I-LOFAR

Lesson Plan: Gravity and the Origins of the Universe

Duration: 35-40 mins

Learning objectives:

1. To explain what gravity is and how it affects us on Earth
2. Explore what gravity in space is like and how it affects orbits
3. Understand gravity's importance in the origins of the Universe

Links to Junior Cycle Science Curriculum:

- ❏ E&S 2, E&S 3 Building Blocks
- ❏ E&S 4 Systems and Interactions
- ❏ PW 3 Systems and Interactions
- ❏ NoS 5 Investigating in Science

Activity	Procedure	Materials	Time
Introduction	• Isaac Newton • Gravity on Earth vs in space	Powerpoint attached	5
Gravity Demonstration	• Use a stretchy fabric stretched and have students hold it taut in a circle • Place the different balls in the fabric showing that objects pull on nearby matter • Showing how objects interact when one is of greater mass - have smaller balls (marbles) thrown in to orbit larger, heavier balls	Stretchy fabric (eg: lycra) square, 1.5 x 1.5 metres Balls different weight or size e.g medicine ball, sports equipment & marbles	15
Gravity's effect on interactions	• What would happen if we had a bigger/smaller sun? - prompt students before adding heavier balls to 'space-time' fabric • What would happen if we 'turned off' gravity?	Gravity And Orbits Simulation model	5
What would happen if there was no gravity at the beginning of the Universe?	• Universe as we know it would cease to exist. • Without gravity it would be big and boring		5
Formation of the Stars	• Clouds of dust and gas some areas more dense - increases gravity's force until collapse • Hotter because matter condensed, core collapses faster - spin • Over time star bigger & hotter until nuclear fusion • Fusion energy against gravity enables stability of the star	Star formation	10