



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

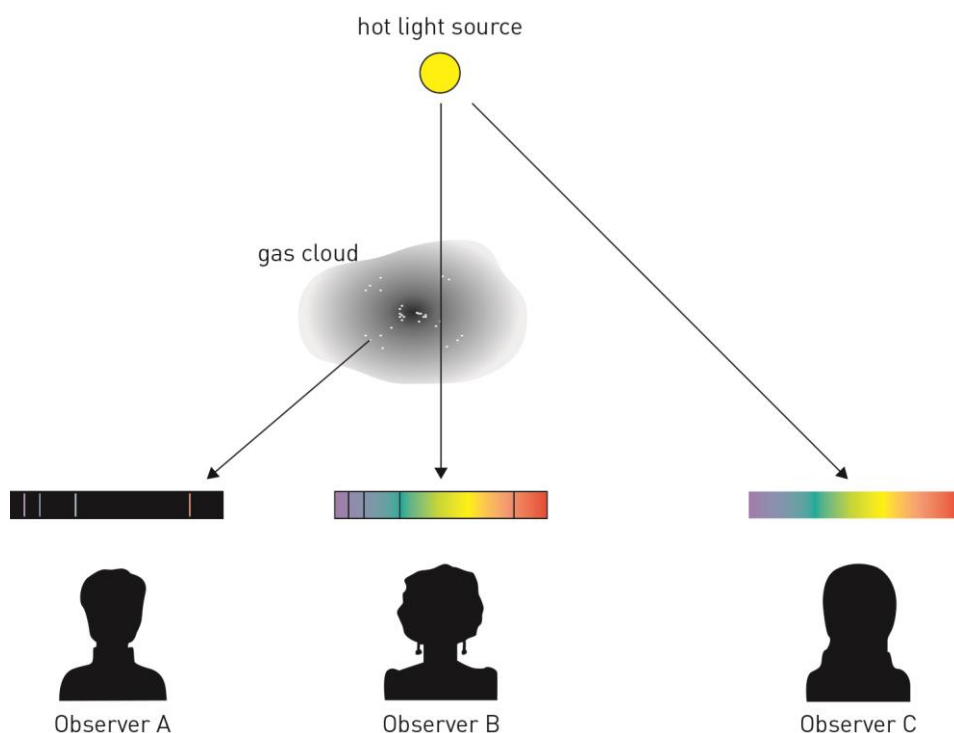
Class: \_\_\_\_\_

## Student worksheet

### 6.4 The galaxies are moving apart

Pages 146–147

## Spectra, the Doppler effect and galactic motion



1 In the diagram above, which observer would see:

a a continuous spectrum?

b an emission spectrum?

c an absorption spectrum?



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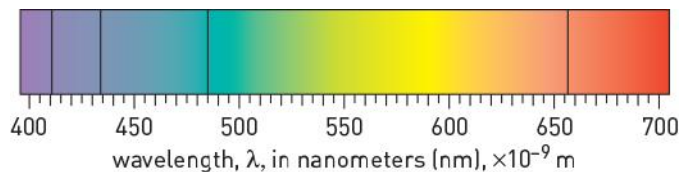


Figure 1

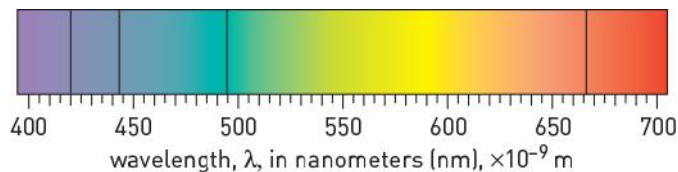


Figure 2

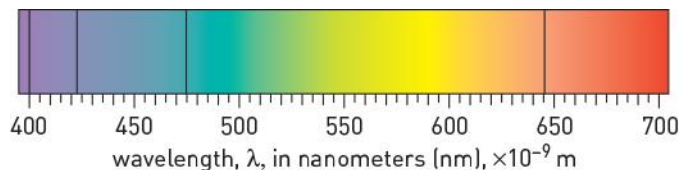


Figure 3

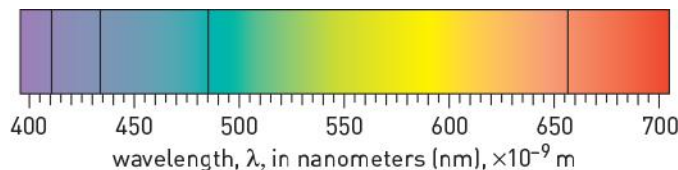


Figure 4

- 2 Figure 1 shows a spectrum for hydrogen obtained in the laboratory. Which of Figures 2–4 best represents the hydrogen spectrum for a galaxy that is heading towards Earth? Explain your answer.

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- 3 What did Edwin Hubble discover about distant galaxies that helped provide evidence for the Big Bang theory?

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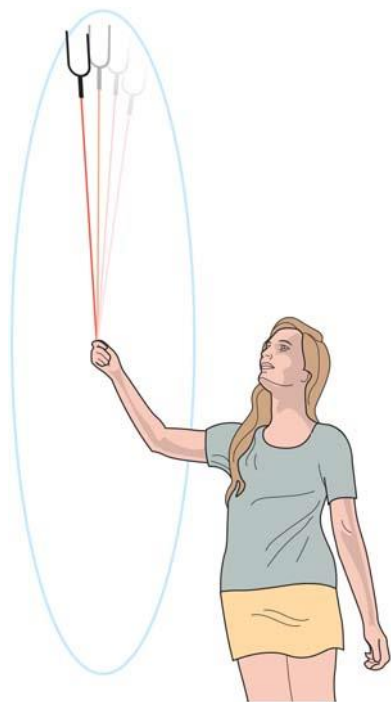


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## Extend your understanding

The Doppler Apparatus (shown below) can be used to understand how the Doppler effect works. To use it, you tie the apparatus to a rope and swing it around in circles. As the apparatus moves in circles, it produces a noise.



- 4 What would you expect to happen to the noise from the apparatus as it is swung around in a circle?

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- 5 Select an example of where else you may hear the Doppler effect in action. Describe how the effect would work in that situation.

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