



## student activity



Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

Science Education Program

School: \_\_\_\_\_

Brace yourself for a wave of exhilaration as you prepare to face one of modern Science's most fascinating innovations. The surging wave of 2685m<sup>2</sup> of water, rising to a height of up to 1.5m is propelled by nothing more than... thin air! Discover how scientific inventions lead to the development of new technology as you learn how a series of fans and plumes pushes the boundaries of wave pool technology to create the perfect wave.

### Syllabus Outcomes

#### Years 6 and 7

**Science and Society D4.5** Students examine and evaluate the potential applications of scientific ideas and inventions.

#### Years 8 and 9

**Science and Society 5.3** Students analyse the relationship between social attitudes and decisions about the applications of science.

#### Year 10

**Science and Society 6.1** Students evaluate contributions to the development of scientific ideas made by individuals and groups in the past and present, and consider factors which have assisted or hindered them.

**Science and Society 6.3** Students use scientific concepts to evaluate the costs and benefits of applications of science.

**Science and Society DB6.3** Students suggest probable, possible and preferred options regarding future applications of science, and the sustainability of those applications.

### Equipment

Student activity sheets, pens/pencils, calculators, stopwatches, plastic metre rulers (optional)



Activities with this symbol may be completed while you're lining having lunch at WhiteWater World, or after you leave WhiteWater World.

### Standard Achieved

S&S D4.5	S&S 5.3	S&S 6.1, S&S 6.3, S&S DB6.3
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### Background Information for Question 1

The Cave of Waves utilises a “Pneumatic Boogie Waves” system created by Murphy Waves Ltd in Glasgow, Scotland. It represents one of the most revolutionary wave-generating technologies in use in the world today. WhiteWater World engineers provided the following explanation of how the system works.

The wave pool “throat” width (in this case 25m) is sectionalised into 8 separate chambers or caissons. Through these 8 caissons, high volumes of low pressure air is injected and released in sequence in accordance to the wave pattern required. The result is the “pushing” of water forward from the cave end towards the beach. The force causes waves to form as well as moving forward towards the beach. The air is supplied by 5 x 75 kW high performance fans that are regulated by a number of preset computer programs, with easy selection on a dial. The timing of duration and sequence of the chambers can be changed to make all different kinds of waves.

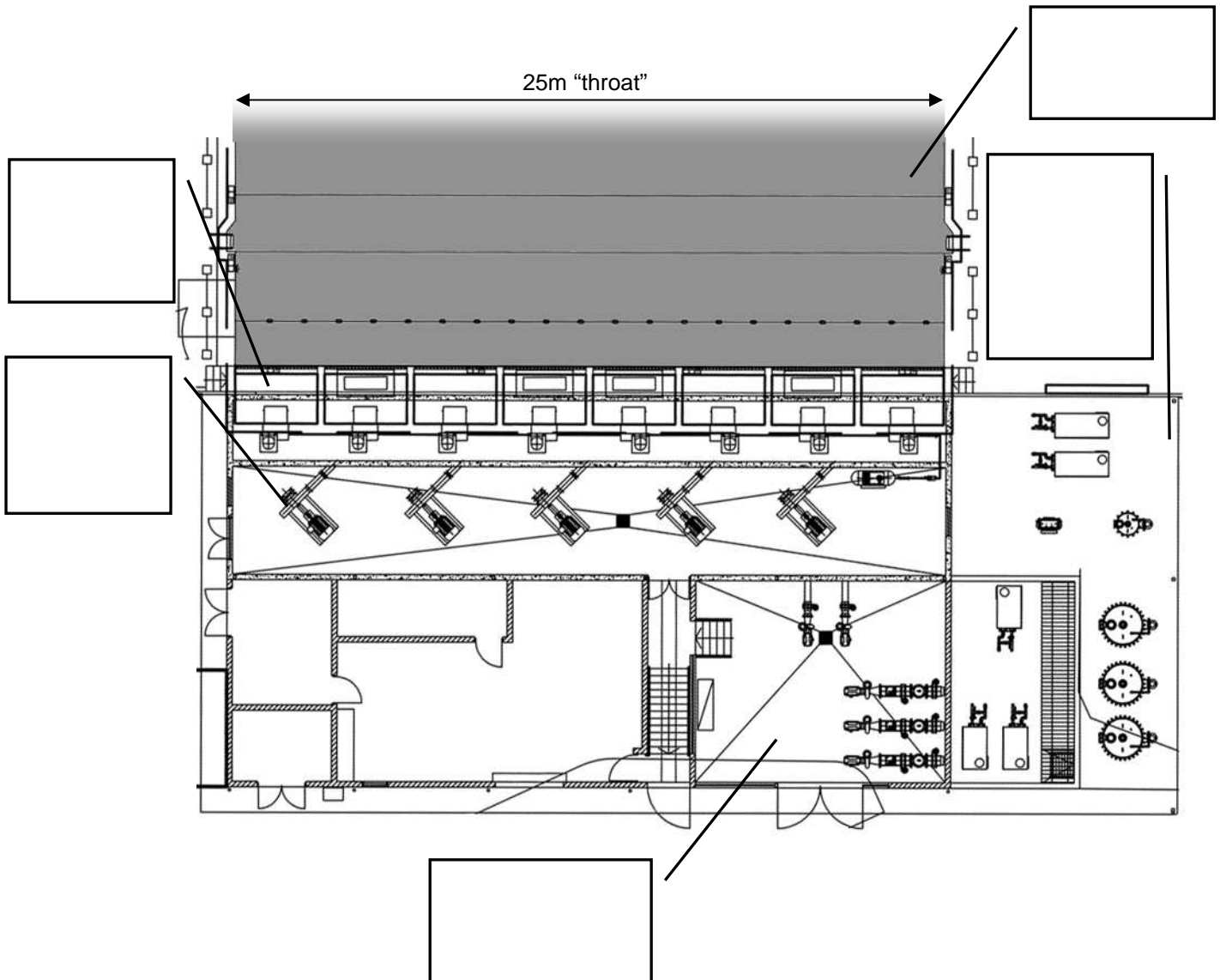


**Question 1 (Level 4 Outcome)**

The diagram below is a plan view of the system, with part of the wave pool visible.

Use the description and pictures on the previous page to write the correct descriptions in the labels below.  
Choose from these descriptions:

- 5 High performance fans
- Wave pool
- Pump room with 5 pumps
- 8 Chambers or caissons
- Filter room with 3 large and 1 small filters



**Did you know?**

The wave generator can be run on fewer than five pumps, reducing the running costs during periods when the pool may be quiet, or when the wave system is being used in the evening to provide 'atmosphere'. It also allows any of the pumps to be removed or serviced without disrupting the operation of the system.

*Standing near the deep end of The Cave of Waves, the submerged passages that lead to the chambers can be seen.*

**Question 2 (Level 4 Outcome)**

The three steps below show the stages of operation of the wave chambers as they create waves. Copy the correct description from the three below to match the diagram in each of the steps.

“Air is exhausted from the chambers allowing the water level to rise within the chambers.”

“No wave action.”

“Air is pumped into the chambers, pushing water down and out into the pool to form waves. The pool water level rises during this action and peaks at the set wave height.”

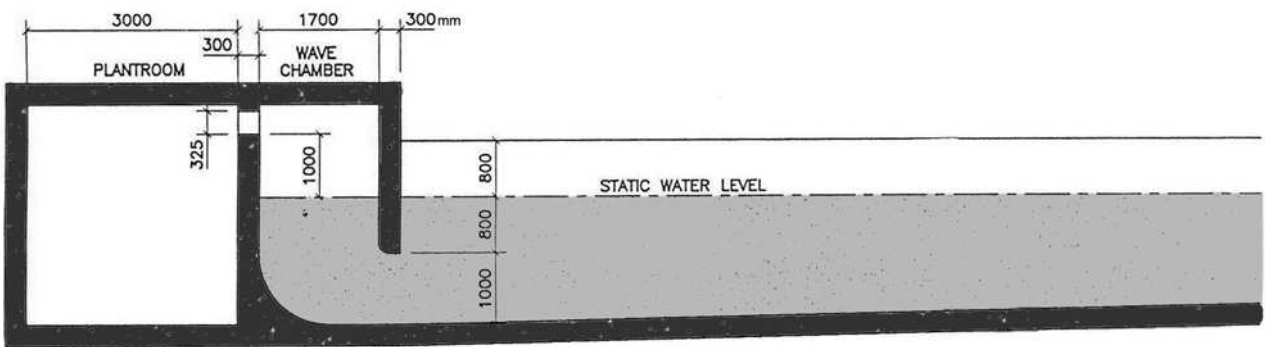
**The Principle of Artificial Wave Generation**

Step 1 \_\_\_\_\_

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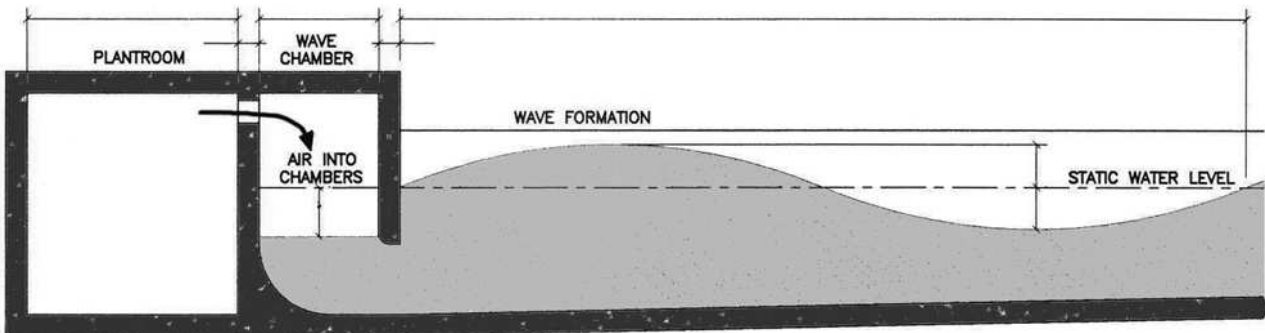


Step 2 \_\_\_\_\_

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Step 3 \_\_\_\_\_

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