

## Life on other planets

Your team of scientists and engineers has been hired by NASA to help determine which newly-discovered extra-solar planets (planets outside our Solar System) might harbor life. Astronomers provide you with a list of the planets and their characteristics. For life to exist, we assume a planet should have oxygen in its atmosphere but no hydrogen—the combustibility of hydrogen deters the necessary chemical reactions needed for respiration. Also, the planet should have liquid water.

Consider molecular oxygen  $O_2$  and hydrogen  $H$ . The mass of  $H$  is  $1.67 \cdot 10^{-27}$  kg, and the mass of  $O_2$  is 32 times larger.

Planet	Diameter (km)	Mass (kg)	Surface T (K)	Surface P (atm)
$\beta$ Pictoris b	209,000	$2.1 \cdot 10^{28}$	1724	10
51 Pegasus b	143,000	$8.7 \cdot 10^{26}$	1284	0.001
$\rho$ Ophiuchus b	140,000	$6 \cdot 10^{24}$	290	0.1
$\alpha$ Canis Majoris	22,000	$1 \cdot 10^{24}$	600	20,000

**On which planets would you suggest scientists and engineers focus their search for living organisms?**

