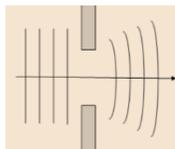


## Waves Diffraction

### Definitions

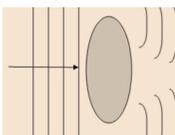
#### Diffraction of waves through a gap

Maximum diffraction (spreading out) occurs when the  $\lambda$  is approximately equal to the size of the gap/obstacle.



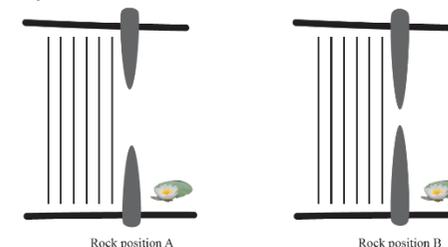
#### Diffraction of waves around a barrier:

The longer the  $\lambda$  the greater the diffraction around each edge of the barrier. The physical process of waves spreading as they pass through a gap is known as diffraction.



### Questions

Water (2016;2)



At one end of a pond, there are two large rocks that can be made to partially block the waves as they move from left to right. A water lily is floating beyond the rocks. By changing the position of the rocks, Tim can cause the water waves to move the floating water lily.

- Name the process by which waves could reach the floating water lily.
- Complete both diagrams to show the pattern created by the waves as they pass through the gap between the two rocks in both rock position A and rock position B.
- Use your answer to part (ii) to decide whether the waves reached the floating water lily using rock position A or rock position B. Give a comprehensive explanation as to why this rock position affected the waves more than the other rock position.

### Terms

**Diffraction:** Bending of waves around a barrier/through a gap

### Tips

- There are no equations in this part of the topic – just diagrams and descriptions.

### Answers

- Diffraction.
- Diagrams completed showing:
  - little diffraction of wave fronts for A
  - diffraction / semi-circular wave fronts for B
  - both diagrams show wavelength remains unchanged.
  - The waves reached the lily using rock position B.
- The closer the width of the gap is to the size of the wavelength of the waves the more the waves diffract and therefore spread out. Little diffraction with A because the gap is very much bigger than the wavelength and so waves do not diffract much and do not reach the lily. The small gap for B is similar in size to the wavelength of the incoming waves and waves would reach water lily because of significant diffraction.