NAME:

Exoplanet Detection Methods
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Here are five major exoplanet detection methods. Assume that we know in each case the host star's distance and spectral type (meaning its star's mass, radius and temperature). For each method, here are:
i) the name
ii) briefly how it works
iii) whether it's distance-dependent or independent
iv) what we learn about the planet from each method given current technology

Name	How It Works	Dist. Dep. or Indep.	ONE Thing We Learn from this Method
radial velocity	Doppler shifts of star from planet's gravity	indep.	direct: minimum mass indirect: temperature
transit	planet blocks star's light when it crosses in front of it (= "transits")	indep.	direct: radius indirect: temperature
microlensing	planet bends starlight from a star FAR behind it (not its own)	indep.	direct: mass
direct imaging	we take a picture of the planet beside its star	depend.	direct: color dir/indir: temperature indir: radius (if we estimate its albedo)
astrometric wobble	planet's gravity pulls star sideways (in plane of sky)	depend.	direct: mass indirect: temperature

Note: If we combine two methods, for example radial velocity (which gives mass) and transit (which gives radius), then we can work out a planet's composition. If we know a planet's orbital period (say from the radial velocity, transit, direct imaging or astrometric wobble methods), then we can work out its temperature based on Kepler's 3rd Law and thus the distance to its host star.

To learn about any elements or molecules in a planet, we must take a spectrum of its star during a transit and work out what is in the planet's atmosphere, if it has one – a hard measurement, but possible to do. If we have a planet's color from direct imaging, that can give clues to its composition, too.