

## Overview of relevance of Magic Planet to the National Curriculum

### A. Science - New (October 2006) KS4 Curriculum

#### 3.7 (iv) Environment, Earth and universe

a) Human activity has measurable effects on the whole biosphere. These are due to population, use of resources, industrial processes, and levels of pollution and waste. Understanding of these effects is based on field measurements of biotic and abiotic factors. Planning is needed at local, regional and global levels to manage sustainability.

Magic Planet content:

- o Global population density.
- o Use of resources..
- o Destruction of habitat.
- o Atmospheric pollution.
- o The Earth's carbon cycle.
- o Etc., etc.

b) Changes in the outer layer of the Earth result from the movement of tectonic plates. This causes slow changes, such as the position of continents and rapid changes, e.g. volcanic eruptions. The atmosphere originated from gases escaping from the Earth's interior; it has changed as living organisms have evolved.

Magic Planet Content:

- o The global and human effect of powerful seismic forces – e.g. the 2004 Tsunami wave spreading across the entire ocean surface within 40 hours.
- o The location and relative movement of tectonic plates.
- o How seismic activity is related to tectonic plate movement.
- o How the continents have moved over the last 300 million years.
- o Real-time feed of seismic activity.

c) Exploration of the solar system and the galaxies in the universe can be carried out on the Earth and from space. Current evidence suggests the universe is expanding and that it began with a 'big bang'.

Magic Planet content:

- o The planets (all of them)
- o Major moons within the solar system (e.g. Europa, Titan, etc.).
- o The Cosmic Microwave Background.
- o Star maps

## B. Geography: KS3

Unit

### Unit 2. The restless earth - earthquakes and volcanoes

Where do earthquakes and volcanoes occur?

What happens when a volcano erupts? Do volcanic eruptions have the same impact in different places?

What happens in an earthquake?

What happened in the 1995 Kobe earthquake in Japan?

Why do people choose to live in active zones?

### Unit 3. People everywhere

What is the world's total population? How and why is it changing? What will it be in 50 years' time?

Which parts of the world are densely and which sparsely populated and why?

What is a settlement? Where do we build our settlements and why?

### Unit 4. Flood disaster - how do people cope?

What causes floods?

Are the effects of flooding greater on the UK compared with Bangladesh?

### Unit 5: Exploring England

What links England with the rest of the world?

### Unit 8. Coastal environments

How do erosion and deposition create coastal landforms?

### Unit 10: Weather Patterns over Europe

What is the difference between weather and climate what can satellite images tell us about the weather?

What affects Europe's climate?

How does climate influence human activity?

What types of climate are found in Europe?

### Investigating Brazil

Where is Brazil located?

Who is making decisions on Brazil's future rainforest images needed?

### Unit 14: Can the earth cope – Ecosystems

What is the distribution of major vegetation type?

How are population and resources interrelated?

What is the world distribution of resources identification of patterns?

### Unit 18: The global fashion industry

How does the fashion industry link people around the world?

Trade patterns

### Unit 19: Tourism good or bad?

What is tourism? How important is tourism as an economic activity?

How and why is the tourist industry changing?

What is the impact of the tourist industry – good or bad?

### Unit 20: Comparing countries

What countries am I going to compare?

### Unit 21: Virtual volcanoes and internet earthquakes

Where do earthquakes and volcanoes really occur?

What causes earthquakes and volcanoes?

### Unit 23: Local action global effects

Antarctica world park: Ask pupils to consider how global warming may affect Antarctica and to discover what may happen as a result.

**C. GCSE Astronomy**

**SUN**

**Sunspots**

Phase 1 - Showing of sunspots over a number of solar revolutions, allowing us to see:-

- 1) The appearance of sunspots (umbra, penumbra and groupings)
- 2) The evolution and subsequent disappearance of sunspots
- 3) Some sunspots are sufficiently long-lived spots to show
  - (i) the rotation period of Sun
  - (ii) differential rotation (sunspots near solar equator rotate faster than those near solar poles)

Phase 2 - Showing the appearance of sunspots over a number of years, allowing us to see:-

- 1) At the start of the 11 year solar cycle, there are few sunspots
- 2) The majority of sunspots early in the 11 year solar cycle are located at intermediate latitudes
- 3) As the solar cycle progresses, the majority of sunspots tend to appear at lower solar latitudes

Relevant section of GCSE Astronomy syllabus

- 2.16 Describe the long-term drift of sunspots, and the sunspot cycle.
- 2.15 Describe the appearance of sunspots (umbra, penumbra and groups)
- 4.25 Describe how information can be obtained ..... including .....differential rotation of the Sun

**Solar eclipses**

Showing solar eclipses, illustrating:-

- 1) How partial eclipses vary from total eclipses
- 2) How ratio of Sun-Earth distance to Earth-Moon distance produces long or short or annular eclipses
- 3) Appearance of Baily's beads (as totality starts), and corona (during totality)

Relevant section of GCSE Astronomy syllabus

- 2.19 Describe the appearance of solar and lunar eclipses.
- 2.20 Describe with the aid of diagrams the mechanism causing solar and lunar eclipses.
- 2.21 Explain the different durations of eclipses of the Sun and Moon, and the reasons for partial and

annular eclipses.

2.22 Explain why the corona can only be observed from the Earth at the time of a total solar eclipse.

### **Transits of Mercury & Venus**

Showing transits of Mercury and Venus, to compare and contrast the sizes, speeds and appearance

Relevant section of GCSE Astronomy syllabus

3.14 Explain transits

### **MOON**

#### **Moon Phases**

Showing rotating Moon, half the Moon illuminated by Sun, half in shadow, allowing us to see:-

- 1) The far side of the Moon is NOT the same as the dark side of the Moon (common misconception)
- 2) Craters near the shadow terminator are more clearly defined than crater further away
- 3) Moon phase from earth is not the same as Moon phase from space away from Earth

Relevant section of GCSE Astronomy syllabus

2.04 Explain Moon's phases, shadow terminator and its effect on lunar observations

#### **Lunar eclipses**

Showing a lunar eclipse with lack of clear shadow terminator and coloured Moon due to Earth's atmospheric pollution

Relevant section of GCSE Astronomy syllabus

2.19 Describe the appearance of solar and lunar eclipses.

2.20 Describe with the aid of diagrams the mechanism causing solar and lunar eclipses.

2.21 Explain the different durations of eclipses of the Sun and Moon, and the reasons for partial and

annular eclipses.

#### **Features of the Moon**

Showing principal features highlighted on Moon

Craters, domes, maria, mountains, mascons, rilles, wrinkle ridges can be seen 'in situ'

Relevant section of GCSE Astronomy syllabus

- 2.05 Describe the principal features of the Moon.
- 2.06 Describe the origins of craters, domes, maria, mountains, mascons, rilles, wrinkle ridges.

## **JUPITER**

Phase 1 - Showing Jupiter spinning several times, to show differential rotation (equatorial regions spinning faster than other latitudes)

Phase 2 - Animation showing impact of fragments of Comet Shoemaker-Levy 9, with impact times related to rotational speed.

Relevant section of GCSE Astronomy syllabus

- 3.04 Describe the main physical characteristics of the planets
- 3.17 Explain the impact of Comet Shoemaker-Levy 9 with Jupiter in 1994

**CREATE A DYNAMIC MAP OF THE NIGHT SKY**, preferably with inverted constellations, so constellations shapes are easily recognisable, with option for star trails.

Relevant section of GCSE Astronomy syllabus

- 4.01 Recognise and draw Ursa Major, Orion, Taurus and Cassiopeia.
- 4.02 Draw the shapes of four other prominent constellations
- 4.03 Use pointers to find Polaris, and Orion's Belt to find Sirius.
- 4.06 State that different constellations are visible at different times of the night and of the year.
- 4.08 State what is meant by circumpolar stars
- 4.09 Interpret and use long exposure photographs of star trails
- 5.10 Describe the use of star trails and arcs around the pole

## D. History

Global history content for the Magic Planet matched to the national curriculum is available at modest cost from third-party software provider Time Maps ([www.timemaps.com](http://www.timemaps.com)). For example, the TimeMaps Interactive (KS3) map of World History can be used profitably with EVERY history unit studied.

According to the QCA:

*“Although pupils have a good in-depth knowledge of specific topics in history, they seem less confident about making links and connections between historical periods. The result is that they often fail to acquire an enduring and deepening knowledge of the past as they progress through key stage 3.”*

Ofsted, also, has highlighted one of their major concerns with history at key stage 3 as being the *“failure of pupils to gain a good overview of history as they progress through school.”*

The *Interactive Map of World History* offers an unparalleled opportunity for pupils to gain a broad overview of history. Brightly coloured, animated maps placed on an interactive timeline introduce the whole sweep of human history. This enables students to place key events in their chronological framework and make links between different periods. The main map sequence connects to a range of interactive modules including:

- The rise and fall of the Roman Empire
- Medieval England, Wales, Scotland and Ireland
- Exploration and discovery
- The Reformation
- The rise of European Empires
- The causes and course of the 2nd World War
- The causes and course of the 1st World War
- The Cold War

and much more ...

How does it work?

### 1. Key Map Sequence and Interactive Timeline

This is a sequence of world maps placed on an interactive timeline, each providing a “snapshot” of the world at a particular date. Together, these maps offer a broad overview of the entire span of recorded history, beginning when civilization got going in about 3500 BC and ending in AD 2005.

You can zoom in and out of the maps, allowing you to view the entire world or focus in on particular regions for a closer examination.

### 2. Information 'Hotspots'

Each map has a range of information 'hotspots' placed liberally over different areas of the map. The information 'hotspots' serve to provide an overview of what is happening in that particular region at that time. Included in many of them are carefully chosen images, used to illustrate key personalities, ways of life or events associated with that region.

### 3. Interactive Modules

Major historical events and episodes are covered in modules which contain interactive and animated maps; they illustrate the rise and fall of empires and civilizations, famous conquests, catastrophic epidemics and other dynamic episodes in history.

## **E. AQA Environmental Science GCSE**

The Magic Planet is relevant to all five themes in this GCSE curriculum, as follows:

### ***Theme 1: Air, Water and Energy***

9.1 Air: the atmosphere.

9.2 Water: the water cycle, uses of water, water supply, treatment and conservation.

9.3 Energy: renewable and non-renewable energy sources, fossil fuels, nuclear, energy conservation.

### ***Theme 2: Rocks and Soils***

9.4 Rocks: uses, mineral extraction.

9.5 Soils: formation, properties, erosion, conservation.

### ***Theme 3: Organisms and the Environment***

9.6 Life Processes: photosynthesis, respiration.

9.7 Ecosystem Processes: energy flow, circulation of materials.

9.8 Wildlife and Landscape Conservation: reasons, methods.

### ***Theme 4: Farming, Fisheries and Forestry***

9.9 Population: Population and food supply.

9.10 Intensification of Farming: mechanisation, fertilisers and pesticides, selective breeding, genetically modified organisms, controlled environments, Government policy, organic farming.

9.11 Fisheries: fish farming, sea fisheries.

9.12 Forestry: cultivation, uses, commercialism.

### ***Theme 5: Waste and Pollution***

9.13 Waste and Recycling: disposal, re-use, recycling.

9.14 Water Pollution: nutrients, organic matter, thermal, oil, monitoring and controlling.

9.15 Air Pollution: The Greenhouse Effect, Global Climatic Change, acid deposition, ozone depletion.

## **F. Art**

A 360 degree canvas! Art students can devise and produce their own content for the Magic Planet, either as still images that the device will rotate, as animations or as movies. It is possible to incorporate any digital input (e.g. video, music, graphics, etc.) and to set the device to run an art show automatically as part of a final exhibit. No programming skills are required for any of this.

## G. Citizenship

### KS3 Unit 21: People and the environment

This unit asks pupils to investigate the complexity of evaluating choices by considering values and scientific evidence together. A key subject for scientific investigation is the interaction between people and the environment, and how this differs both geographically and historically. By appreciating the wider impact of individual behaviours, pupils begin to consider the need for changing lifestyles, now and in the future.

Pupils are encouraged to consider the positive and negative effects of scientific and technological developments on the environment. They take account of others' views and understand why opinions differ. They evaluate the strength of the evidence they have collected. They select and use a wide range of reference sources. They communicate clearly the results of their research and explain its significance. They begin to appreciate the power and the limitations of scientific methodology

Some of the key learning outcomes for this unit are to make connections between their own actions and choices and the effects these have on other communities – locally, nationally and globally and to communicate their views to a chosen audience, having agreed an appropriate method of presentation and making appropriate use of ICT.

Magic Planet's role in unit:

- A source of relevant scientific content for the debate (e.g. pollution, human impact in the environment, global warming, etc. etc.).
- Provides global context for the impact of local decisions.
- Provides a new, highly relevant form of ICT for presenting data, persuading and building pressure for policy changes.