USING PLANET 10 AT KEYSTAGE 3/4

Here is one approach to using Planet 10 with a whole class. You will need to be able to present the images on a screen large enough for all to see.

The emphasis is on considering whether a planet might be fit for life.

Part 1: The Solar System

This is an opportunity to review pupils' knowledge of the solar system. It will also provide useful experience of looking at the solar system model when you eventually launch your own Planet10.

- **Watch the planets as they orbit the Sun.**
  Use the solar cam control to switch to view from above. Zoom in and out.

- **Identify some of the planets.**

- **Watch out for comets** as they plunge in towards the Sun, pass round it, and move out into the depths of space.

- **Ask pupils to comment on the shapes of the orbits of planets and comets.**
  What role does gravity play in the solar system?
  (Planets have almost circular orbits; comets have highly elliptical orbits.
  The Sun's gravity holds the planets in their orbits – without it, they would disappear off into space.
  Comets speed up as they approach the Sun, because its gravity is getting stronger.
  They slow down as they move away from it.)

- **Ask pupils to suggest how the planets' temperatures will vary.**
  Which will be hot, which cold?

- **Use the information pages** accessed via the left of the screen to check values for some planets, compared to Earth.
  (In general, planets near the Sun are hotter than those further way.
  However, Venus is hotter than Mercury. Two factors: a planet's atmosphere can produce a greenhouse effect – that's why the Earth is warmer than the Moon.
  A planet which rotates slowly will have bigger day-night variations.
  What would we notice if the Earth rotated more slowly, or more quickly?)

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- **Ask pupils why we have seasons.**
  Compare tilts for different planets using the information pages.

- **Ask what else might cause seasons.**
  (An elliptical orbit would give seasonal variations as a planet orbits the Sun.
  However, we have seasons which are opposite on opposite sides of the Earth –
  Winter in UK while Summer in Australia. An elliptical orbit would give us all winter when furthest from Sun, summer when closest.)

- **What implications might this have for life?**
  (Life would not like temperatures which varied greatly between seasons.)

- **A big question: How do we know about other planets?**
  (Observations from Earth with telescopes;
  observations from spacecraft which have flown past, or landed.)

- **In the past, people have thought** that both Mars and Venus might be inhabited by intelligent beings. We can't see the surface of Venus, because of its cloudy atmosphere.
  Mars was thought to have canals, and hence water.

- **Look at the information pages on these planets.** Venus has an acidic, carbon-dioxide-rich atmosphere with a strong greenhouse effect giving rise to very high temperatures.
  Mars has now been visited and is predominantly arid.

- **Ask whether these planets might be modified for life, and if so, how?**
  (Venus – probably impossible. Mars – atmosphere needs altering, and water is also required.)

You have now considered most of the factors associated with life on the planets, and you can go on to design your own Planet 10.

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Part 2: Designing Planet 10

Work your way through the sections. Ask pupils to predict the effects of each change before you operate the controls. For example:

- **We can make our planet spin faster or slower.**
  What differences would we notice if the Earth were to spin faster?
  (Shorter days and nights. The Earth would have to spin much faster if it was to spin us off into space.)

- **Try spinning the model faster, and watch for Alert messages.**

- **What differences would we notice if the Earth were to spin slower?**
  And if were to spin in the opposite direction?
  (Longer days and nights; greater temperature differences between night and day.
  In the opposite direction, the Sun would cross the sky from west to east.)

- **Slow the model's spin; reverse it; watch for alert messages.**
  Agree on a suitable rate of spin.

Once you have designed your planet and named it, you are ready to launch it into the Solar System.

Part 3: Launching Planet 10

This section should be fun. Watch for warning messages, and disasters.

If you have a planet which comes to a sticky end, ask pupils to explain what went wrong, and how they could have modified the design to last longer.

If you have a successful planet which lasts a long time, ask pupils to summarise the features which make a planet suitable for life. They could do this using the same scheme as the 'designing a planet' section of Planet 10:

physics	size, tilt, spin
chemistry	atmosphere, surface
biology	bacteria, plants, animals, Earth visitors, aliens
orbit	shape, diameter