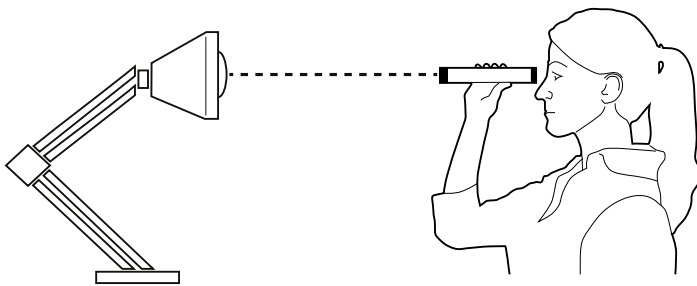


## UNDERSTANDING STARLIGHT: EXOPLANET ATMOSPHERES

If you look at stars in the night sky, you may notice that they have different colours. This is because some stars (the reddish ones) are cooler than others. Blue-white stars are the hottest. Astronomers can also find out the chemical elements present in a star. They do this by separating out the different wavelengths in the star's light.



**Spectrum**

There are two ways to split up light to see the spectrum of wavelengths it is made up of: using either a prism or a diffraction grating. In this activity you will use a diffraction grating to see the colours present in light from some different sources.

### What you'll need:

- Light sources (filament lamp, fluorescent lamp, sodium lamp, LED torch, Bunsen flame)
- Diffraction grating or spectroscope
- Sodium chloride (common salt) – a few grains

### What you need to do:

1. Look at a filament lamp through the diffraction grating or spectroscope. You will see a spectrum. Record the colours you observe.
2. Repeat with the other lamps. Are all the colours of the spectrum present? Are any colours brighter than the rest? Record your observations.

3. Look at the light coming from the Bunsen flame. Now drop a few crystals of salt into the flame so that it turns orange. (This colour is due to the sodium atoms in the salt.) Observe the spectrum of this light. Which colours can you see? Which is brightest?

### Emitting and absorbing light

The sources you have observed are sources which emit light, just like a star. The spectra are called emission spectra, and these can tell us about the chemical elements present in a star.

Planets are colder than stars. We see them by reflected and transmitted light. Astronomers can find out about planets and their atmospheres by seeing what wavelengths of light they absorb.

## EXOPLANET ATMOSPHERES: ABSORBING AND TRANSMITTING LIGHT

Watch a demonstration which shows how light may be absorbed by a gas. Record your observations below. Your explanation should include at least one of the following words: absorbs or transmits.

Demonstration	Observation (is there a shadow of the flame?)	Explanation
White light is shone at a Bunsen flame.		
Sodium chloride is added to the flame.		
Light from a sodium lamp is shone at a Bunsen flame.		
Sodium chloride is added to the flame.		

**Taking it further** Use the internet to research which atoms and molecules scientists search for when looking at exoplanet atmospheres.