

## Questions: diffraction

1 A section of a Hubble Space telescope image is shown below.



Credit: ESA/Hubble & NASA.

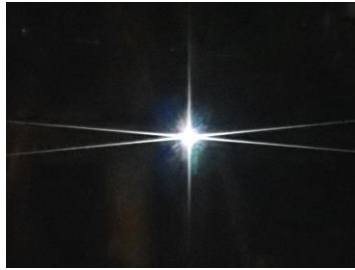
- a What causes the spikes that surround stars in this Hubble image?
- b Why are all the objects not surrounded by spikes?
- c Explain briefly why images of stars in refracting telescopes do not have surrounding spikes but images of street lights taken with digital cameras do.

2 Diffraction patterns surround the lights in this digital camera image.



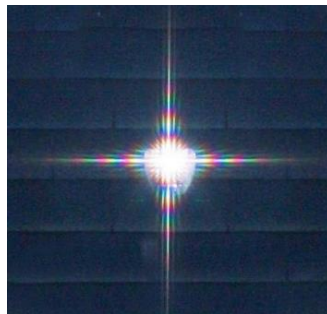
- a Assuming that no special filter has been used outline the most likely cause of the diffraction spikes.
- b The pattern on the left appears to be double. Suggest the most likely reason.

**3** The diffraction pattern was made by photographing a bright LED through a small triangular aperture.



**a** Draw the shape of the aperture.

The image below was taken through a screen door.



**b** Describe the screen and outline the reason for the colours in the spikes.

The Street light in this image (taken with a diffraction filter) is surrounded by a more complex pattern.



**b\*** What can you say about the filter and how might a similar pattern be achieved with an aperture?

4 We have a telescope in the office.



a Describe the diffraction pattern you would expect to see around bright star images.

A second telescope has the six pointed pattern around bright point sources.



b In what ways could this telescope differ from the one above?

We had the telescope above in the workshop for a week and when it came back we neglected to check the repairs. After return star images looked like this.



c What do you think has been changed or left out?