

## The Big Splash

### Purpose:

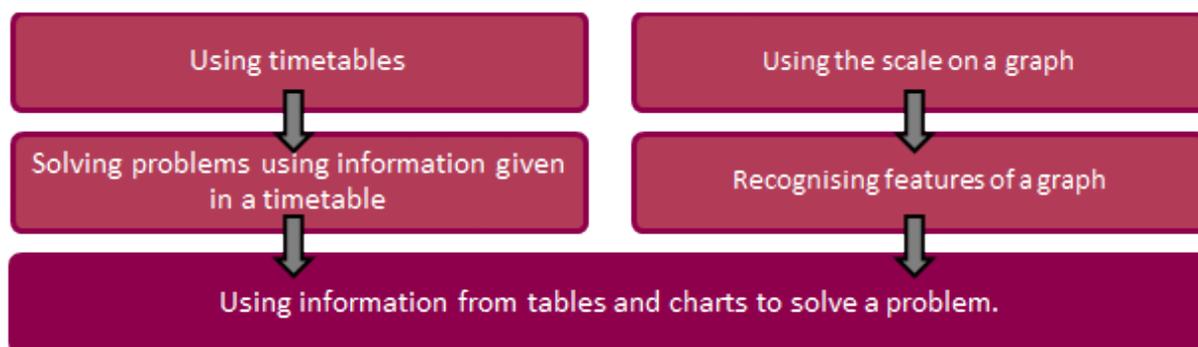
The purpose of this activity is to engage students in using the information provided on tables and charts to solve a problem.

### Achievement Objectives:

GM4-4: Interpret and use scales, timetables, and charts.

### Description of mathematics:

This activity ideally follows exploration and learning in the following areas.



These examples refer to the same tide table that is given in the activity.

#### Using timetables

*When will it first be low tide at Port Chalmers on Friday?*

#### Solving problems using information given in a timetable

*What is the mean time between consecutive high tides at Oamaru?*

#### Using the scale on a graph

*How many metres higher is high tide than low tide?*

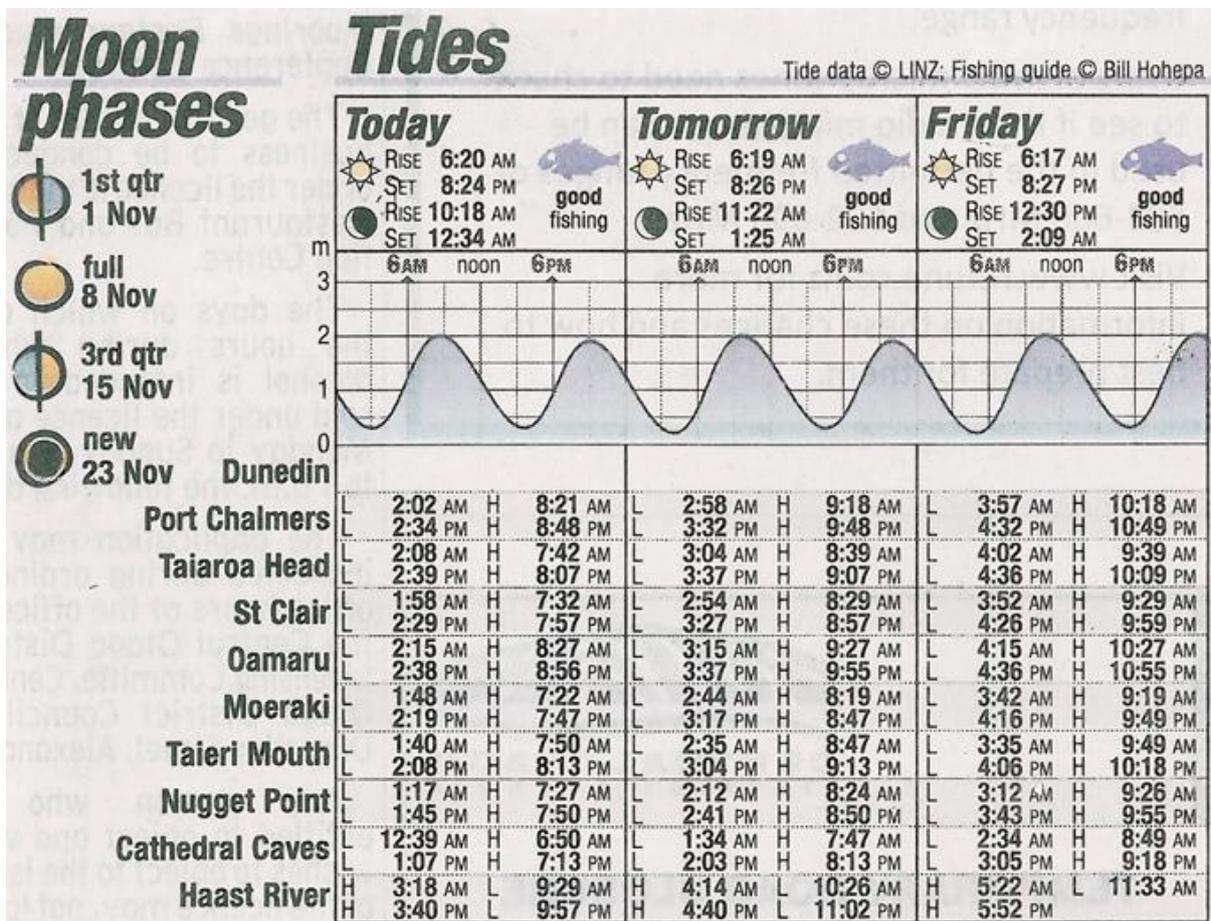
#### Recognising features of a graph

*A boat can sail into Port Chalmers as long as the tide is above 1.5 m. For what proportion of each day can this occur?*

To solve this problem, the students may explore with numbers, or use visual representations. The approach should be chosen in sympathy with their skills and preferred method of solution.

### Activity:

On a high tide at St Clair Beach, waves can splash up and drench the footpath. Use the tide table below to work out which would be the best time, during the day, to see this happen on the next Sunday.



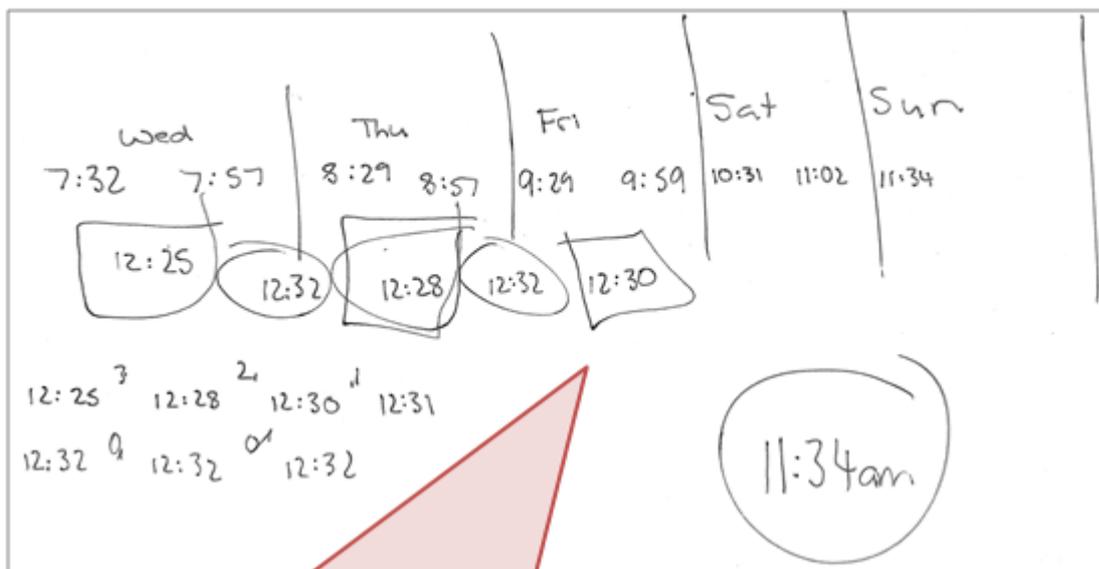
(Tide chart from Otago Daily Times, 29/10/2014)

## The arithmetic approach

The student is able to solve the problem, with guidance.

Prompts from the teacher could be:

1. Which will be the most useful for you to use? The graph or the table of times for high tide? Or both?
2. How many high tides occur on each day?
3. Consider how many high tides will occur after Friday, before one occurs on Sunday during the daytime.
4. Find the times for the high tides for St Clair over the three days featured.
5. Find the time between high tides.
6. Use the time between high tides to work out when the next high tide will be, and the next few after that.
7. Choose the forecasted high tide that occurs during daylight on the following Sunday.



T: Tell me about your working here. It looks very well ordered.

S: I looked for all the high tide times at St Clair, and I listed them on their own so that all the other numbers weren't distracting me.

T: And then you've got some other numbers after those.

S: Yeah, I worked out the time differences, and they are all different by a minute or two.

T: So how did you decide to use the time differences?

S: I just decided to use the differences for the daytime high tides because that's what we want to predict with.

## The conceptual approach

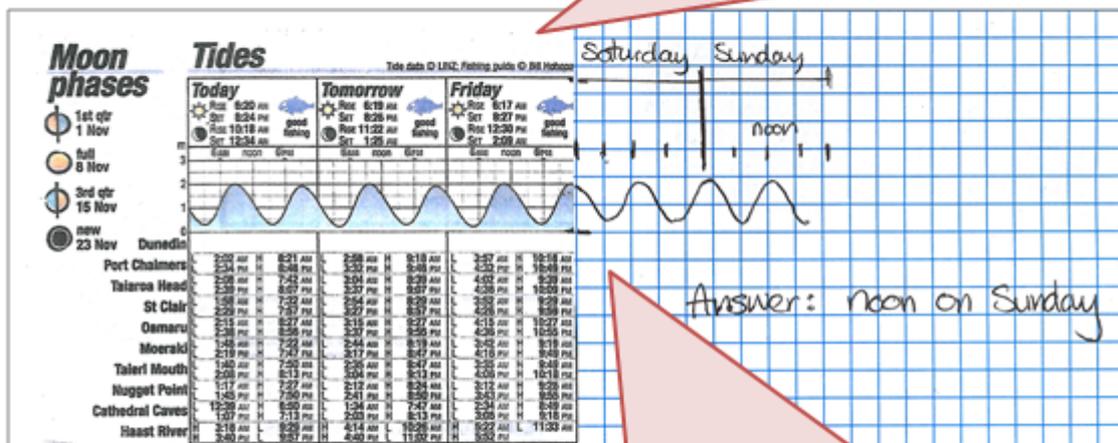
The student is able to solve the problem, within the context given.

Prompts from the teacher could be:

1. Which will be the most useful for you to use? The graph or the table of times for high tide? Or both?
2. How many high tides occur on each day?
3. Consider how many high tides will occur after Friday, before one occurs on Sunday during the daytime.
4. Forecast the high tide that occurs during daylight on the following Sunday.

T: Tell me about how you answered the question.

S: I extended the graph on my own paper. I traced the scale and the waves to find out where the peaks were on Sunday. The pattern should keep on going and the other high tide was in the middle of the night.



T: This is a very tidy graph. How did you manage the scale so well?

S: I chose square paper but the scale didn't match so I traced the time markings too.

T: And you didn't write numbers on those time markings.

S: No, because it's just the same scale and I could count along, as long as I didn't mix up the days, so I wrote those on.