Technology (comparative constructions, materials, redesign) and History (comparative shapes, meaning and symbolism across cultures).

In te Ao Māori there is an intrinsic interconnectedness. Treasures such as manu tukutuku give us insight into ngā rā o mua, earlier days. But more importantly, by exploring these treasures today we restore that connection in the present. So kite flying can be used to connect kura with whānau and te taiao.

# **Student activities**

**1**. Students could have competitions building and flying their taonga tākaro, inviting whānau on the day to see their efforts. Such events can bring communities together, showing values that Māori treasure like arohatanga, manaakitanga and whanaungatanga. At Matariki these bonds could be strengthened by also sharing kai.

2. Make a kite and fly it.

a. Draw a diagram of your kite and the forces on it.

b. Justify the materials used for its construction.

c. Discuss the modifications needed after test flights.

d. What factors would increase your kite's lift?

**3**. Find out how insects and birds are adapted to fly.

**4**. Find out about godwit migration and how scientists track them.

**5**. Learn about the Beaufort wind scale to judge different types of wind.

a. Use the scale to determine the strength of wind on the day you fly your kite.

b. Discuss Tāwhirimātea and the 200 types of wind that Māori knew.

# **Useful resources**

Kids Greening Taupo, <u>Make a manu tukutuku</u>. Science Learning Hub activities, <u>Kites</u>, <u>What flies</u>?, <u>Wings and lift</u>.

Jack Thatcher on Manu taratahi, <u>Part 1, materials;</u> <u>Part 2, making kite frame; Part 3, assembling</u> <u>the kite</u>.



#### students making manu taratahi with toetoe and harakeke, Vanessa Fraser.

NGHS

# References

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# Ngā Kupu

Atua – Supernatural being Hau takiwā – Air Kākaho – Stem of toetoe Pana whakarunga – Lift force Parenga hau – Air resistance Parirau – Wing/s Poutama – Stepped pattern Rangi – Weather, day, sky, heavens Rere – Flight, to fly Taratahi – One point, triangular kite Taumaha – Weight force Tautō – Drag force Tōpana – Force/s Torohaki – Thrust force Waka rererangi - Aircraft.





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