



# All SySTEMs Go Half Day Event Lesson Plans

Lesson: WeDo 2.0 Rover

Key Stage / Number of Students	Resource	Time Frame
KS 2 / 5 Students	5x Ipad with WeDo 2.0 App 5x Lego WeDo 2.0 set Handout	40 Minutes

**Overview:** The activity involves a brief explanation of the bricks and a request to keep bricks in the correct boxes. Then a demo of the WeDo 2.0 app and a look at the handout. Students then log into the app and open the first model, following instructions.

They will do this for each model in the handout, then build up two models to be the Rover and robotic arm and work as a group to decide how the two models will be combined and programmed to work in tandem.

**Aim and Objectives:** To learn about Rovers and to use Apps and Lego Education materials to learn about motors and sensors and then use that knowledge to solve a problem.

All learners will build and program at least one WeDo 2.0 model

Some Learners will upgrade a WeDo 2.0 model

Most learners will build and program two WeDo 2.0 Models

Most learners will be part of a group that collaborates to combine two WeDo 2.0 Models together to build and program a Lego rover with Robotic Arm.

**Background:** Autonomous robots have been a requirement for Space missions for a long time, as it is difficult to stay in contact with them over the distances involved. Students learn about the history of famous Astronauts but often gloss over all the engineers and programmers involved in both the big missions (like Principia) or the day to day missions that provide our internet, mobile phone signals and GPS locations (Global Positioning Satellites). This Activity lets students experience what is involved in building and developing autonomous rovers. In the future some rovers may be remote controlled by Astronauts in orbit; this will be especially useful if we ever send Astronauts to orbit hazardous planets like Venus or Gas giants like Saturn.



# All SySTEMs Go Half Day Event Lesson Plans

Lesson: Lego Space Animation

Key Stage	Resource	Time Frame
KS 2 / 5 Students	5x boxes of randomised Lego blocks 5x I pads with Lego animation and Green Screen Apps 5x Blue Screens Handout Checklist with A,B, C background choice encase students do not finish.	40 Minutes

Overview: Students are tasked with creating a space themed animation, this can be sci fi or factual, suggest building a space station and filming a spacecraft docking and undocking. Or making a Space battle scene if they are more interested in sci fi.

Aims and Objectives: Students will learn about animation and how to use green screen.

All learners will build spacecraft and other space environment objects (Comets, Space Stations, Satellites or possibly more Alien objects)

All learners will animate their models with blue screen

All Learners will choose a background for their animation

Most learners will add a background to their movies using greenscreen app themselves or choose one to be added before they are uploaded to youtube.

Background: Space Science and Science fiction have grown together over the years, with fiction by the likes of HG Wells and shows like Star Trek.



# All SySTEMs Go Half Day Event Lesson Plans

Lesson: EV3 Mars Mission

Key Stage	Resource	Time Frame
KS 2 / 5 Students	5x EV3 Kits with extra thermometer 5x laptops with EV3 software	40 Minutes

Overview: Students are tasked with completing challenges by programming the EV3 Rover.

Aims and Objectives: Students will program a Rover to drive as desired and to interact with their environment.

All students will learn to program the rover to drive, turn and reverse.

All students will program the rover to sense the world and respond to stimuli such as Temperature change using the EV3 Thermal sensor.

Background: As the recent JUNO probe to Jupiter has proven, computer programming is extremely important when using robots that are a long way from the Earth. The time delay in communicating with a robot on a distant planet means that it would be too late to adapt what the robot is doing. So we will always have a need for autonomous robots in the Space industry as well as on Earth in manufacturing, where it saves money and increases productivity.