Making Waves on the Whanganui

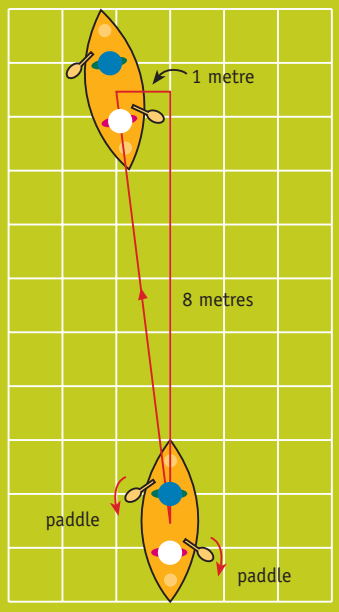
You need: a photocopy of the rapids map, square grid paper

ACTIVITY

Maasi and Dave are paddling their Canadian canoe down the Whanganui River.

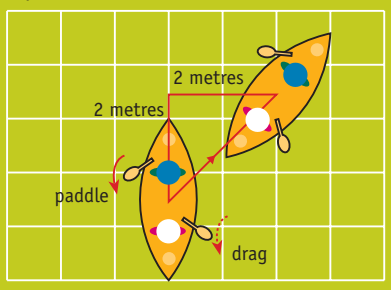
Maasi and Dave know they can change the direction of their canoe by varying the side they paddle on. The diagrams below show the effect of three different combinations of stroke.

i.



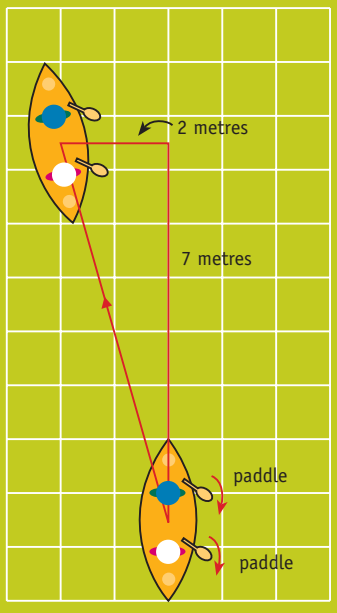
Maasi paddles 1 stroke on the right, and Dave paddles 1 stroke on the left. The canoe travels 8 metres forward and 1 metre to the left, ending up at a slightly different angle. [Vector $\begin{pmatrix}-1\\8\end{pmatrix}$]

ii.



Dave paddles 1 stroke on the left, and Maasi drags her paddle on the right. The boat travels 2 metres forwards and 2 metres right and finishes up making an angle of 45° to its original course. [Vector $\begin{pmatrix}2\\2\end{pmatrix}$]

iii.



Both Dave and Maasi paddle for 1 stroke on the right side of the canoe. The boat travels 7 metres forwards and 2 metres to the left, finishing at a different angle. [Vector $\begin{pmatrix}-2\\7\end{pmatrix}$]

1. Draw another three diagrams, labelled **iv**–**vi**, showing what happens if the pair paddle on the opposite sides to those shown in diagrams **i**–**iii**.

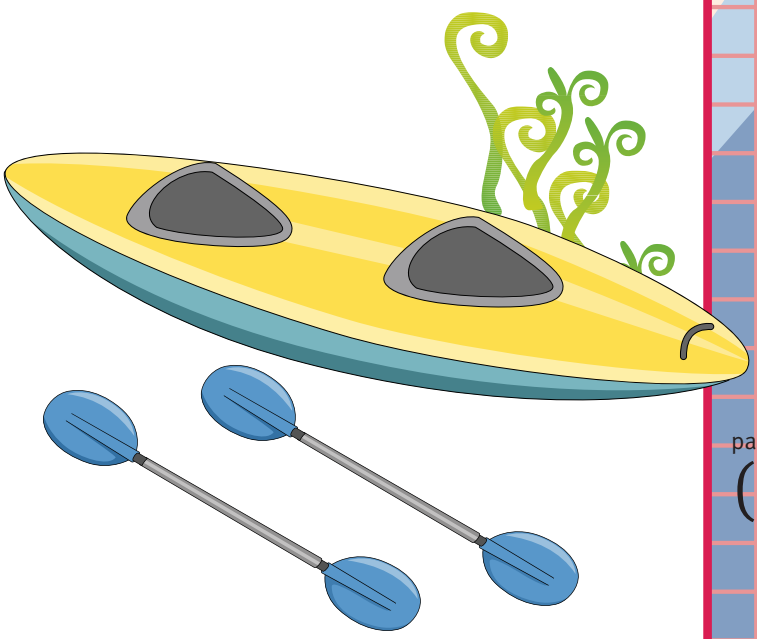
2. They want to get their canoe through the rapids on page **20**.
They can use any of their six strokes and the current.
On your photocopy of the map, plot a route they might take.

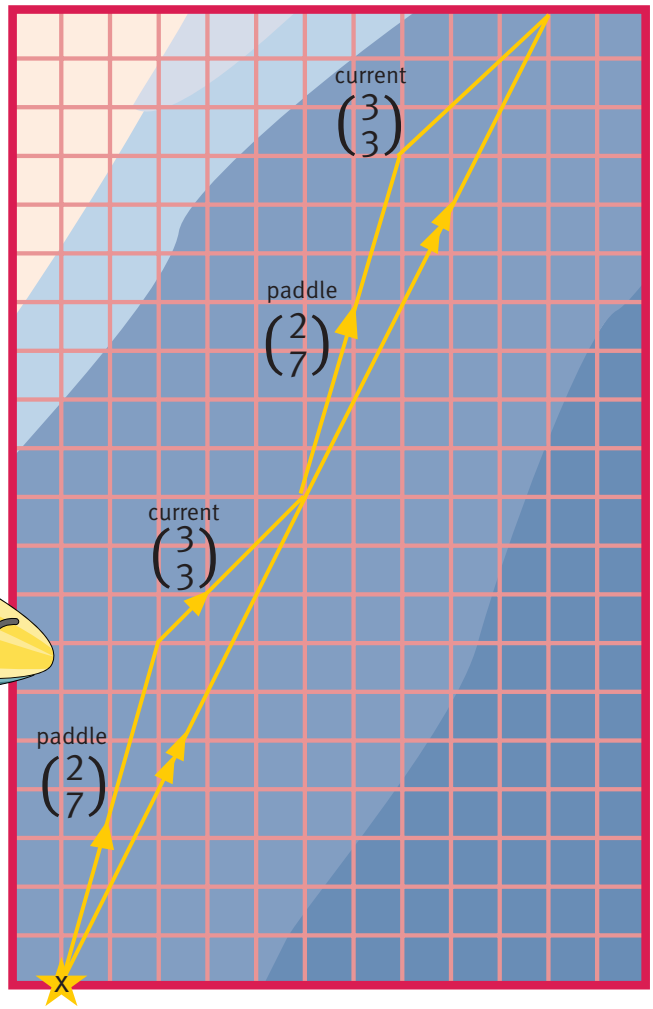
   Start the journey at X. Choose a stroke, draw the vector, and then add the effect of the current. Use a double arrowhead on the vector that shows the canoe's actual direction (paddle + current). Now choose another stroke, add the effect of the current, and so on. Label each stroke with its vector. (See the diagram below.)

   Remember:
   - The rocks and the tree snags are dangerous – avoid them!
   - Sometimes you can choose not to paddle at all and let the current do the work.
   - For maximum fun, ride the pressure waves from the beginning to the end.

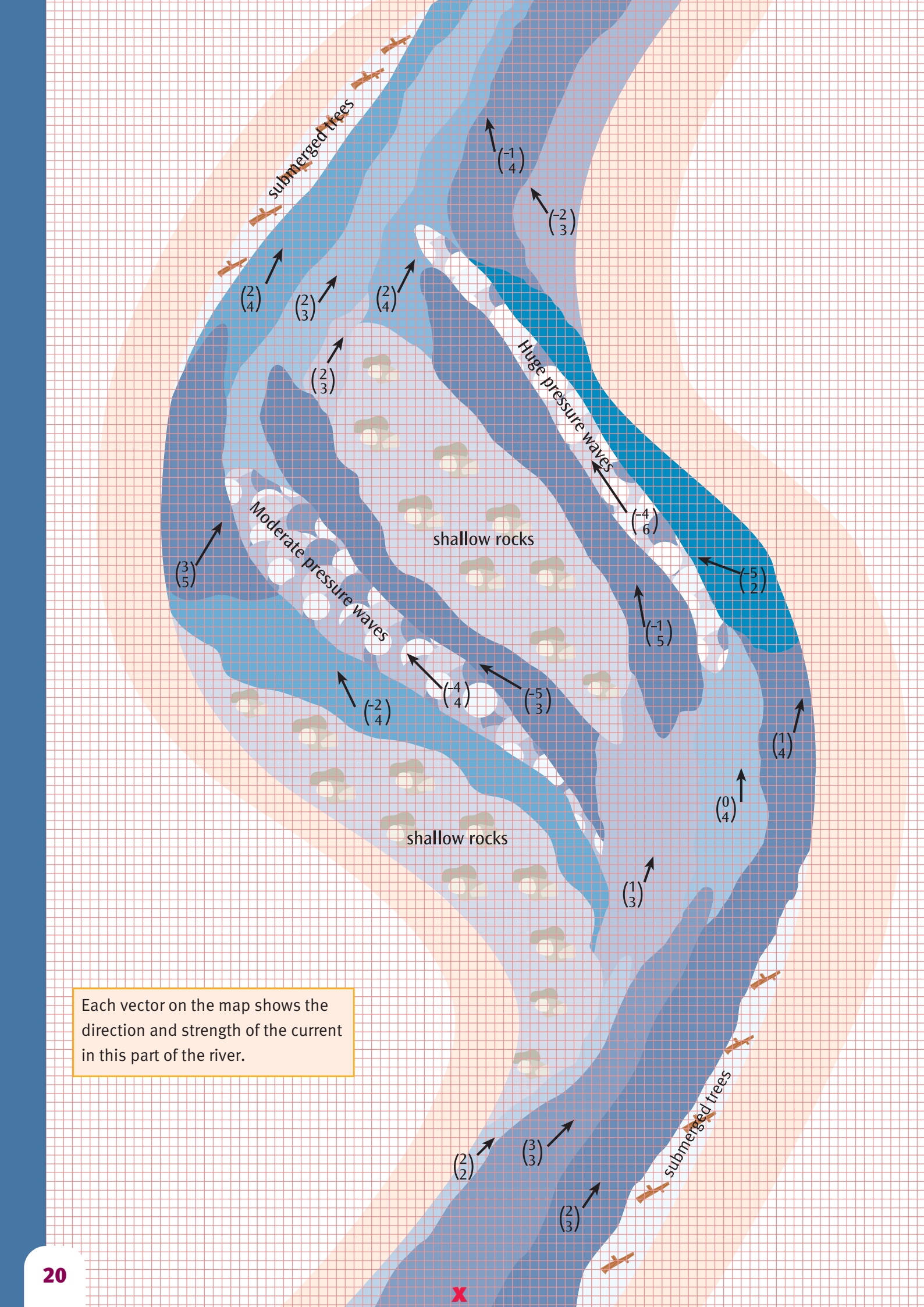
3. When you have found one way through the rapids, start again from X, exploring the other side of the river.

4. Find a way of comparing the vectors so that you can tell which parts of the river have the strongest current.





A possible start to the journey



Each vector on the map shows the direction and strength of the current in this part of the river.