

only element with this property

Water

small molecule --> gas at room temperature
but polymer formation --> liquid
on evaporation, not a polymer

universal solvent

very high heat capacity

expands on freezing

RIGHT ENVIRONMENT

Temperature

right in range for water to be liquid

Water

abundant compared to rest of solar system

Atmosphere

oxygen level in right range (21%)
much less, not enough for animals
much more (25%), plant life burnt up

Gravity

if one fourth, too little atmospheric pressure

if twice, too much greenhouse effect

The Sun

Size:

20% larger: sun would already have used up fuel

20% smaller: too little blue for photosynthesis
earth (closer) would spin down, too long day
and night

Sun's Variation in Luminosity:

if too much, then life killed

already "too much" (25%) over past 4 billion years
but greenhouse effect "turned down" just at right
time by plants producing oxygen

even with this turndown,

if earth 5% closer to sun, runaway greenhouse early
would have killed plants