PHYSICS

OMEGA SECTOR

Brief summary of activity:

For this puzzle the user has to launch a spaceship and dock it with a space station, taking into account the effect of gravity. The user chooses the speed and direction of the spaceship, but once launched only gravity will steer the ship.

Specific Curriculum Area:

Year 9 — Unit 9J: Gravity and space, Section 1: What is gravity? Section 6: a. What keeps the planets and satellites in orbit? Section 7: b. What keeps the planets and satellites in orbit?

Assessment method:

Teacher observation.

Differentiation:

There is no obvious area of differentiation within this task except for the increasing difficulty when levels are completed.

Learning objectives:

Children should learn: that gravity is an attractive force which acts on the Earth towards the centre of the planet, that gravity is an attractive force between objects with mass, about how the idea of gravity was related to empirical observations; that the Sun is massive and exerts a very large gravitational force, which keeps planets in orbit; to relate the model of circular motion to data on the orbits of planets and satellites; that the Moon is a natural satellite of the Earth, whose orbit is maintained by the Earth's gravitational pull.

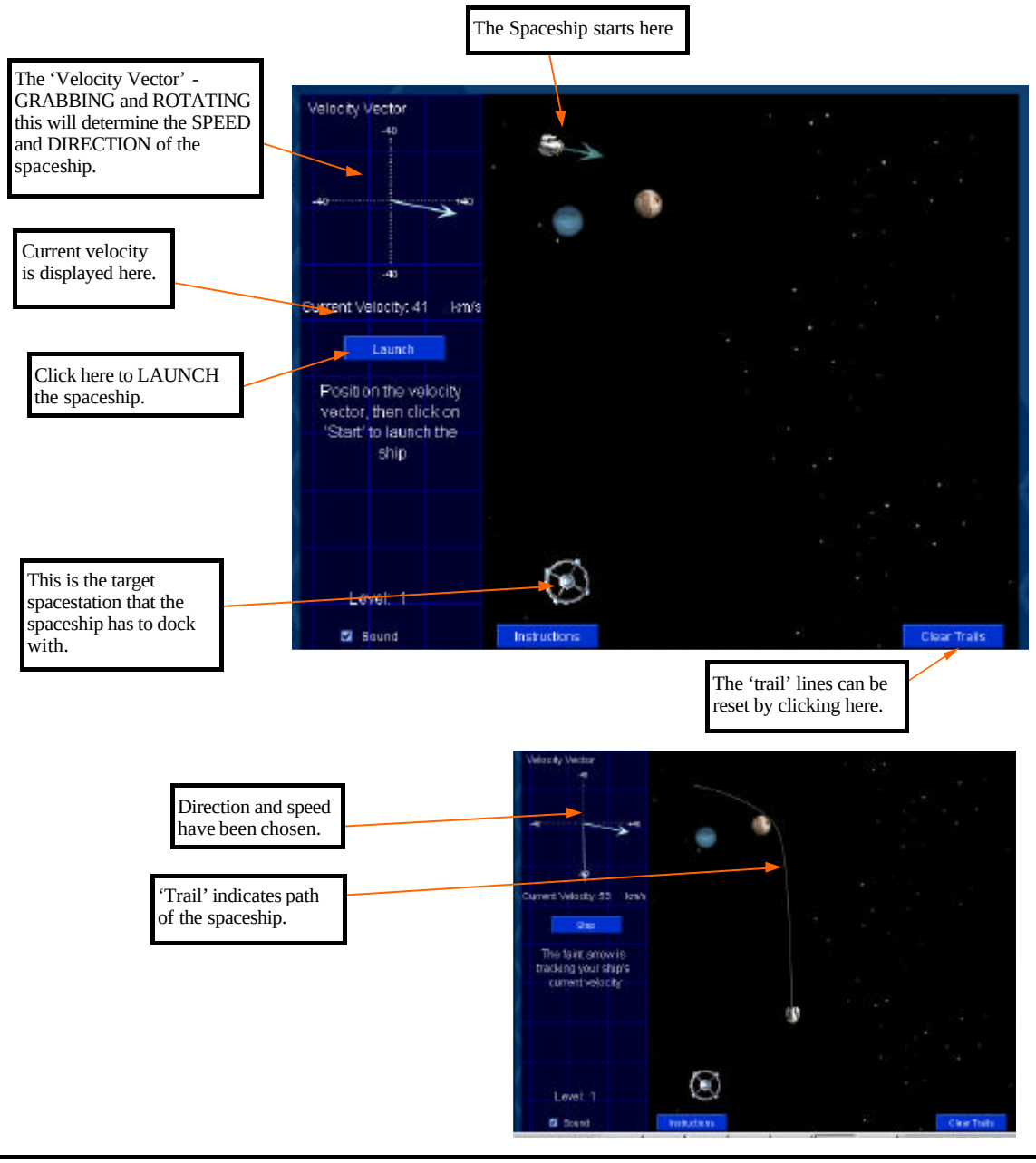
Use of Activity in a lesson:

This task could be set as a homework activity, assuming Internet access is possible. Alternatively, the teacher could demonstrate the task to the class (via an Interactive Whiteboard).

Hints and tips for teachers:

1. Tell pupils not to get frustrated if they do not succeed until having had many attempts—encourage trial and error.
2. At higher levels the planets shoot at the spaceship—so you must be aware of this!
3. Pupils having difficulty should keep the ‘trail lines’ visible so that they can see where their previous attempts have gone wrong.

URL:



Troubleshooting:

If you cannot change the direction or speed of the spaceship, ROTATE the 'Velocity Vector' to determine the direction, and DRAG the 'Velocity Vector' to determine speed. Then click 'LAUNCH'.

Other links:

http://www.standards.dfes.gov.uk/schemes2/secondary_science/sci09j/09jq1
http://www.standards.dfes.gov.uk/schemes2/secondary_science/sci09j/09jq5a
http://www.standards.dfes.gov.uk/schemes2/secondary_science/sci09j/09jq5b