

renewable environment

student activity



Science Education Program

Name: _____

Teacher: _____

School: _____

What would you do differently if you were designing a water park in the middle of the worst drought in Australia's history? You might be surprised to learn how much the responsible management of resources influenced the design of WhiteWater World. This activity takes you into the minds of WhiteWater World engineers to investigate the water-saving mechanisms employed in the park.

Syllabus Outcomes

Years 6 and 7

Earth and Beyond 4.3 Students summarise information to compare ways in which different communities use resources from the Earth and beyond.

Years 8 and 9

Earth and Beyond 5.3 Students prepare scenarios about the use of renewable and non-renewable resources of the Earth and beyond.

Year 10

Earth and Beyond 6.3 Students argue a position regarding stewardship of the Earth and beyond, and consider the implications of using renewable and non-renewable resources.

Earth and Beyond DB6.4 Students use the ideas and concepts of science to evaluate ways in which human activity could be modified to create a sustainable future.

Science and Society D6.4 Students make presentations supporting the different sides in debates about controversial applications of science.

Life and Living DB6.3 Students examine potential long-term effects of human activities on the environment.

Equipment

Student activity sheets, pens/pencils, calculators



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

Standard Achieved

E&B 4.3	E&B 5.3	E&B 6.3, E&B DB6.4, S&S DB6.4, L&L DB6.3
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Regenerative Media Filtration

Question 3 (Level 5 Outcome)

The most important water saving strategy employed by WhiteWater World is the use of a “Regenerative Media Filtration” (RM) system.

Traditionally, water parks around the world operate a “High Rate Sand Filtration” (HRS) system. If WhiteWater World used this system its annual filtration requirement would be 22 642 551 litres of water. Using the RM system, its requirement is 303 619 litres.

Calculate the volume of water saved every year using the RM system.

Volume saved = _____ L

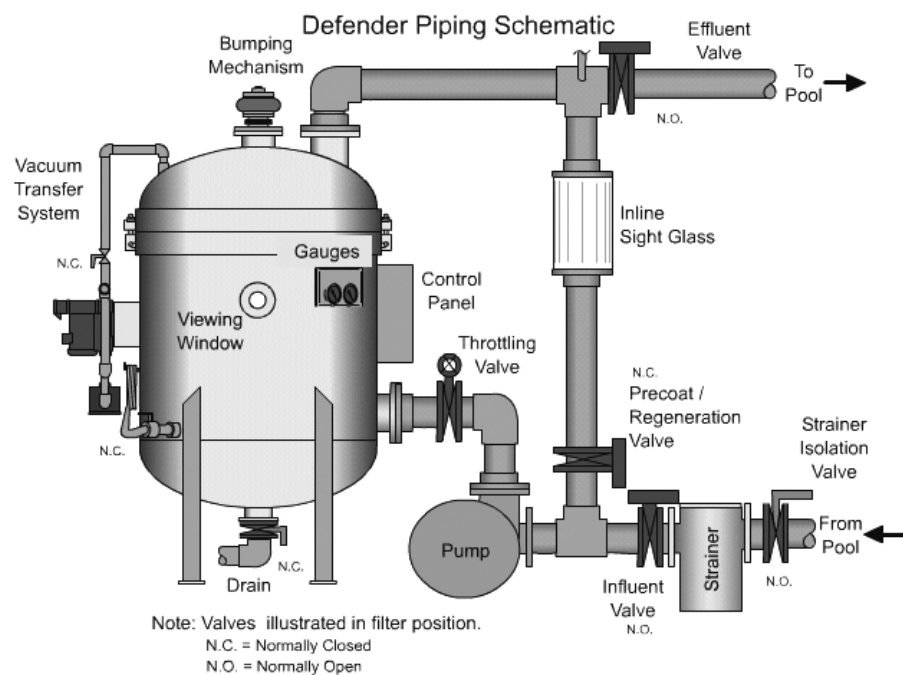
Calculate the volume saved as a percentage of the total (22 642 551 L).

Percentage saved = _____ %

WhiteWater World employs a “Defender” Regenerative Media Filtration system from filter manufacturer Neptune-Benson.

A fine filter powder called “Perlite” removes all particles from the water which are larger than 4-5 microns ($4-5 \times 10^{-6}$ m). That is, right down to a few thousandths of a millimetre!

The tremendous water savings achieved by this system are by virtue of the fact that the filter media does not require cleaning by running water through backwards (back-washing).



Question 4 (Level 6 Outcome)

The innovative cleaning system utilised by the Regenerative Media Filtration System is explained in the following seven steps. Match the descriptions below with the diagrams on the following pages, and copy the description next to its diagram.

When the filter powder becomes laden with collected dirt, the filter will go through a "bump" cycle. The flex tubes are shaken each day to release the powder and collected dirt. This process is performed automatically by hydraulics and does not waste any water.

After the Perlite is sucked into the filter it is cycled through the filter to "precoat" the tubes.

The filter consists of hundreds of "flex tubes" through which the water to be filtered will flow. In the first stage, the filter powder "media" (Perlite) is sucked into the filter.

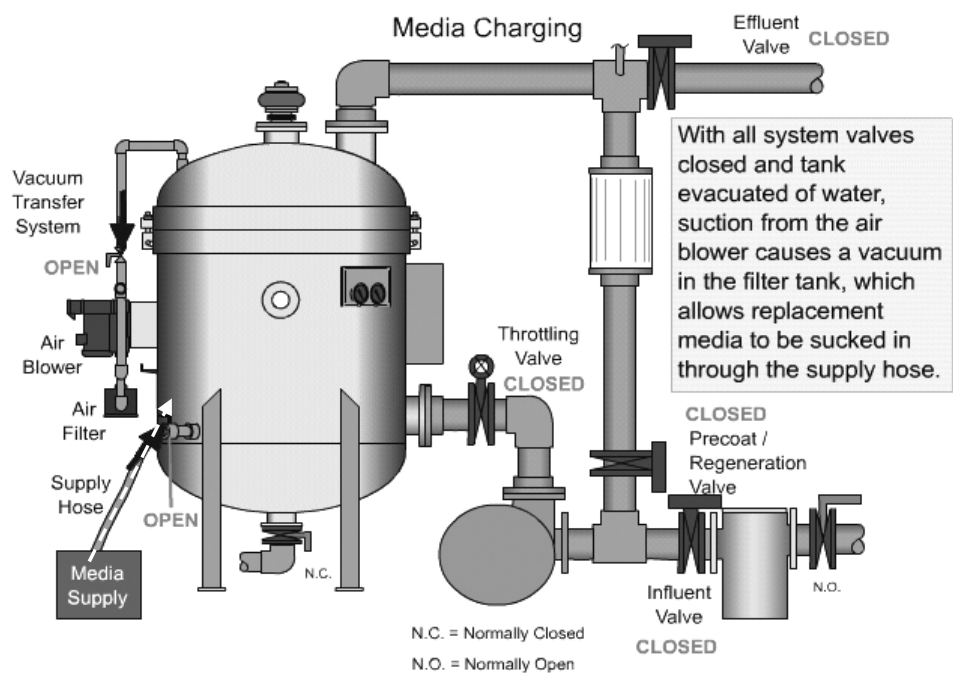
When the tubes are fully coated with Perlite the filter is ready for operation.

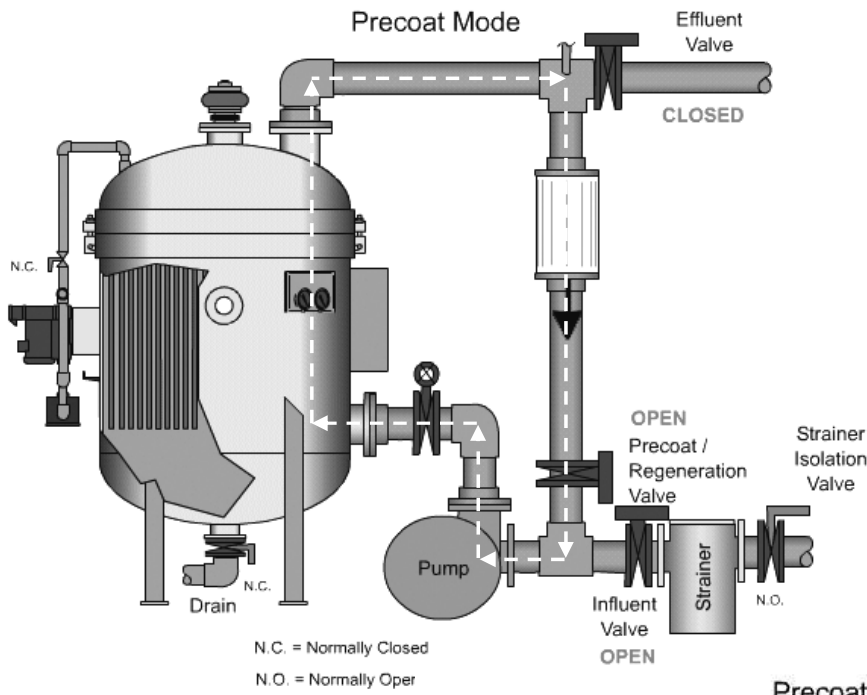
As the water to be filtered passes through the flex tubes, the filter powder removes dirt and fine particles.

Perlite sticks to the tubes.

After a number of bumping cycles, the filter powder and dirt is discharged through the drain. This is the only stage at which water wastage occurs, and only one filter full of water is lost.

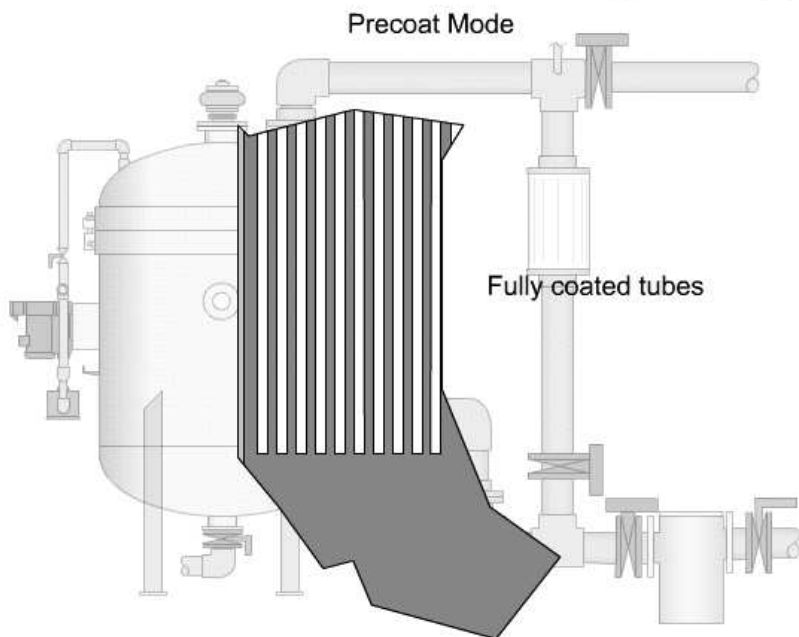
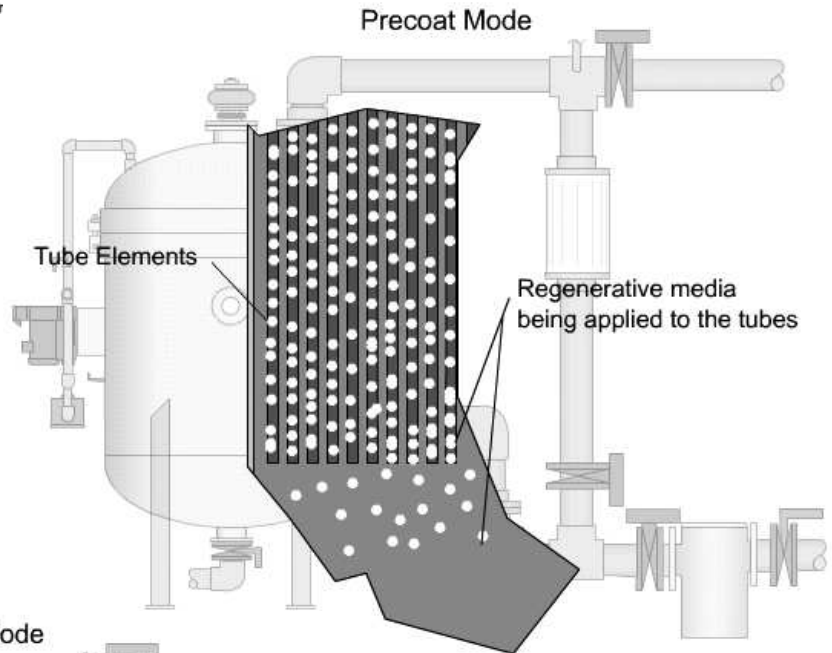
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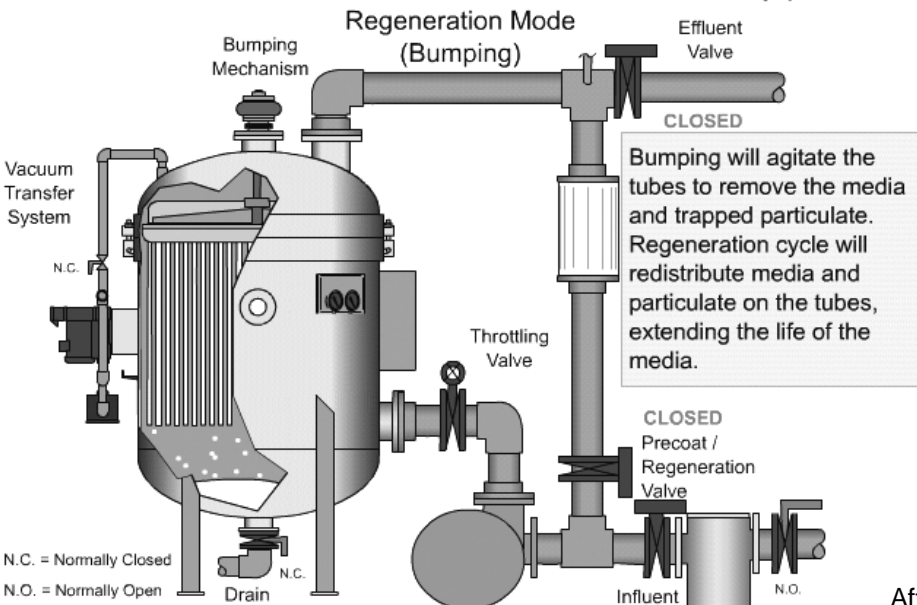
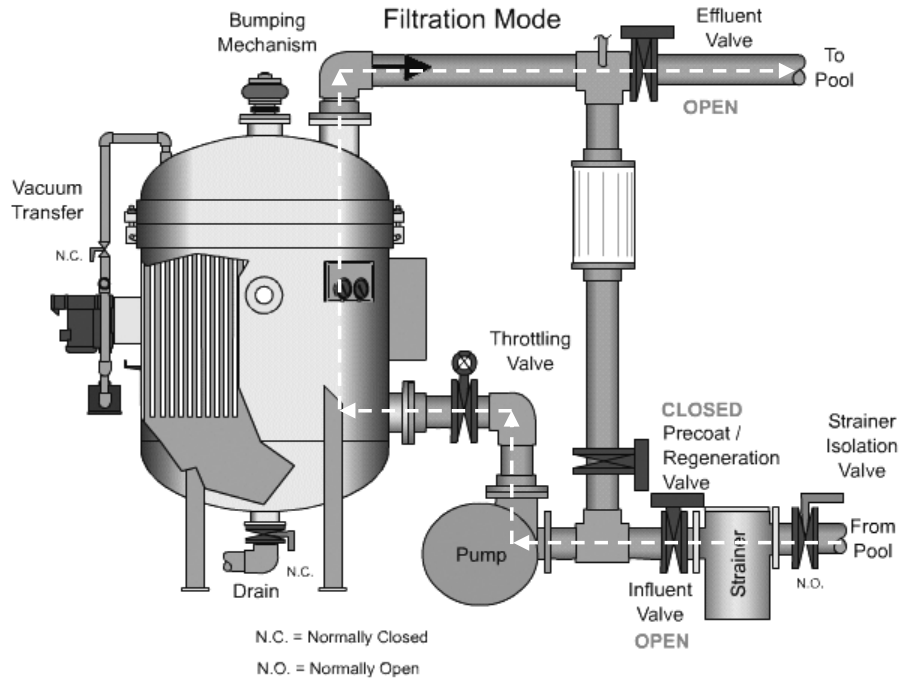
2. _____

3. _____



4. _____

5. _____

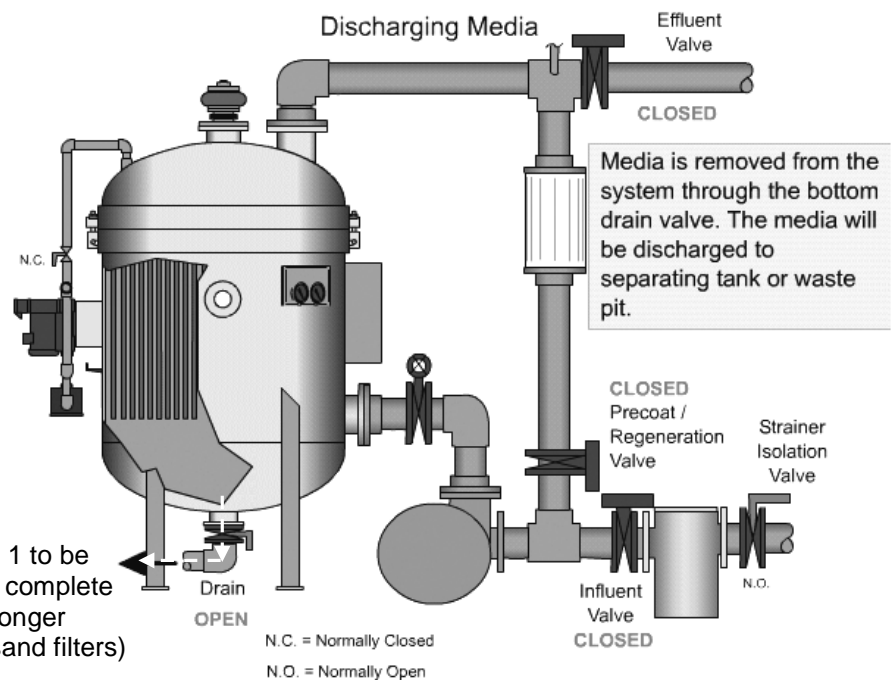


Bumping can be programmed to occur at intervals desired for maximum performance

6. _____

After bumping, the system enters a precoat cycle, which redeposits the powder back on to the flex tubes.

7. _____



The system then returns to Step 1 to be recharged with new media. This complete cycle normally lasts 30 days or longer (twice as long as for traditional sand filters)

