



gravity fields

festival 2012
21/28 September

**Explore.
Wonder.
Celebrate...**

A FESTIVAL CREATIVELY
EXPLORING THE PHYSICAL
SCIENCES AND CELEBRATING
ONE OF THE WORLD'S
GREATEST THINKERS
SIR ISAAC NEWTON

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For more information and to book tickets:

www.gravityfields.co.uk | 01476 406158

Welcome to Gravity Fields...

Fascination with Sir Isaac Newton and his achievements spans the world. Who would have thought that prime time television such as *Bang Goes the Theory* and the *Big Bang Theory* would captivate millions in this modern era?

It is a pleasure to return to Grantham for a festival dedicated to the life and career of Newton. He has been an inspiration – not only to me but to countless others – to follow his path of scientific discovery, and the festival cannot fail to inspire a new audience.

From my birthplace in Grantham to Trinity College in Cambridge I have followed one of the greatest scientists of all time. I was only the second person from Grantham to sign the fellows' 'big book' at Trinity College. The first was Isaac Newton. I am now a community governor of his old school, the King's School, and my office in Geneva even overlooks the 'Rue Newton'

At the European Organisation for Nuclear Research (CERN) we continue to make discoveries about the most fundamental particles and forces of nature, including the infamous Higgs Boson, as well as striving to understand how gravity fits into the 'big picture'.

I wish the Gravity Fields Festival the success it deserves, both in its inaugural year and in years to come.

Professor Val Gibson

Professor of High Energy Physics, Val is the most senior woman scientist at Trinity College, Cambridge and currently part of an international collaboration working on experiments at the Large Hadron Collider in CERN, Geneva.

Where better to celebrate the life and work of Sir Isaac Newton than in and around the town of Grantham, close to his birthplace and under the same skies of the county of Lincolnshire. Building on the vision established by South Kesteven District Council and many local partners, my challenge was to bring outstanding creative work and science of an international standard to the festival, while offering events for everyone to enjoy.

There was a second challenge: to make sure that every event tells its own part of the Newton story. In November 2011 we invited leading artists, producers and scientists to the area to explore the Newtonian themes of vision and optics, motion and gravity, planets and the universe, and Newton's heritage. Many of the ideas which came out of these days are now incorporated in the festival programme.

In earlier times, along with contemporaries such as Sir Christopher Wren, Edmond Halley and Robert Hooke, Isaac Newton wrote, explored and experimented without the modern barriers between science, arts, philosophy and religion. His thinking encompassed them all.

I hope festival-goers take inspiration from all our events, from the sound installation under the apple tree in Newton's garden at Woolsthorpe to the exploration of what lies beyond the stars.

Rosemary Richards, Festival Director

I would like to add my personal thanks to Dr Emma Walker and Tish Francis for all the encouragement and inspiration they have offered the Gravity Fields Festival.

With thanks...

The Gravity Fields Festival is produced by South Kesteven District Council with the support of a professional festival team. The festival could not have been produced without the work and support of councillors and staff at South Kesteven District Council and grateful thanks are expressed for the vision of everyone involved. And particular thanks to all those who have officially sponsored and supported the festival, and also to the many organisations and individuals who have given time, energy and space but are not listed here. Thanks to you all. Enjoy **your** festival.



SOUTH KESTEVEN DISTRICT COUNCIL

Your council working for you

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With thanks to Caroline Sheppard
and Suzanne Lewthwaite for
additional help.

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Grantham Business Club

Grantham Civic Society

Grantham College

Grantham Journal

Lincolnshire Arts, Chris Heighton

King's School Grantham

National Trust

South Kesteven District Council

St Wulfram's Church

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The King's School Grantham

Masonic Hall Grantham

National Portrait Gallery

National Trust

The Priory Business Venue

Ramada Grantham

The Roseland Group

St Wulfram's Church

Viking Signs

Walton Girls' School

Woodland Trust

Birth of a Festival

Sir Isaac Newton began his life on Christmas Day 1642 at Woolsthorpe Manor near Grantham in the same year Galileo died. In his early childhood, the armies of the Civil War marched north and south near his home. At the age of 12 he attended the King's School in Grantham and lodged with the local apothecary in the town's High Street.

As a young adult he returned home from his Cambridge studies when the plague ravished England and spent eighteen months conducting some of the most important experiments of his life on light, optics and the universe, and developing his theories on calculus and gravity. He famously observed the forces that pulled on the moon – and an apple.

The schoolboy Newton loved colours, making inks and melting metals. He wrote down cures and potions, built his own telescope and sundials and made models of windmills and carts with moving parts that actually worked!

His contemporaries included Christopher Wren, a philosopher as well as the architect who re-built London after the Great Fire, and his thinking was influenced by Aristotle and Plato. Newton's wide-ranging studies included numerous writings on theology and the secret study of alchemy. Some of his beliefs and activities were considered heretical.

When he left Cambridge in his late forties, Newton moved to London and became Master of the Royal Mint.

In 1672, Newton became a member of the Royal Society – at the forefront of science since its foundation in 1660- and was elected President in 1703. He held the position for the rest of his life, reflecting the esteem in which he was held.

Isaac Newton 1642 – 1727

Gavity Fields is financially supported by South Kesteven District Council for the best of reasons. It's our shared belief that a festival commemorating Sir Isaac Newton is a perfect fit and eminently worth the council's investment. It is a long overdue celebration of a truly remarkable man and follows the tradition of Stratford celebrating Shakespeare and the book festival which has put Hay-on-Wye on the map.

As a council we are very proud of the man considered by many to be the greatest and most influential scientist who ever lived because he was born, educated and lived in this beautiful corner of south Lincolnshire.

In later centuries, as well as providing the first woman prime minister in Margaret Thatcher, Grantham also produced the first diesel engine, the first tractor and was the first town in England to have female police officers.

We are equally proud of our inaugural festival programme of Newton-related science, arts, drama, poetry, writing, heritage and street theatre.

We are very grateful to the Arts Council England for their support and appreciative of the wide and varied contributions made by local companies, organisations and businesses.

Councillor Linda Neal

Leader, South Kesteven District Council

Education is on festival curriculum

Gravity Fields is delivering the most extraordinary science, art and history lessons ever.

The education programme, sponsored by Cummins Generator Technologies of Stamford, is curriculum gold-dust from Key Stages 2 and 3 through to sixth form.

Around 25 schools, colleges and community groups have been working to create their own amazing Newton-themed processions which will take place on Friday 28 September as part of the 'Transformation of the Town'. Workshops are being led by local artists under the guidance of international processions company Shademakers. Cummins has contributed science background to some of these workshops.

During the Festival Week for Schools:

KS2 and KS3: Science Museum shows and the National Space Centre's planetarium along with an Apothecary Shop and an Alchemy Lab, offering the chance to create the 'philosophers' stone' (gold)! These link with a special visit to Woolsthorpe Manor.

For KS3 and above: a guided audio tour, 'Giant Steps', follows in Newton's footsteps. There are also a number of **free after school talks** from some amazing speakers. And Cummins is hosting **sixth form pupil groups** to illustrate job opportunities in the working world of engineering science and innovation. Email gareth.clarke@cummins.com for information.



Monday-Thursday

9.30am, 12.30pm

KS2 – Stardome and Alchemy

Central Grantham

£2 per child 2 hrs 30 mins

The Stardome: Visit the National Space Centre's planetarium, explore and discover the night sky and the myths and legends of the constellations, and learn more about our universe and those beyond.

Alchemy Lab: Visit the illegal alchemist's laboratory hidden away in Grantham. Help the alchemist experiment and strive to create the 'philosophers' stone'. Learn about Newton's passions for Alchemy even though it was illegal while he lived.

Two simultaneous experiences at 9.30 (ends 12 noon) and two at 12.30 (ends 3pm). Each experience can accommodate one class group and groups move location half way through the session.

Monday-Wednesday

9.30am, 11.15am, 1.45pm

KS2 – Science Museum, Feel the Force

Guildhall Theatre

£2 per child. 1 hour

Feel the Force explores some of Newton's most important work. Isaac Newton and Phil the Stunt Frog join forces in this action-packed extravaganza. Take a trip to the Leaning Tower of Pisa, Ancient Greece, the Moon and the Highland Games as we take a closer look at the forces that shape our world.

Monday-Thursday

10am

KS2 – Meeting Newton and The Apothecary

Woolsthorpe Manor/George Centre

£2 per child. 3 hours

Meeting Newton: Visit Newton's birthplace. Meet him in person at one of the most creative points in his life and explore his experiments with light as well as learning about his childhood at Woolsthorpe.

The Apothecary: Visit an Apothecary shop of Newton's time. Learn what Apothecaries did and why, and help them make cures and lotions. Be entertained by our apothecary show by Dizzy O'Dare Presents....

Two simultaneous experiences begin at 10am (end 1pm). Each experience accommodates one class group and groups move location half way through the session. Bus transfer provided between Woolsthorpe Manor and Grantham Apothecary. Schools must provide their own transport to start and finish points.

Monday-Thursday

10.30am

KS3 – Giant Steps

Guildhall Arts Centre

£2 per child. 1 hr 30 mins

A specially commissioned audio promenade drama tour follows in the footsteps of Sir Isaac Newton, interweaving with stories of Grantham past and present.

Thursday 27

9.30am

Supercool

Guildhall Theatre

£2 per child. 1 hr 30 mins

Play with liquid nitrogen to explore heat and temperature!

To book tickets for any of the educational programme events, call Grantham Guildhall Box Office on: 01476 406158. Please make the box office aware if any students have access requirements. If you have queries about the programme or would like advice on booking please call Clare on 07588 682608.



The Age of Scientific Discovery

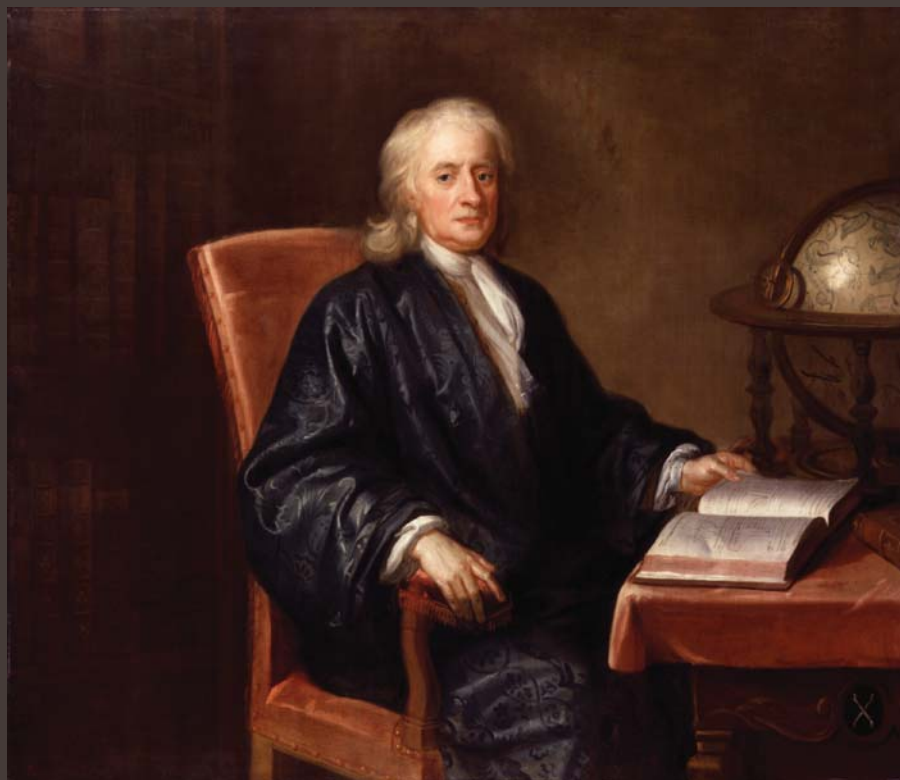
A National Portrait Gallery display at Belton House celebrates the scientific heroes of an extraordinary era.

Newton would have surely welcomed an exhibition of portraits in his honour, so close to his birthplace. Shrugging off his early reclusiveness, Newton regularly commissioned portraits of himself in the latter part of his life.

This National Portrait Gallery display, seventeen works specially transported from London, draws together oil paintings, miniatures and prints of some of the early scientific pioneers and founders of the Royal Society, including Sir Isaac Newton.

They are all intellectuals and academics who developed a system of knowledge based on observation and experimentation – the founding of modern science.

Never before has such an impressive art collection been seen in the locality, or one that so accurately reflects the age through art. The inaugural meeting of the Royal Society took place in Gresham College,



London, on 28 November 1660. Members were united by a shared commitment to the 'new philosophy' promoted by Sir Francis Bacon and their revolutionary open-minded approach to discovery laid the foundations of modern science.

The exhibition is open with normal National Trust entry until the 4th November 2012. Further details on page 9.



*Top Left: King Charles II (1660)
by John Roettier 1631-1703
Above: Sir Isaac Newton (circa 1726)
by Enoch Seeman 1694-1744
Left: Edmond Halley (1721 or before)
by Richard Phillips 1681-1741
Right: Samuel Pepys (published 1690)
after Sir Godfrey Kneller 1646-1723*

*All images copyright
National Portrait Gallery, London*

**National
Portrait
Gallery**



**National
Trust**



Events through the festival...



ARTS EVENT. 11+

Giant Steps

Specially commissioned for the Gravity Fields Festival

in partnership with BBC Lincolnshire, BBC Outreach and the University of Lincoln

Giant Steps is an audio promenade drama tour, which follows in the footsteps of Sir Isaac Newton on a journey of his life that interweaves with stories of Grantham past and present. Writer: Craig Baxter. Director: Jeremy James.

Meet at Grantham Guildhall

Tickets: £8 (£5 concs)

Duration: approx 1 hour 30 mins

Dates/Times:

Sat 22: 10am, 1pm, 4pm

Sun 23: 10am, 1pm, 4pm

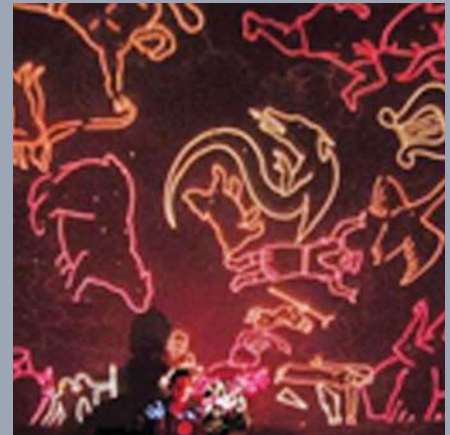
Mon 24-Thu 27: 2.30pm and 5.30pm

Fri 28: Live performances of extracts in the town centre between 7pm and 9.30pm.



Reflections:

Newton came to Grantham to study at the King's School, lodging with William Clarke's family at the apothecary on the High Street. A lifetime that spanned the Civil War, the Plague and the Great Fire of London, was shaped by his personal clashes starting with a fight in the streets of Grantham.



SCIENCE EVENT

Stardome

From the National Space Centre

Escape into a mobile planetarium that recreates the dark night sky with hundreds of brilliant points of light splashed across the inside of the dome. The stars are projected into their positions for any time of the year with interpretations from different civilisations. The Stardome offers ticketed half-hour shows.

St Wulfram's Church

Tickets: £3. Duration: 30 mins

Dates/Times:

Sat 22: 10am/10.30am/12.15pm/12.45pm/2.15pm/2.45pm/3.45pm/ 4.15pm

Sun 23: 12pm/1.30pm/2pm/3pm/3.30pm/4.15/4.45pm

Fri 28: 6.45pm/7.45pm/8.15pm/9pm



Reflections:

Newton grew up under the Lincolnshire night skies in the mid-1600's. His family lived at Woolsthorpe Manor, a few miles south of Grantham, and his time spent as a boy and young man sparked life-changing observations of stars, moons and comets in the heavens above.

For more information
and to book tickets:
www.gravityfields.co.uk
01476 406158



ARTS EVENT

Isaac Newton and the Age of Scientific Discovery

National Portrait Gallery at Belton House in partnership with the National Trust

In the 17th century, intellectuals developed a system of knowledge based on observation and experimentation. The display draws together portraits and miniatures of some of these early scientific pioneers. During Festival week 100 free tickets will be available daily. Book online or at box office. Exhibition continues until Nov 4 but normal admission charges apply after Festival.

Belton House

Tickets: FREE but please reserve tickets. (Free tickets not available from Belton House)

Festival week 21-28 September (except Mon 24 and Tue 25): 12.30pm - 4.30pm
NT members free entry.

Exhibition not accessible for wheelchairs



Reflections:

Newton became one of the leading figures of a group of scientists and philosophers including figures such as John Locke, Thomas Hobbes, Edmond Halley and Samuel Pepys.



HERITAGE EVENT

Pages from the Past The Trigge Library

An exhibition of books from the chained library of Francis Trigge (1598). See books that Newton might have thumbed through as a King's School student, released from the intriguing Tudor chained library in St Wulfram's Church for rare public display. *Arranged by The Friends of St Wulfram's, with advice from the British Library.*

St Wulfram's Church

Tickets: FREE

Fri 21 – Fri 28 September

(excluding Sunday 23). 10am – 4pm



Reflections:

The display includes books on theology, history, cosmology, medicine and law, dating from the earliest days of printing (ie the late 15th century), a new technology that would revolutionise the communication and dissemination of new ideas.



SCIENCE EVENT

Can You Hear Black Holes collide?

University of Glasgow exhibition stand

A hands-on exhibition for anyone who has ever wondered about violent events in the cosmos. Come and explore the science and technology behind the challenging new gravitational wave astronomy. Gravitational waves, or “ripples” in space and time, are produced by incidents like exploding stars, colliding black holes and even the Big Bang itself.

The George Centre

Tickets: FREE

Times: 10.30am – 4.30pm



Reflections:

Newton's theory of gravity has been incredibly successful, but is only an approximation. Einstein's general relativity describes gravity not as a force but as a curving of space and time; leading to predictions about the effects of strong gravity fields – including gravitational waves – differing dramatically from those of Newton's gravity

Events through the festival...

● ARTS EVENT. 11+

The Ethometric Museum

**A theatrical sound presentation
by Ray Lee. Produced by OCM**

Listen carefully, it's not going to be quite like anything you will have heard (or seen) before. You are going to be taken into the Ethometric Museum, a gallery of amazing electrical curiosities. As the Museum doors are unlocked the ethometric mysteries are revealed! *'Witty, strange and beautiful. Nothing else like it at Edfest.'* The Guardian



The George Centre

Tickets: £8 (£5 concs)

Duration: 45 mins

Dates/Times:

Sat 22: 1pm/2.30pm/5pm/6.30pm

Sun 23: 12pm/1.30pm/3pm

Mon 24 - Thu 27: 1pm/5pm/6.30pm



Fri 28: 3pm/5pm/7pm/8.30pm



● HERITAGE EVENT. 7+

Apothecary Shop and Alchemy Laboratory

Newton lodged with the apothecary in Grantham High St while attending the King's School. At Cambridge he experimented in secret with alchemy. Learn and laugh with these entertaining glimpses behind the scenes of 17th century science. Gravity Fields Festival has created an apothecary experience in a shop adjacent to Newton's lodgings and you can find a secret alchemy lab along Guildhall Street. Join the Dizzy O'Dare circus performers in the Apothecary, and Alchemist Jack Greene, as they mix potions and materials and offer entertaining insights into the early days of pharmacy and chemistry.

Apothecary Shop: The George Centre 
Alchemy Laboratory: Guildhall Street 
Tickets: FREE

Public Opening Times:

Sat: 11am - 1pm / 2pm - 4.30pm

Monday -Thursday 2pm - 4.30pm


Friday 7pm - 9.30pm

ARTS EVENT

Longplayer

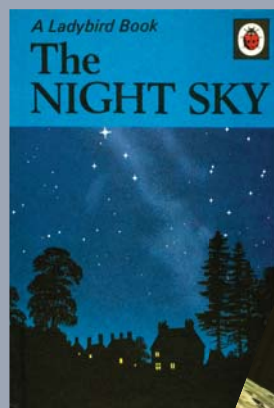
Jem Finer Sound Installation

Longplayer is a one thousand year-long musical composition which you can listen to in the magical setting of the garden at Newton's childhood home.

Under the Apple Tree at Woolsthorpe Manor 

Tickets: Normal entry rates apply to Woolsthorpe Manor, although there are free entry tickets for some festival events

Times: During Woolsthorpe Manor's normal opening times.



HERITAGE EVENT. 5+

Ladybird Science Paintings Exhibition

Now firmly established as design classics, Loughborough-based Ladybird books brought the wonders of the world to life for countless children, who revelled in the lavish illustrations. Their titles explored scientific principles, inventions and experiments – all vividly illustrated in a way which inspired future generations of astronomers, inventors, explorers and naturalists. Ladybird Books never dedicated an entire volume to Isaac Newton, but the legacy of his many discoveries is revealed and explored in many of their titles.

On Saturday 22nd at 10.30am the exhibition will be introduced with a talk by Stephanie Barton, former Managing Director of Ladybird Books, and Grantham resident.

Grantham Museum 

Tickets: FREE. **Times:** 10am - 4pm

Ladybird art to re-awaken childhood inspiration

How could producing a TV programme on the favourite toys of Top Gear presenter James

May and his sisters produce a new chapter for the Ladybird books which inspired generations? And lead to an exhibition of Ladybird art for the Gravity Fields Festival?

As with all good stories, this has a simple beginning. We discovered that



© Ladybird Books Ltd MMXII

the only childhood passion that James shared with his sisters was Ladybird books. As the TV programme's producer, I traced the original Loughborough Ladybird books artwork to a vast archive store in Reading. James' interest, not surprisingly, lay with the boys' own stuff – aeroplanes and adventurers. One of his favourites was 'The Story of Flight'. And when James took the lid of the box, he actually gasped. There, in full technicolour glory, was the original painting of Montgolfier's hot air balloon. He was a young boy again, delighting in the detail, colour and wonder of the moment when he first found out about the history of flight.

Our exhibition of 40+ framed and unframed paintings centres around two particular classics: 'The Night Sky' and 'Exploring Space'. What inspirations they proved to be for generations. The natural progression from observing the night sky is surely exploring space and the 'Exploring Space' archive still captures the excitement of the age.

What could be more thrilling for a child in the late 60's and early 70's than the prospect of astronauts and cosmonauts? For countless young, enquiring minds this was dangerous, daring and empowering stuff. Science in the hands of children and with girls in the thick of scientific exploration. These were indeed special books; affordable (for many years half a crown 'old money'), accessible, and the perfect size for small hands. Little wonder adults also found them irresistible.

We hope our choice of artwork contains something to delight everyone – and perhaps reminds you of your very own Ladybird memory?

Claudine King-Dabbs
Creative Producer, Festival Science Events

© Ladybird Books Ltd MMXII

FRIDAY 21



5pm ● FAMILY EVENT

Festival Opening

The George Centre ♿

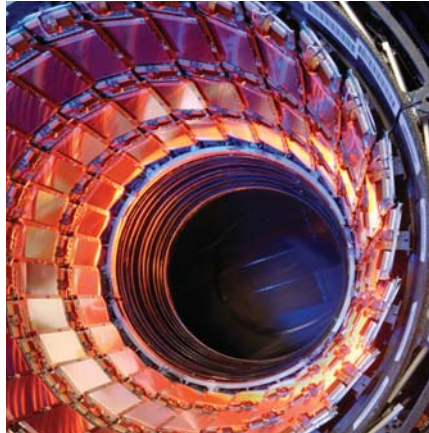
Tickets: FREE Duration: 20 minutes

Dallas Campbell, presenter of BBC's *Bang Goes the Theory* will open the Gravity Fields festival at The George Centre. Come along to hear how Dallas has been inspired by science and help us celebrate the start of the festival week.



Reflections

The George Centre is on the site of one of Grantham's two historic coaching inns and was mentioned in Charles Dickens' *Nicholas Nickleby*. It is also adjacent to the apothecary in which Isaac Newton lodged as a schoolboy which is now the site of the ASK Italian restaurant.



6pm ● SCIENCE EVENT

The High Energy Frontier: The Large Hadron Collider

Professor Valerie Gibson

University of Cambridge

Guildhall Theatre ♿

Tickets: £4. Duration: 1 hour

From school in Grantham to international scientist, Professor Valerie Gibson, UK spokesperson for the Large Hadron Collider in CERN, Geneva, returns to give the opening science presentation of the Festival. The latest news and discoveries from CERN, the world's biggest experiment that aims to understand the most fundamental particles and forces of nature. What is mass? Does the Higgs Boson exist? Why is the universe made of matter?



Reflections

Newton is famous for work on gravity – still the least understood of the forces of the universe. This event will encapsulate what is known about the other three fundamental forces, the electromagnetic, strong and weak, and how scientists are endeavouring to incorporate gravity into a single 'Grand Unified Theory'.

7pm ● ARTS EVENT

White Light Deadgood

St Wulfram's Church Spire ♿

Tickets: FREE Duration: 7pm-10pm

Deadgood design studio presents a light work. 'White Light', reflecting Newton's experiments splitting white light through a prism into the colours of the rainbow. White light will emanate from the direction of Sir Isaac Newton's old school next to St Wulfram's church, shine to the church tower, and be split by a prism effect into the colours of the rainbow up the spire... one of the tallest in the country.



Reflections

Newton's book '*Opticks*' was his second major piece of work on the natural sciences, and was made available to the public in 1704.

It deals with the refraction of light and optics, including experiments he conducted to explore splitting white light into colours.

7.30pm ● ARTS EVENT

Festival Opening Concert

St Wulfram's Church ♿

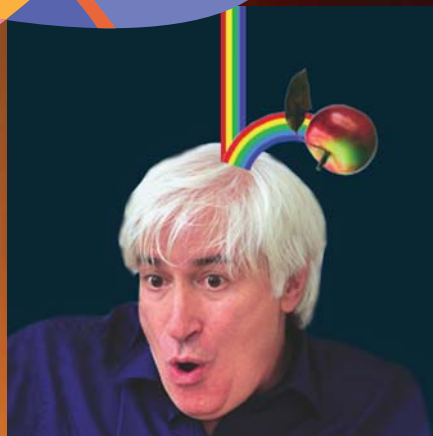
Tickets: FREE

Lincoln Pro-Musica and St Wulfram's choir bring you an evening of celestial sounds and exquisite lighting effects within the church.



Reflections

Music illustrating our themes of science and space including; Strauss Thunder and Lightning Polka, the Harry Potter Suite, Jupiter and Mars from Holst's Planets, John Williams's Star Wars, Tallis' O Nata Lux and Elgar's Nimrod.



7.30pm ● ARTS EVENT

Newton

Premiere

Produced by TFA Ltd in
association with Gravity Fields

Stamford Arts Centre ♿

Tickets: £12 (£8 concs)

Duration: 1 hour plus after-show talk
and reception

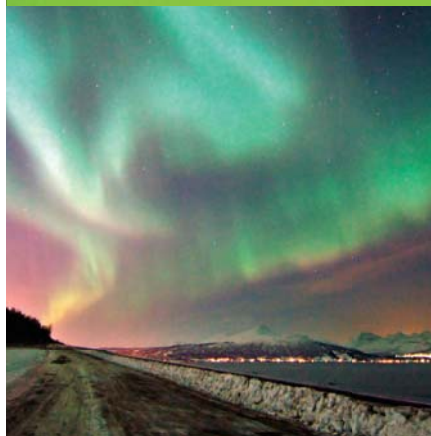
This touching, entertaining piece of solo theatre offers a rounded, warts-and-all portrait of Isaac Newton, his superhuman struggles in pursuit of new truths, and the sorcery and mysticism to which he attended outside of science. Tales and ideas about this towering genius come thick and fast from an array of characters both old and very modern. Set firmly in Grantham and its surroundings, Klaff weaves this work around the notion that Newton was an isolated figure.

'I've rarely laughed so hard, nor been so moved.' Time Out on Jack Klaff



Reflections

Like Einstein, Newton had about him a quality of 'apartness'. The stage fills with people swirling around a solitary figure in whose mind world-changing ideas never ceased to crowd.



8pm ● SCIENCE EVENT

The Explosive Sun & the Northern Lights

Dr Pål Brekke

Senior Advisor, Norwegian Space Centre

Guildhall Ballroom ♿

Tickets: £4. Duration: 1 hour

Ever seen the Northern Lights? Enjoy the myths and modern science behind them in a multimedia presentation which shows the Sun as a stormy and variable star which contributes much more than just light and heat. The Sun is the source of the beautiful Northern Lights and can affect our technology-based society in many ways.



Reflections

'We derive from the celestial phenomena the forces of gravity with which bodies turn to the sun and the several planets...by other propositions which are also mathematical, we deduce the motions of the planets, the comets, the moon and the sea.'

'A Treatise of the System of the World'

FRIDAY
21

8.15pm ● FAMILY EVENT. 5+

visualise:reloaded

Science Made Simple Ltd

Gareth Smith and Debbie Syrop

Co-producers and performers

www.sciencemadesimple.co.uk

Guildhall Theatre ♿

Tickets: £12 (£8 concessions)

Duration: 1 hour 5 mins

A mischievous mix of physical theatre and live science demonstrations from an award-winning company with a passion for science, engineering and maths, and a smash hit show at the Edinburgh Festival. This event is hugely popular with children, but also suitable for adults... you don't need to be accompanied by a 7-year old to enjoy it!

'...this defies anyone, no matter what their age, not to stare in wonder.' The Scotsman



Reflections

Exploring – colour-mixing with light, polarised pictures, laser refraction and chromo-stroboscopic effects. Did Newton's research into orbits and forces include swinging glasses full of water, making vortices and smoke rings?

SATURDAY

22

10am-4.15pm ● FAMILY EVENT. 6+ Stardome

Mobile planetarium. See (p8) for information.
St. Wulfram's. Tickets: £3
Times: 10am/10.30am/12.15pm/12.45pm/
2.15pm/2.45pm/3.45pm/4.15pm

10am ● FAMILY EVENT. 11+ Giant Steps

Promenade drama tour. See (p8) for details.
Meet Grantham Guildhall. Tickets: £8 (£5)
Times: 10am/1pm/4pm.

10am-12.30pm ● FAMILY EVENT. 7+ Whizz Bang Workshop

Kesteven and Grantham Girls School ●
Tickets: FREE but please reserve tickets
Duration: 1 hour

An exciting opportunity to join a fun session of science experiments. There will be bangs, pops and fizzes to watch and a chance to take part in activities including; making a pH rainbow in a test tube; watching a jelly baby scream; and seeing a Science teacher "set fire" to their hand! Activities designed for children interested in Science but also fun for adults.

Workshop times: 10am & 11.15am.
25 places available for each workshop.

10am-4pm ● FAMILY EVENT. 7+ Family Science Day

The George Centre ● **Tickets: FREE.**

Workshops, heritage and science activities in and around the George Centre. Visit the apothecary shop and the Alchemy Lab (p10 for details). A drop-in workshop shows you how to make telescopes. Book onto 'Newton's Instruments' and 'Voice on a Light Beam' workshops (see listings). Make your own carnival hat for the *Transformation of the Town* processions. Learn more about the latest thinking on gravitational waves at an exhibition stand from Glasgow University. Book tickets for the weird and wonderful Ethometric Museum. Come and enjoy!

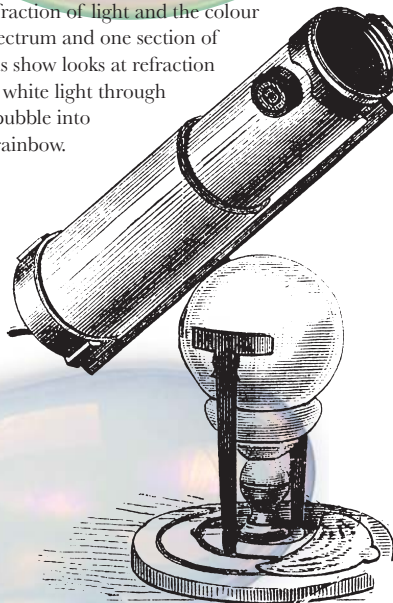
11am ● FAMILY EVENT. 3-11 The Bubble Show The Science Museum

Guildhall Ballroom ●
Tickets: £8 (£5 concs) Duration: 1 hour

Be a Bubbleologist with the biggest bubbles you will ever see! Bubbles of all sizes, going up, down, this and that way, with help from the audience! Discover the secret Science Museum bubble recipe and enter the human bubble.

Reflections...

Newton's curiosity was sparked by refraction of light and the colour spectrum and one section of this show looks at refraction of white light through a bubble into a rainbow.



11am ● ARTS EVENT Organ Recital Concert Dr Tim Williams

St Wulfram's Church ●
Tickets: FREE. Duration: 1 hour

A concert exploring the relationship of gravity with music from a variety of composers and eras. Music ranging from Bach to Reger, with explanations from organist Dr Tim Williams, Director of Music at St. Wulfram's.

Reflections...

The organ at St Wulfram's is one of the finest in Lincolnshire. The original organ dates back to 1736 but has been rebuilt a number of times. Some pipes of the original organ by Gyffick still remain in use.

12pm ● SCIENCE EVENT. 10+ Newton's Instruments Dr Jonathan Hare

George Centre ●
Tickets: FREE but please reserve tickets
Duration: 1 hour

Beautiful recreations of 17th century scientific apparatus are demonstrated by Dr Jonathan Hare. The original equipment was used by leading science lecturers of the day, such as Desaguliers, to help explain Newton's revolutionary ideas to the general public.

Reflections...

Even when first written, Newton's best known work, *The Principia*, was only understood by a few people. After it was published, wonderful equipment and apparatus was designed to demonstrate his experiments to the public.



12.15pm ● SCIENCE EVENT

On the Newton Papertrail

Professor Rob Iliffe

The Angel and Royal Hotel

Tickets: £4 Talk only. £9 with sandwich lunch. Duration: 1 hour

The untold story of Newton's private papers stretches over nearly three hundred years. What secrets do they contain and why has it taken so long to uncover them? When Newton died, he left many secrets in a trunk full of his private writings on theology, church history, alchemy and his work as Master of the Mint. This talk traces the long and meandering path of Newton's papers from the darkness of that trunk to the virtual light of day (today many of them are freely available online).

1pm ● ARTS EVENT.11+

The Ethometric Museum

Sound installation. See (p7) for information.

The George Centre & Tickets: £8 (£5 concs) Times: 1pm/2.30pm/5pm/6.30pm

2pm ● PARTICIPATION EVENT.10+

Voice on a Light Beam

Dr Jonathan Hare

Meet at the George Centre &

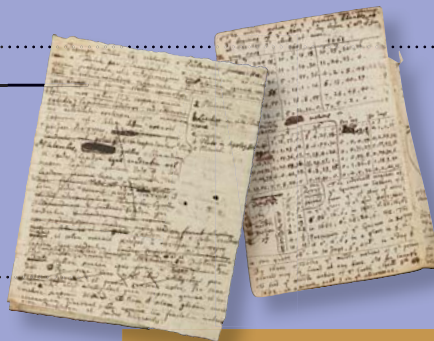
Tickets: FREE but please reserve tickets Duration: 1 hour

This workshop explores what light is, how it is made, how it appears in nature, light you can't see... and much more. We will create exciting experiments and, amazingly, send our voice on a beam of light! If weather is fine the workshop participants may be leaving the premises so please book an accompanying adult with children under 16.



Reflections...

This is a fascinating example of amplitude modulation of light using sound vibrations. Learn how modulated light is detected and demodulated in a receiver so that we can hear the sound. A wide range of physics and engineering experience can be learnt through these exciting 'sunbeam' experiments.



3pm ● PARTICIPATION EVENT

Unveiling Newton's Plaque

Venue: The George Centre &

Tickets: FREE Duration: 20 minutes

Join the members of the Civic Society inside the George Centre (High St entrance) prior to unveiling the plaque. The plaque will be unveiled at the site of the apothecary shop where schoolboy Isaac Newton lodged when he attended the King's School, Grantham.



Reflections...

Newton lodged with the apothecary William Clarke whose second wife, Katherine Babington Storer, is believed to have been Newton's mother's cousin. Katherine had been married before to Edward Storer, and one of the children of her first marriage, who lived with Newton in Grantham High St, was Arthur Storer, and went on to become America's first modern astronomer.



3.30pm ● SCIENCE EVENT.18+

The Alchemy of Brewing

Oldershaw Brewery

Venue: The Angel and Royal Hotel

Tickets: FREE (numbered queue system at venue) Duration: 1 hour

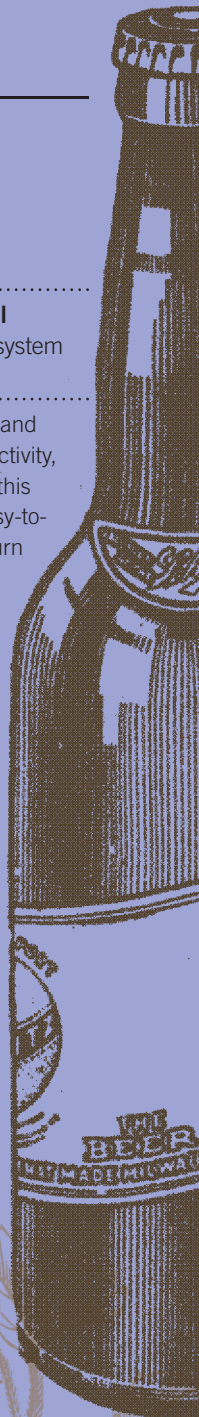
A fascinating introduction to the art and science of brewing. From enzyme activity, bittering units to flocculating yeast, this whistle stop tour will give you an easy-to-understand guide of how brewers turn four very simple ingredients (water, malted barley, hops and yeast) into the wonderful drink that is beer. This will be followed by a tutored beer tasting introducing different styles of beer. Now that's what we call practical science!

Please note: the presentation is on the first floor and not accessible for wheelchairs, but tastings are available in the downstairs bar.

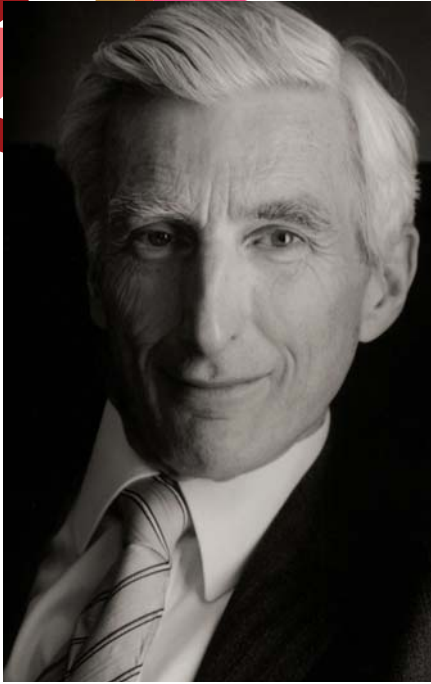


Reflections

The beer and the knowledge will be provided by local brewery, Oldershaws (www.oldershawbrewery.com) who are also providing the Gravity Fields Festival beer, Newton's Drop (a regular 4.1% ABV brew which is being given a special new look for the festival). Oldershaws beer will be available for purchase at the event.



SATURDAY
22



4pm • SCIENCE EVENT .10+

Planets, Stars and the Universe

Professor Martin Rees

Guildhall Theatre ♿

Tickets: £4. Duration: 1 hour

This illustrated talk, by the Astronomer Royal and former President of the Royal Society, Professor Martin Rees, will describe the cosmos revealed by modern astronomy – a panorama of planets, stars and galaxies governed by physical laws that allowed these systems to form, and enabled life to emerge here on Earth, and perhaps elsewhere.



Reflections

Gravitation, and Newton's Laws, are crucial in the cosmos, and reflecting telescopes now have mirrors many metres across – in contrast to Newton's pioneering telescope that fitted on a table-top.

5.30pm • FAMILY EVENT .7+

Standing on the Shoulders of Giants A Story told with Gravity

Dr Marty Jopson



Guildhall Ballroom ♿

Tickets: £8 (£5 concs). Duration: 1 hour

Join Marty as he delves into the story of how Newton came up with his ideas on gravity. From the Ancient Greeks through Newton's genius, he brings the story bang up-to-date with the hunt for the Higgs Boson. There will be bangs and silly machines and, almost certainly, a mess! Presenter on the BBC's *One Show* and *Food Factory*, Marty has been performing science shows for 20 years.



Reflections

'If I have seen further it is by standing on ye shoulders of Giants' wrote Sir Isaac in 1676. At face value this is a reference to the great thinkers of previous generations such as Galileo and Copernicus, but some say it might also be an insulting reference to Newton's rival Hooke's diminutive stature!

6.30pm • FAMILY EVENT 3-11

The Bubble Show

Stamford Arts Centre ♿

Become a Bubbleologist! See (p14).

7pm • SCIENCE EVENT

visualise:reloaded

Grantham Guildhall Theatre ♿

Physical theatre and live science. See (p13) for more information.



7pm • HERITAGE EVENT .14+

Festival Banquet: Harlaxton Manor

Menu devised by Annie Gray

Harlaxton Manor ♿

**Tickets: £45. Gala tickets: £400 for 10
Time: 7 – 10.30pm**

A wonderful opportunity to dine in 17th century style in the stunning surroundings of Harlaxton Manor alongside festival speakers and scientists. Come dressed to dine in modern or period style as you wish! Enjoy the surroundings, atmosphere, food and history. *'The bigness of eggs, a skillet of water, a taste of Salamagundy, a Whipt Syllabub...'* Food historian Annie Gray advises on food for historic events and has created a delicious menu for this exciting evening adapted for modern diners from recipes of the time.

Salamagundy

Take the breast of turkeys, fowls or chickens and minced then fine, some white veal, or both; boil 4 eggs hard, chop the whites by themselves and the yolks by themselves, shred some capers and an apple or two, and some lean ham or neat's tongue [calf's tongue]; then take a middle sized funnel and put a little of one sort of your minced things into it, first stop the top with a cork, then put in a little of another sort, and do continue until you have filled your funnel; press it tight down...turn out. Garnish with lettuce, sliced lemon, and anchovies washed. Eat with oil and vinegar.

RECIPE, THACKER 1758



Food in Newton's Time

Isaac Newton's life (1642-1727) spans a brilliant period in English food. Persian-influenced food of the medieval period was declining; new ingredients from the New World were being accepted; and butter and cream were now widely used. Flavours were zingy and exciting, with exotic ingredients very much to the fore. The rise of a commercial, urban class, interested in new scientific movements and encouraging of intellectual and artistic pursuits, of which Newton would be a member, laid the roots for the later development of English society.

Dinner was no longer eaten in a great hall with ranks of servants spread out below their masters. The dining room was introduced and fine dining became a mark of gentility. Cookbooks were published at a rate never seen before, including, by the 1670s, the first female-authored cookbooks. Dinner was served in a precursor to the à la Française style – the meal consisted of two courses plus a sideboard and dessert.

Banquet Menu

Starter: Salamagundy

First Course: Vegetable Soup

Second Course: Chicken fricassée, potato pudding, butter'd cauliflower and greens

Dessert: Whip't Syllabub

Tea and coffee with pastilles after meal

Other Beverages: Wine and water on table (apple juice served)

Further drinks and additional wine available from bar but not included in meal cost.

Food Historian: Annie Gray

8.30pm ● ARTS EVENT . 8+

LEO

Circle of Eleven

Walton Girls' High School ●

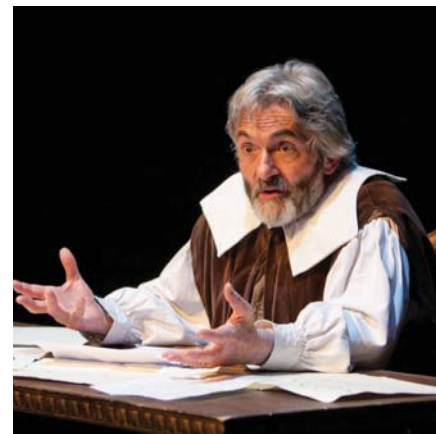
Tickets: £15 (£10 concs) **Duration: 1 hour**

Multi-award winning show, Edinburgh Fringe First winner. LEO is a surprising and witty one-man piece of Physical Theatre that defies the laws of gravity. Thanks to a ground-breaking stage concept and ingenious video projections, LEO appears in fabulous scenes and heads off on a truly fantastic adventure! The show won three awards at the Edinburgh Festival 2011, and was invited to Broadway. Directed by Montreal Actor/playwright Daniel Brière. 'LEO soars!' **New York Post**
'The funniest, most inventive performance that I have ever seen. Fabulous!'

Nytheatre.com

'...surprising, illusionary, fascinating'

Edinburgh Spotlight



8.30pm ● ARTS EVENT . 12+

The Trials of Galileo

by Nic Young with
Tim Hardy as Galileo
Hint of Lime Productions

Guildhall Ballroom ●

Tickets: £12 (£8 concs) **Duration: 1 hour.**

How did Galileo become branded a heretic? This one-man show highlights the dramatic events surrounding Galileo's heresy trial, and how he misjudged the thinking of the time. Galileo's tragedy was that he never understood his differences with the Church and that they were about politics not scientific fact. When he finally came to realise this, it was too late.

'A tour-de-force from this fine actor!'

Fringe Review, Brighton



Reflections:

Galileo died in 1642, the year Newton was born. His work in physics and astronomy laid foundations on which Newton would build.

SUNDAY 23

10am ● FAMILY EVENT 11+

Giant Steps

Promenade drama tour. See (p8) for details.

Meet Grantham Guildhall. Tickets: £8 (£5)

Times: 10am/1pm/4pm.

10.30am ● FAMILY EVENT 8+

Family Boomerang Making Day

Dr Hugh Hunt and students

University of Cambridge

Grantham College Sports Hall ♿

Tickets: FREE. Tickets can be reserved or drop in and join a session if space available

Sessions: 10.30am/11.30pm/1.30pm/3.30pm

The Aborigines have known about the fun you can have with boomerangs for thousands of years, and we want to share that fun with you today. Build your own boomerang in sessions through the day and join in a mass throwing at 3.30pm to see if we can set a record number of throws!



Reflections

The boomerang is governed by the gyroscopic effect and aerodynamic lift. Gyroscopes are fascinating, counter intuitive and yet their behaviour is completely described by Newton's 2nd Law of Motion " $F=ma$ ". Don't worry about the science: the day is about making boomerangs and seeing them fly.

My boomerang will come back!

Who would have thought that a boomerang's gracious curving flight is down to the gyroscopic forces explored by Newton. Or that they were first used in Poland, not Australia. For boomerang, read gyroscope, with aerodynamic forces generating a twisting movement which causes the



gyroscope to move on a circular path. Earliest known uses of boomerangs were actually found in what is now Poland, about twenty thousand years ago. Australia has, however, become the spiritual home of the boomerang, and Australian engineer Dr Hugh Hunt from Cambridge University has long been hailed as the guru of boomerangs; indoor, outdoor, curved or square.

Forget the popular lament 'My boomerang won't come back'. That would be as silly as if Robin Hood's deadly arrows came back, says Dr Hunt. Boomerangs used for hunting were not meant to come back. They were heavy, hockey-stick-shaped throwing sticks moving in a confusingly wobbly path and designed to bring down any kangaroo or bird they hit. Today's best indoor version is a cross-shaped balsa-wood boomerang that looks like a 4-bladed propeller.

And even the 'flick of the wrist' needed to propel them is as much physics as physical; needing just the right ratio of spin and forward velocity!



11am ● FAMILY EVENT 5+

Rural Crafts at Woolsthorpe Manor

The National Trust

Woolsthorpe Manor ♿

Tickets: FREE but please reserve tickets

A day of rural crafts – costumed guides, demonstrations of ancient skills and a chance for visitors to try many crafts for themselves. Visit Newton's Woolsthorpe birthplace, step back in time and discover the skills you'd need to live on a 17th century farm. Try your hand at wood-working techniques, spinning and weaving, felt-making and many other traditional skills from times gone by.

Wheelchair access to lower floor of Science Centre, Café and Orchard (uneven grassy surface). Parking by ticket office.



Reflections

Newton's studies were interrupted when his mother foresaw a future for him in farming. It didn't work, but he became a committed observer of nature during his time on the family farm at Woolsthorpe.





Living with a Legend...

Just seven miles down the road from Grantham is Woolsthorpe Manor, the mellow stone house where Isaac Newton was born 370 years ago. Although no longer a family home, the National Trust staff who keep it open to the public know what it's like to be living with a legend.

More than 33,000 people visit Woolsthorpe every year, to spend some time in the place where Isaac did his most important scientific work.

'You never know who you're going to meet,' says Ann Moynihan, Support Officer. '...an Italian maths professor explaining gravity to his family, or someone wanting to come and split sunlight into the colours of the rainbow in Newton's room, just like he did in 1667. People come from all over the world to stand by the apple tree – for some it's a lifetime ambition.'

In the Science Discovery Centre, a converted barn across the farmyard, Isaac's science is brought to life by an enthusiastic team of volunteers. Almost everyone talks about Isaac as though they know him personally, from the volunteer in costume to the retired teacher showing children how a telescope works.

Somehow he is still here, a young man scratching drawings on the walls, making sundials, and setting up prisms to split the Lincolnshire sunlight into rainbow colours.

'We once measured the distance from the shutter to the wall' says Ann, 'and it was 22 feet – check in Isaac's notebook! That was a moment when we felt we could almost touch him.' Walk around Woolsthorpe on a quiet day, and you might just spot him...

11am ● FAMILY EVENT 11-14

Material World

The Science Museum

Guildhall Ballroom

Tickets: £8 (£5 concs) **Duration: 1 hour.**

Dive into the weird world of materials in which no jelly baby, Barbie doll or paint tin is safe! In this fast-paced, fact-packed show we explore why the world is the way it is. Interactive demos include fake beards and a triple-headed monster, and answer important questions like: what's the world around us made of?



Material World makes sense of the science that shapes our lives, sparking curiosity, releasing creativity and changing the future by engaging people of all generations and backgrounds, much as Newton did in his lifetime.



12pm ● FAMILY EVENT 6+

Stardome

Mobile planetarium. See (p8) for information.

St. Wulfram's. Tickets: £3

Times: 12pm/1.30pm/2pm/3pm/3.30pm/
4.15pm/4.45pm

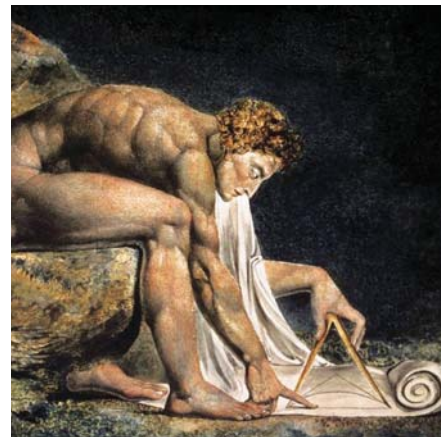
12pm ● ARTS EVENT 8+

LEO Circle of Eleven

Physical Theatre that defies the laws of gravity. See Sat (p17) for information.

Walton Girls High School ♿

Tickets: £15 (£10 concs) **Duration: 1 hour**



12.15pm ● SCIENCE EVENT

Newton and Religion

Rob Iliffe, Helen Martin, Philip Ball

The Angel and Royal Hotel

Tickets: £4 Talk only. **£9** with sandwich lunch. **Duration: 1 hour**

Professor Rob Iliffe is an expert on the role religion played in the lives of scientists, including Isaac Newton. Helen Martin has made it her individual quest to delve deep into Newton's classical education. Philip Ball's book 'Curiosity' questions if the curiosity of scientists in Newton's era was the original sin?

12.30pm ● ARTS EVENT 11+

The Ethometric Museum

Sound installation. See (p10) for information.

The George Centre ♿ **Tickets: £8** (£5 concs)

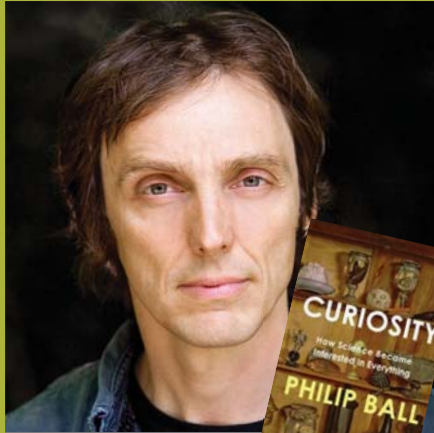
Times: 12.30pm/1.30pm/3pm

2.30pm ● ARTS EVENT 12+

The Trials of Galileo

One man show highlighting the dramatic events surrounding Galileo's heresy trial. See Sat 22 listing (p17) for information.

SUNDAY
23



3pm ● SCIENCE EVENT 6+

Isaac Newton: An Outsider in the Age of Curiosity

Philip Ball

Masonic Hall ♿

Tickets: £4, Duration: 1 hour

Until the Renaissance, curiosity was seen as a vice! The 17th century witnessed the liberation of curiosity as a driving force of scientific enquiry and by the early Enlightenment, it could be a virtue. Contrary to common perception, Newton did not personify this new attitude: his mathematical exploration of nature seems both more ancient and more modern.



Did Newton fit in – or not – to what is often called the Scientific Revolution, the period in the seventeenth century when modern science began? Philip Ball argues that the key principle of Newton's new science was not that it was mathematical but that it was omnivorously curious.

3.30pm ● ARTS EVENT

Grantham Celebrities in 18th Century Poetry

Dr Valerie Rumbold

University of Birmingham

**The Angel and Royal
Tickets: £4 Talk only**

£7.50 with afternoon tea. Duration: 1 hour

Returning to her home town of Grantham Dr Valerie Rumbold explores the town's celebrities as portrayed in literature. As well as Newton, seventeenth-century Grantham produced another notable celebrity – comic actor, Poet Laureate and autobiographer Colley Cibber (*engraving above*). Alexander Pope's great satire *The Dunciad* deploys the reputations of both these very different celebrities as part of its attack on 18th-century England as a culture on the road to ruin.



Newton and Cibber both attended the King's School, Grantham, during the seventeenth century (and Cibber even wrote about the experience in his autobiography). They were both famous in the print culture of their time, though Cibber is less well known today.

3.30pm ● FAMILY EVENT 5+

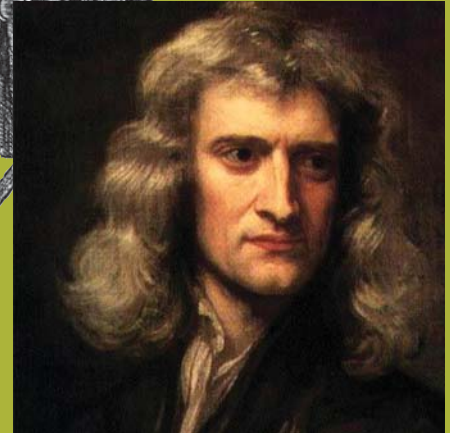
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Science Made Simple

Guildhall Theatre ♿

Tickets: £12 (£8 concs) Duration: 1 hour.

A mischievous mix of physical theatre and live science demonstrations. See Friday 21st listing for more information (p13).



4.45pm ● HERITAGE EVENT

Isaac Newton, Lawyer Professor Rob Iliffe

Masonic Hall

Tickets: £4. Duration: 1 hour

When his opponents turned science into a 'litigious lady', Newton relished destroying them using the judicial style learnt at university. He routinely used his formidable forensic expertise in his theological writings, his dealings with local tenants, and defence of the University of Cambridge against James II, and his disputes with Robert Hooke and other contemporaries.



Newton famously preferred a 'mathematical' approach to science above a scholastic, disputational style. Nevertheless, he was taught the art of disputation at Cambridge and used it against his critics. The paper draws substantially upon new archival material from Jerusalem as well as evidence concerning his often tense relationship with tenants at Woolthorpe Manor.

5pm ● SCIENCE EVENT. 7+

Standing on the Shoulders of Giants: A Story told with Gravity

Dr Marty JopsonScience presenter on the BBC *One Show***Guildhall Ballroom** ♿**Tickets: £8** (£5 concs) **Duration: 1 hour**

Marty Jopson delves into Newton and gravity. See Sat 22 (p16) for more information.

6pm ● ARTS EVENT. 8+

LEO

Walton Girls High School ♿**Tickets: £15** (£10 concs) **Duration: 1 hour**

Physical Theatre that defies the laws of gravity. See (p17).

**6.30pm** ● ARTS EVENT.

Choral Evensong

St Wulfram's Church ♿**Tickets: FREE.** **Duration: 1 hour**

A special Choral Evensong for the Festival.

7.30pm

The Trials of Galileo

Hint of Lime Productions**Guildhall Ballroom** ♿**Tickets: £12** (£8 concs) **Duration: 1 hour.**

One man show highlighting the dramatic events surrounding Galileo's heresy trial. See Sat 22 listing (p17) for more information

SUNDAY
23

IN THE SHADOW OF THE MOON

**7.30pm** ● SCIENCE EVENT. 12+

In the Shadow of the Moon

Documentary film screening**Dr Chris Riley, Filmmaker****Guildhall Theatre** ♿**Tickets: £4.** **Duration: 2 hours 15 min.**

'In the Shadow of the Moon' tells the story of the 24 men who flew there between 1968 and 1972. Hailed as the definitive story of the Apollo program, the film won the 2007 Sundance World Cinema Audience, and has become a classic record of this unique moment in our shared human history. The film will be screened and Dr Chris Riley, the filmmaker, will talk and answer questions.



Reflections

Space flight relies on Newton's laws, from his third law which underpins the workings of the rocket motors which first propelled us into space, through to his law of universal gravitation, which gave Apollo mission planners the confidence of aiming a manned space craft at the Moon. As Bill Anders, one of the first three humans to leave Earth orbit put it en route to the Moon on Apollo 8 "I think Isaac Newton is doing most of the driving right now."

MONDAY

24



12.15pm • HERITAGE EVENT

Newton and the Longitude

Dr Rebekah Higgitt

Royal Observatory Greenwich

The Angel and Royal Hotel

Tickets: £4 Talk only. £9 with sandwich lunch. Duration: 1 hour

Why should sailors be grateful to Newton? His contribution to astronomy is often thought of as abstract knowledge but it had direct relevance to a very practical problem. His theory of the motions of heavenly bodies was of fundamental importance to finding longitude at sea, although he failed to develop the necessary lunar theory.



Reflections

The story of longitude links directly into Newton's life and work. He focused on lunar theory late in life specifically to help find a longitude solution. But as President of the Royal Society, Newton also took centre stage in the wider search for possible solutions, whether astronomical or mechanical.



1pm • ARTS EVENT. 11+

The Ethometric Museum

Theatrical sound installation. See (p10) for info.

The George Centre **Tickets: £8 (£5 concs)**

Times: 1pm/5pm/6.30pm



Reflections

Ethometric Instruments Ltd have been approached by the space agency to provide Ethometric instruments for the next Mars deep space probe! Ethometric Instruments will be used to monitor for microscopic variations in background harmonic variations and help to determine the existence of gravitational waves.



2.30pm • FAMILY EVENT. 11+

Giant Steps

Promenade drama tour. See (p8) for details.

Meet Grantham Guildhall. Tickets: £8 (£5)

Times: 2.30pm, 5.30pm.





4.15pm ● HERITAGE EVENT.11+

Integrity and Accuracy Newton's Legacy to the Royal Mint

Graham Dyer
Royal Mint Museum

Grantham Museum ♿

Tickets: FREE but please reserve tickets
Duration: 1 hour. Age: 11+

In a surprising career move in middle life Sir Isaac Newton switched from academia to reshaping the currency of the country and restoring order to coinage. This fascinating talk is devoted to Newton and the performance of official duties that were a major part of his life after 1696..



Reflections

Newton took up the position of Master of the Royal Mint in 1699. He had a mission to bring advances to the coinage system and claimed to have brought it to a 'much greater degree of exactness than ever was known before'. He developed a reputation for his uncompromising resolve to stop clipping and counterfeiting of coins.



6pm ● SCIENCE EVENT.11+

Human Spaceflight- Fantasy or our Future

Anu Ojha
National Space Centre

Harlaxton Manor ♿

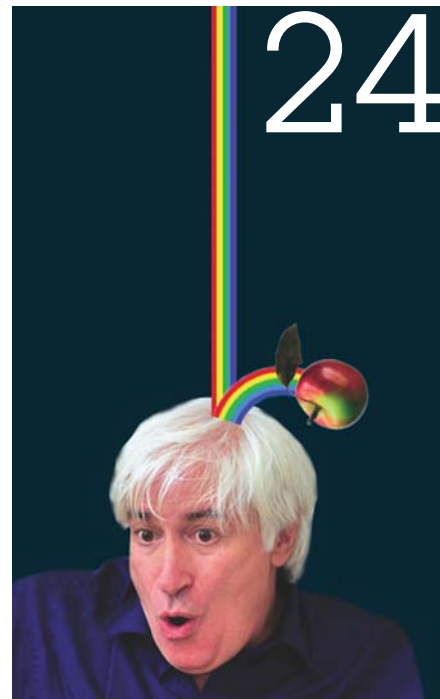
Tickets: £4. Duration: 1 hour

Do you think space travel is an indulgent, expensive fantasy or the key to our future as a species? Anu Ojha asks what has human spaceflight achieved? Will humans follow in the footsteps of robotic missions to Mars and the outer planets? Will we one day settle in space?



Reflections

For four billion years life on Earth has evolved deep in our planet's gravity well – but the last half century has seen humans embarking on voyages which would have been deemed impossible in Newton's era.



8pm ● ARTS EVENT

Newton

Jack Klaff
**Produced by TFA Ltd in
association with Gravity Fields**

Guildhall Theatre ♿

Tickets: £12 (£8 concs)

Duration: 1 hour plus after-show talk and reception

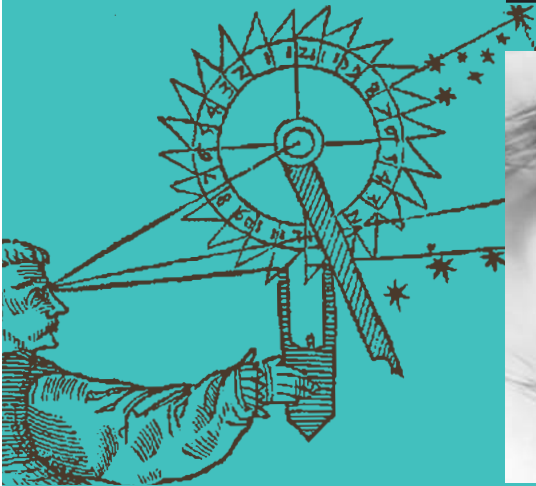
This touching, entertaining piece of solo theatre offers a rounded, warts-and-all portrait of Isaac Newton, his superhuman struggles in pursuit of new truths, and the sorcery and mysticism to which he attended outside of science. Tales and ideas about this towering genius come thick and fast from an array of characters both old and very modern. Set firmly in Grantham and its surroundings, Jack Klaff weaves this work around the notion that Newton was an isolated figure.



Reflections...

Like Einstein, Newton had about him a quality of 'apartness'. The stage fills with people swirling around a solitary figure in whose mind world-changing ideas never ceased to crowd.

TUESDAY 25



1pm ● ARTS EVENT. 11+

The Ethometric Museum

Theatrical sound installation. See 'Events through the festival' (p10) for information.

Times: 1pm, 5pm, 6.30pm.



2.30pm ● FAMILY EVENT. 11+

Giant Steps

Audio promenade drama tour. See 'Events through the festival' (p8) for information.

Times: 2.30pm, 5.30pm.



12.15pm ● HERITAGE EVENT

An Astronomer, His Friend & Their Teacher

Helen Martin

Teacher and Consultant to Temple University, Pennsylvania USA

The Angel and Royal Hotel

Tickets: £4 Talk only. £9 with sandwich lunch. Duration: 1 hour

Two Grantham boys – America's first modern astronomer, Arthur Storer and his famous friend, Sir Isaac Newton – and their extraordinary teacher, Henry Stokes. Helen Martin travels from Philadelphia, USA to share her exploration of Storer, Newton and the teacher who prepared them both for their staggering contributions to science.



Reflections

Arthur Storer emigrated to America and contributed important observations of a comet to Newton's *Principia*. Storer's Comet is referred to today as 'Halley's Comet'. Working with Grantham historians, via the internet, Helen and colleagues have recently started a modern-day version of information sharing about celestial movements between the USA and England.

4.15pm ● SCIENCE EVENT. 12+

Ten True Things About Vision

Dr Ben Craven

National Space Centre

Guildhall Ballroom ♿

Tickets: FREE but please reserve tickets Duration: 1 hour.

What's the truth about our remarkable gift of sight? Illustrations and demonstrations debunk 10 vision myths, from colour mixing to why the inverted image in your eye doesn't need turning right way up again. Popular books and websites have lots of information about our sense of sight – but much of it just isn't true!



Reflections

Isaac Newton experimented with and wrote about the way we see, particularly the relationship between light, colour and optics. He used his own eyes to test his theories, risking blindness in the pursuit of a clearer understanding of vision.

6pm ● SCIENCE EVENT. 12+

Nature's Calendar since Newton

Woodland Trust and Professor Tim Sparks

Venue: Woodland Trust HQ ♿

Tickets: FREE but please reserve tickets Duration: 1 hour 30 mins.

Have a go at weaving a willow birdfeeder and try your hand at making a Green Man face using natural materials. Then hear from Professor Tim Sparks about Phenology – the study of the timing of natural events. In the UK there is a 300 year history of such records kept by natural historians.

Willow weaving starts at 6pm followed by the talk at 6.30pm!



Reflections

In the time of Newton many of the facts about nature that we now take for granted were unknown but many shared his interest in the natural world and some began systematically recording the signs of the seasons.

**6.30pm** ● SCIENCE EVENT .12+

On the Brilliant Colours of Newton's Peacock Feather

Professor Peter Vukusic

School of Physics, University of Exeter

Guildhall Ballroom ♿

Tickets: £4. Duration: 1 hour 30 mins.

How does the peacock get its colour? Since Newton published his seminal *Opticks* text in 1704, scientists have tried to better understand how brightly coloured creatures such as butterflies, fish and birds produce their brilliant iridescence. This lecture describes how Newton's early insight informs the study and technological application of iridescent colour production.



Reflections

Newton described the source of the bright iridescent colours found in peacock feathers in his *Opticks* book of 1704, using significant insight and scientific reasoning, long before the development of microscopy techniques that would verify his theory. His ideas on light and colour have helped form the pool of 'accepted knowledge.'

**7pm** ● PARTICIPATION EVENT .8+

Ask the Astronomer and Moongaze

Dr Chris LintottUniversity of Oxford
Co-Presenter BBC Sky at Night

Colsterworth and Woolsthorpe Village Hall (talk) followed by Woolsthorpe Manor (moongazing). ♿

Tickets: £4. Duration: 1 hour 30 mins.

Anything astronomical to ask? Set a challenge for astronomer, *Sky at Night* co-presenter, and Royal Society Kohn Prize winner, Chris Lintott. Put your questions to Chris and see if you can stump him! Then join him and local astronomers to look at the night sky over Isaac Newton's old home Woolsthorpe Manor. Please park at Woolsthorpe Manor unless you have a disability – it is a short walk between the two buildings. Wheelchair access to lower floor of Science Centre, Café and Orchard (uneven grassy surface). Disabled parking by ticket office.



Reflections

Ask Chris any question you like about the universe and see if he can draw inspiration from Isaac Newton's childhood home and the famous apple tree. Look into the night sky above Newton's old home, and muse as he did, on the relationship of the moon to the earth and apples falling from a tree.

8pm ● ARTS EVENT

Newton

Jack Klaff

Guildhall Theatre

Tickets: £12 (£8 concs) Duration: 1 hour

This touching, entertaining piece of solo theatre offers a rounded, warts-and-all portrait of Isaac Newton, his superhuman struggles in pursuit of new truths, and the sorcery and mysticism to which he attended outside of science. See Friday 21st listing (p13) for more information.

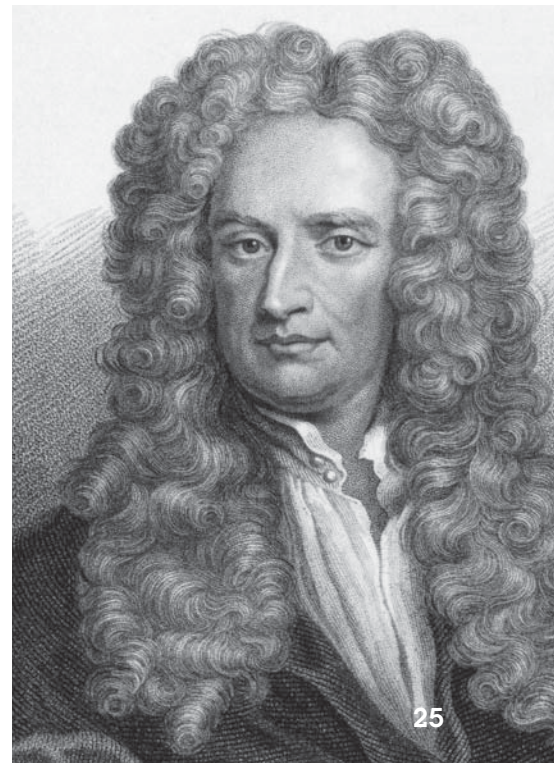
'Newton was not the first of the age of reason, he was the last of the magicians.'

JM Keynes

'The poets were wrong. Newton didn't unweave the rainbow. He wove it.'

Jack Klaff

'Jack Klaff makes your thinking easy. I've rarely laughed so hard, nor been so moved.'

Time Out

WEDNESDAY

26

1pm ● ARTS EVENT. 11+

The Ethometric Museum

Theatrical sound installation. See 'Events through the festival' (p10) for information.

Times: 1pm, 5pm, 6.30pm.

2.30pm ● FAMILY EVENT. 11+

Giant Steps

Audio promenade drama tour. See 'Events through the festival' (p8) for information.

Times: 2.30pm, 5.30pm.



1pm ● ARTS EVENT. 12+

Astronomy and Poetry

Dame Jocelyn Bell Burnell

University of Oxford

Council Chamber, South Kesteven District Council. ♿

Tickets: FREE but please reserve tickets

Duration: 1 hour 30 mins

There are many poems about astronomy and space. Within these broad themes what topics have attracted poets, and how have they handled them? This talk looks at such questions and includes readings of some of the poems.



Reflections

Poets have long been stargazers, moved by the strange infinities of the universe to translate them into metaphor and song. But what do they know of the science of astronomy? And what do astronomers know of poetry?

In May 2012 Professor Dame Jocelyn Bell Burnell was placed by BBC Radio 4 in their New Elizabethans top 60 people during Queen Elizabeth II's reign. As a postgraduate student at Cambridge University she was the person who first noticed a pulsar – a spinning star made up of neutrons.



4.30pm ● SCIENCE EVENT. 14+

Dambusters: Engineering the Bouncing Bomb

Hilary Costello

University of Cambridge

Kesteven and Grantham Girls School ♿

Tickets: FREE but please reserve tickets

Duration: 1 hour

The last time planes attempted to blow up a dam using a bouncing bomb was in May 1943, until last year, that is. Hugh Hunt and Hilary Costello were asked by Channel 4 to lead a team of engineers to re-create the dambusters raid. Tracked by a film crew, their challenge was to suspend a spinning bomb under a vintage aircraft, and build a 10 metre-high dam especially for the purpose of blowing it up. Their applied maths led to a dramatic conclusion.



Reflections

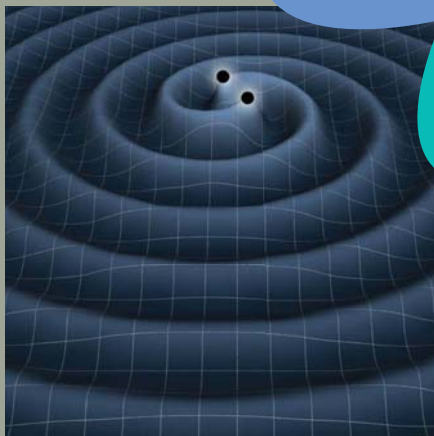
The Dambusters raid has connections to both Newton and Grantham. Newton's laws of motion are vital in working out how to get a bomb to bounce on water and St. Vincents, Grantham was the headquarters for the Dambusters raid.

Lethal science of the Dambusters' raid

In 1939, visionary aircraft designer Barnes Wallis crafted a very special bomb that would bounce across water and destroy German dams. The audacious 1943 raid by 617 Squadron, planned in Grantham, was a success and a 1950s feature film carried the Dambusters story into British legend. But what was the science behind the bouncing bomb? It was certainly highly complex, and many of Barnes Wallis's vital working calculations were lost.

What a challenge for Cambridge engineer Dr Hugh Hunt, then, as he set out to solve the scientific puzzle of exactly how Wallis did it for a special Channel 4 documentary, excerpts of which are being included in a talk for Gravity Fields by Dr Hunt's collaborator Hilary Costello.

It's easy to forget what an extraordinary technical achievement and audacious mission it was. Imagine a unique, spinning five-ton bomb bouncing across the surface of the water like a giant skimming stone – destroying two dams in Germany's Ruhr valley, crippling Hitler's arms factories and changing the course of the war. How on earth did they re-create that?



6pm ● SCIENCE EVENT.15+

Opening a New Window on the Universe

Professor Martin Hendry

University of Glasgow

Harlaxton Manor ♿

Tickets: £4. Duration: 1 hour. Age: 15+

There is a new space race. An international group of more than 800 scientists are hoping to detect for the first time 'gravitational waves'. These are the so-called 'ripples in spacetime', predicted by Einstein and the product of the most violent events in the Universe, such as exploding stars, and even the Big Bang itself.

8pm ● ARTS EVENT.8+

LEO Circle of Eleven

Stamford Arts Centre ♿

Tickets: £15 (£10 concs) Duration: 1 hour

Multi-award winning show, Edinburgh Fringe First winner. LEO is a surprising and witty one-man piece of Physical Theatre that defies the laws of gravity. See Sat 22 listing (p17) for information.



8pm ● ARTS EVENT.10+

The Ethics of Progress

Unlimited Theatre

Guildhall Theatre ♿

Tickets: £12 (£8 concs) Duration: 1 hour.

'The thing about the future is, by the time it happens, it's already too late.'

The Ethics of Progress is a mind melting, jargon free, whistle stop tour of leading edge Quantum Physics, delivered with warmth, wit and charm by Unlimited Theatre's Artistic Director Jon Spooner. By explaining in straightforward terms the concepts of

Superposition, Quantum Entanglement and Teleportation, *The Ethics of Progress* pushes theoretical physics into real life situations and imagines the world as it might be in the not-too-distant future. You'll certainly laugh. You'll definitely see things in a different way. Don't worry about understanding the quantum physics bit, Unlimited are ace at presenting complicated stuff simply. You'll leave the theatre with a spring in your step! *'I went into this show with a heavy heart thinking the subject would be over my head. I came out wanting to change the world. Brilliant.'* **The Guardian**

THURSDAY 27



9.30am ● PARTICIPATION EVENT

Conference: Science and Technology Support for Business

SKDC and De Montfort University

Stoke Rochford Hall

Tickets: please apply for places at www.mybusinessevents.com/gravityfields
Duration: 9.30am - 3pm

A conference for small and medium size companies seeking science and technology development advice, funding and support. It's a free business event, run in conjunction with De Montfort University, offering insight into available Government help for the sector with inspirational talks and networking.



Stoke Rochford is close to Woolsthorpe Manor where Isaac Newton was born and grew up. Delegates will have their thoughts firmly on business innovation and development. Discover and take advantage of links to the great man on a tour of the hall and the opportunity to visit other festival events.

12.15pm ● HERITAGE EVENT

The Sensorium of God

Dr Stuart Clark

Royal Astronomical Society

The Angel and Royal Hotel

Tickets: £4 Talk only. £9 with sandwich lunch. **Duration:** 1 hour

Isaac Newton: quintessential scientist – also alchemist, maverick theologian, and arch-heretic. Dr Stuart Clark explores how this complicated man's unscientific traits were essential in shaping the scientific revolution. Just what did Newton mean when he called the Universe: The Sensorium of God?



Sir Isaac Newton may be best known for his writings on the physical sciences and his mastery of mathematics, but he actually wrote more about theology than science. He was a strictly religious man, yet someone who dabbled in the illegal practise of alchemy, and heretically questioned the Holy Trinity.



1pm ● ARTS EVENT. 11+

The Ethometric Museum

Theatrical sound installation. See 'Events through the festival' (p10) for information.

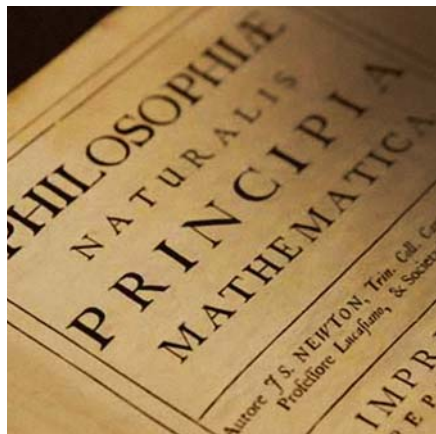
Times: 1pm, 5pm, 6.30pm.

2.30pm ● FAMILY EVENT. 11+

Giant Steps

Audio promenade drama tour. See 'Events through the festival' (p8) for information.

Times: 2.30pm, 5.30pm.



4.15pm • SCIENCE EVENT.14+

Never at Rest – Newton and his Revolutionary Discoveries

Professor Raymond Flood

Venue: King's School

Tickets: FREE but please reserve tickets

Duration: 1 hour

One of the world's greatest mathematicians, Newton made discoveries in mathematics that revolutionised the world and remain important today. Raymond Flood, will be introduced by Professor John Toland, the Director of the Isaac Newton Institute for Mathematical Sciences.



Reflections

Newton's range of interests was breath-taking. His reluctance to make his work known – always in uneasy contention with his reluctance to let anyone else take the credit – led to many controversies.



6pm • SCIENCE EVENT.16+

Let's Particle

**Professor Val Gibson and
Dr Hugh Hunt with compere
Dr Katie Steckles**

Harlaxton Manor

Tickets: £4. **Duration:** 1 hour

From balls to the Higgs Boson, Newton to now. An entertaining dialogue between Dr Hugh Hunt (representing Newton's balls) and Professor Val Gibson (representing the cutting edge of particle collisions), compered by mathematician, Dr Katie Steckles. Physics can be fun and this debate aims to be just that, helping you understand what goes on at CERN and how it relates to the physics discoveries of the past. Balls or not, we will be steered through a discussion which promises to bring you up to date with the whys and wherefores of the latest particle physics.



Reflections

Newton's notion of particles was something most of us share in our mind's eye - a picture of something small and spherical. Now the world of particles and high energy physics has erupted into a new era with the discovery that a new particle consistent with the Higgs exists.

7.30pm • SCIENCE EVENT.14+

Songs of the Stars: the Real Music of the Spheres

Dr Don Kurz

University of Central Lancashire

Guildhall Theatre

Tickets: £4. **Duration:** 2 hours

A multi-media talk introducing the relationship of music to stellar sounds exploring the real sounds of the stars and musical compositions where every member of the orchestra is a real (astronomical) star! For over 2500 years the idea of a celestial 'music of the spheres' has reverberated down the millennia. The stars have sounds in them that we use to see right to their very cores.



Reflections

Newton's physics is fundamental to our understanding of stars and planets. Newton's form of Kepler's third law is the source of our knowledge of the masses of stars and planets.

THURSDAY 27

8pm ● ARTS EVENT.11+

Hanging Hooke

Take the Space

Written by Siobhán Nicholas

Performed by Chris Barnes

Venue: Guildhall Ballroom ♿

Tickets: £12 (£8 concs) Duration: 90 mins

Christopher Wren loved him. Isaac Newton loathed him. Robert Hooke was an ingenious man, one of the fathers of modern science. Yet he was written out of history. This one man play tells a tale of intrigue and betrayal, and explores the captivating 17th century world of new science and discovery.

'The most wonderful piece of new writing I have seen in years.' **Plays International**



Reflections

After Newton died, a letter from Hooke and a well-thumbed copy of Hooke's *Micrographia* were found amongst his possessions. Five years before *Principia*, Hooke's letter outlined his theory of universal gravity. That visionary concept explained the mystery of elliptical orbit and led to Newton's calculation. How tragic that these two brilliant men could not have explored further... together.



8pm ● ARTS EVENT.

The Ethics of Progress

Unlimited Theatre

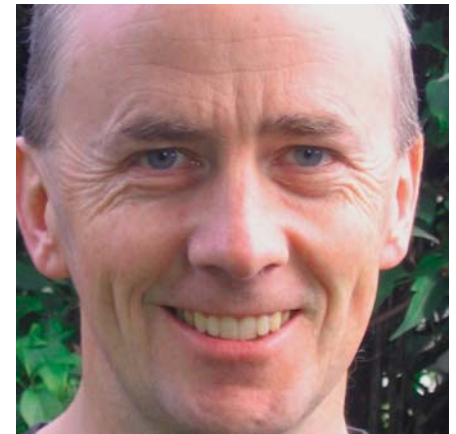
Stamford Arts Centre

A whistle stop tour of leading edge Quantum Physics. See Wed 26 listing (p27) for more information.

9pm ● PARTICIPATION EVENT.8+

Science Pub Quiz

Dr Ben Craven



The Angel and Royal Hotel

Tickets: Free. Email gravityfields@southkesteven.gov.uk to reserve your team's place, type 'Pub Quiz' in subject line

Ask me one on.... science. Or perhaps you aren't a science fiend? No problem! With "what happens next?" demonstrations and plenty of opportunities for inspired guesswork, anyone can have a go at this light-hearted science-based pub quiz. And who knows what you'll learn.



Reflections

Isaac Newton's curiosity gave answers to questions the world needed to know. He may have been educated here in Grantham and you may have been educated here as well, but you don't have to be a genius on his scale - or any scale - to take part!

10am

Science and Technology Careers Day Session

Cummins Generator Technologies**Venue: Cummins Generator****Technologies, Stamford** **Tickets: Please email****gareth.clark@cummins.com****Duration: 2 hours.**

A Science and Technology Careers Day delivered by Cummins Generator Technologies, Stamford for Stamford and South Kesteven sixth forms. Cummins Generator Technologies designs and manufactures the world's broadest range of AC generators from 0.6 to 20,000 kVA under the MARKON®, STAMFORD® and AvK® product brands.

**12pm**

● SCIENCE EVENT

Stones from the Sky

Professor Colin Pillinger**2011 Royal Society Michael****Faraday Prize winner****Grantham Baptist Church** **Tickets: £4 Duration: 2 hours**

Newton was of the opinion that no small bodies exist beyond the moon. But he was wrong as Britain's recently discovered largest meteorite at 93kg will testify.

1pm

● ARTS EVENT

Music, Numerology and Astrology Recital

Douglas Hollick**St Wulfram's Church** **Tickets: FREE Duration: 1 hour**

Douglas Hollick, locally based organist and international early keyboard scholar will play the magnificent organ at St Wulfram's Church, one of the finest in Lincolnshire. Works by Buxtehude, JSBach and three English composers representing Newton's life; organ pieces by Thomas Tomkins from 1648-1650; works by Henry Purcell corresponding with the middle years; and Jeremiah Clarke with the end.

2pm

● ARTS EVENT .11+

Hanging Hooke

Venue: Guildhall Ballroom **Tickets: £12 (£8 concessions)****Duration: 90 mins**

One man play exploring the captivating 17th century world of new science and discovery. See Thu 27 listing (p30) for more information.

6pm

● ARTS EVENT

Closing Discussion: Music and Deep Time

Jem Finer, Musician and Professor Pedro Ferreira**Guildhall Theatre** **Tickets: £4. Duration: 1 hour.**

A fascinating discussion on how art can illustrate scientific concepts. Jem Finer, musician, artist and composer of *Longplayer*, a piece of music written to play for 1000 years without ever repeating itself, talks to cosmologist and astrophysicist Pedro Ferreira about systems, long-duration processes and extremes of scale in both time and space. Chaired by Siân Ede, author of *Art & Science*.

7.30pm

● SCIENCE EVENT .12+

In the Shadow of the Moon

Documentary film screening**Stamford Arts Centre** **Tickets: £4. Duration: 2 hours 15 min.**

The definitive story of the Apollo program.. See Sun 23 listing (p21) for more information.

Transformation of the Town

Grantham as you have never seen it!

Friday 28 September
7pm-9.30pm
Grantham Town Centre

In a spectacular Festival Finale, Grantham town centre will come alive with Newton themed processions, aerial displays, light projections and professional and community performers.

An event for the whole family, join in the celebration of Isaac Newton, the town's most famous son.

Grantham will be transformed as it looks to the future as well as the past.



For one special night, Grantham will be transformed with all colours of the rainbow in a celebration of Newton's discoveries about light and the planets. Wander through the pedestrianised streets of the town to explore the streets in a new light. Enjoy the processions, marvel at fire pendulums and aerial artists, discover the secret Alchemy Lab and let the Apothecary suggest unusual remedies for your ailments.

Six processions, made up of local community groups, will circulate in all corners of the town centre from St Wulfram's to Wide Westgate. Each procession will be themed

with one of the colours of the rainbow and will feature individually designed costumes, Newtonian hats, banners and flags. *(If you thought there were seven colours in the rainbow, current scientific thinking – and the logistics of the town centre! – merges violet and indigo, but even Newton originally thought there were five then added two more!)*

Come and join the blaze of colour as a Deadgood's rainbow projection lights up the spire of St Wulfram's, Cirque Bijou takes Newton (suspended on a crane) on a trip to the stars and planets outside the Guildhall, and the World Famous brings giant fire pendulums to the Market Place. Take part in your own theatrical journey exploring Newton's heritage with Giant Steps, stargaze at the Stardome in St Wulfram's, and enter the mysterious world of the Ethometric Museum.

This will be a magical night of celebration, light, sound, music and colour with something for everyone... Come along and enjoy!

**In the Market Place...****'Pendulum Fires'**
by The World Famous

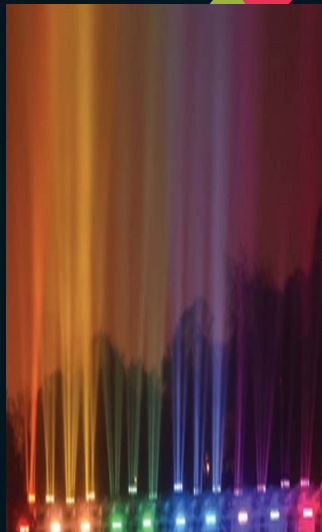
in the Market Place is a giant, but simple and beautiful, fire installation based on the pendulum theory of Newtonian mechanics. Fifteen pendulums, each a large flaming sphere, when released will sway back and forth at different rates, creating slowly-changing magical patterns of fire. The World Famous is one of the country's leading pyrotechnics companies using fireworks, fire, flame and special effects to animate, amaze, celebrate and communicate. In July for the Cultural Olympiad they brought the iconic National Theatre to life with fire and flames.

Outside the Guildhall...**'Starstruck'**
by Cirque Bijou

This new commission from *Cirque Bijou* explores and celebrates Newton's findings and work examining the solar system. A huge sun will shine down from the Guildhall building with celestial imagery shot from the Hubble telescope projected onto it. In an extraordinary aerial spectacular that grows and develops over the evening, we will see Newton studying the stars and night sky. Planets, fiery objects and aerialists form a ballet in the air, like a child's giant mobile. *Cirque Bijou* is one of Europe's most creative performance production companies, producing events throughout the world.

**Around the town...****Shademakers**

Carnival Club have been working with local artists, schools and community groups to create the fabulous costumes and structures for the processions around Grantham. Shademakers is at the forefront of contemporary carnival design, regularly producing high-quality, technically innovative costumes and structures. The organisation is a key contributor to the development of the art-form, particularly in new design technology and costume construction techniques.

**On St Wulfram's spire****'White Light'**
by Deadgood Studio

In the quiet of the old quarter of Grantham, by Newton's old schoolroom, shafts of White Light are shone into the night sky and refracted by the spire of St Wulfram's to emerge as a vivid spectrum of colour – reflecting Newton's experiments when he split white light through a prism into the colours of the rainbow. Deadgood Studio is a design studio (Newcastle and London) led by creative directors Dan Ziglam and Elliot Brook which was commissioned as one of the four successful proposals of the Brilliant programme for the Lumiere festival in Durham to create a lightwork inspired by a natural weather phenomenon.

**In the George Centre...****'The Last Apothecary'**
by Dizzy O'Dare

Harking back to the old country fairs of days gone by, a roaming treatment centre full of daft and nutty treatments for equally foolish ailments. For 2012 Dizzy O'Dare has designed The Last Apothecary and brought it to our very own apothecary shop in Grantham. If you suffer from knobbly knees, lazy husband syndrome or random levitation, they have the cure for you. This comical duo will delight and charm as they prank and play.



Transformation of the Town...



Elmer Street and Bluegate...

Community Sculpture

Laury Dizengremel

Through the day of Friday 28th at the corner of Elmer St and Bluegate local sculptor Laury Dizengremel will construct a Newtonian colour wheel. Volunteers are invited to drop by at any time from 10am to 6pm to help and add your own mathematical equations to the work of community art as it is erected, and during the evening from 7pm to 9.30pm there will be an opportunity to add your own decorative equations to the corner where two processions meet.



In the George Centre...

Ray Lee's

'Ethometric Museum'

A gallery of amazing electrical curiosities. As the Museum doors are unlocked the ethometric mysteries are revealed...! 'If you're after something genuinely different 'Ethometric Museum' will take your breath away.' Three Weeks Ticketed shows throughout the evening.

Around the town...

'Giant Steps'

Encounter Newton's local history with extracts from Giant Steps, an audio-promenade tour by Craig Baxter with performances by local community groups in partnership with BBC Outreach and BBC Radio Lincolnshire and the University of Lincoln. Craig Baxter has written numerous stage plays including Like Confessing a Murder.



At St Wulfram's...

'Stardome'

Ticketed half hour shows inside the National Space Centre's Stardome. Escape into a mobile planetarium that recreates the dark night sky with hundreds of brilliant points of light splashed across the inside of the dome.



In Guildhall Street...

Alchemy Jack

In his secret alchemy lab, Alchemist Jack Greene and his assistant will strive to create the 'philosophers' stone. In Newton's time alchemy was illegal but Newton practised the secret art in his rooms at Cambridge, mixing metals and burning substances through the night.



In Wide Westgate...

Fairground rides

As with all community celebrations through the centuries our transformation would not be complete without some of the fun of the fair...some specially selected rides exhibiting 3G forces in Wide Westgate with additional rides for the young members of the audience.



Around the town...

Food Stalls

will be available in Westgate and in the area near St Wulfram's, and a bar will be available and food will be served in the Angel and Royal hotel courtyard.

Community Groups

The following schools, community groups and local organisations are participating in the processions:

Allington with Sedgebrook Church of England Primary School
Asda
Bourne Westfield Academy,
Cliffedale Primary School
Colsterworth C of E Primary School
Corby Glen Community Primary School
Corby Glen Dance School
Denton Church of England School
Grantham Additional Needs Federation, Ambergate School
Grantham Baptist Church
Grantham Carnival
Grantham College
Grantham Dance School
Grantham Dramatic Society
Grantham Huntingtower Community Primary School
Grantham Youth Theatre
Great Ponton Church of England School
Harlaxton Church of England Primary School
Ingoldsby Primary School
Kesteven and Grantham Girls' School
Long Bennington Primary School
Minority Communities Service,
Lincolnshire County Council
New Life Church Youth Outreach
Polish Club
Ropsley Church Primary
St Mary's Catholic Primary School
The National Church of England Junior School
Walton Girls' School, Harlaxton Road
Wyndham Park Nursery School
Youth Theatre Company, Grantham Guildhall

For more information and to book tickets:

www.gravityfields.co.uk
01476 406158

Festival contact details:

South Kesteven District Council,
St Peter's Hill, Grantham,
Lincolnshire, NG31 6PZ

gravityfields@southkesteven.gov.uk

Apologies

The Gravity Fields Festival is unable to bring IOU's Volatile Light sound and light installation to Grantham as featured in our original listings programme because of unexpected technical difficulties with the proposed venue which we have not been able to overcome. This is a great disappointment to the festival and we offer our apologies to IOU and our audience and look forward to future opportunities to work with IOU.

We had also hoped to bring Lindsay Seer's digital installation The Truth Was Always Here, based in Lincolnshire and exploring the local history of alchemy. Unfortunately this has not been possible due to unforeseen circumstances. We hope we may work together in the future.

Rosemary Richard,
Gravity Fields Festival Director

Fringe Events

Thu 20 September

Preview Evening

Pages from the Past

St Wulfram's Church

7pm - 9pm. Tickets: £5

An opportunity to see some of the valuable and ancient books held in the Trigge Chained Library in St Wulfram's Church. This library, founded in 1598, would have been known to Newton when he was at the King's School (then known as the King Edward VI Grammar School). At this preview, the exhibition will be officially opened by the Bishop of Lincoln, Rt Revd Christopher Lowson. Refreshments and wine available. Contact Mrs J Parker to book on 01476 562204 or jean.parker@btinternet.com.

Cheques payable to St Wulfram's Church.

21-28 September

Granite ball floating on water!

Grantham Guildhall

Tickets: FREE

This amazing piece of engineering allows such a small tolerance between the ball and the bowl that once water is pumped into the bowl the water will lift the ball and make it spin. This is a good example of gravity seemingly being defied.

Courtesy of Stone & Water Ltd

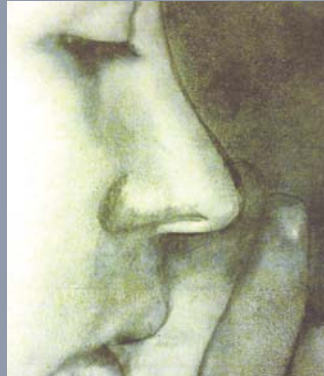
25 September

Bellringing Workshop

St Wulfram's Church

7pm - 9pm. FREE

Newcomers welcome to come and try bellringing. If you ever wanted to have a go now is your chance! Children over 12 welcome but under 18s must attend with an adult. Enquiries to Diana Power diana.power@btinternet.com



21-28 September

'The Whispering' and 'Isaac's Prayer' Soundscapes

St Wulfram's Church:

The Crypt and The Quiet Chapel

Tickets: FREE

During church opening hours

(except during other events or services)

Local artist Annie Samuel will be displaying two soundscapes, *The Whispering* and *Isaac's Prayer*. *Isaac's prayer* has been written to echo the type of prayers and thoughts of the congregation during this time and can be heard in the Quiet Chapel.

The Whispering is a current reflection of prayer, taken from anonymous volunteers from schools, local congregations and from inmates at Nottingham prison. The whispers echo intimate and unsettling prayers that demand an emotive reaction from the listener.

Sun 23 September

Historic Walking Tour

Meet Angel and Royal Hotel

2pm. Tickets: FREE.

Max 20 people

Walking Tour with Grantham's Blue Badge Guide Malcolm Knapp.



Fri 21 and Fri 28 September

Scientific Instruments Appraisal Days

Grantham Auction Rooms

Old Wharf Road, Grantham

Tickets: FREE

Grantham TV Antiques Expert and Auctioneer, Colin Young will be holding specialist Scientific Instruments Appraisal Days from 9am - 1pm on Fridays 21 & 28. Bring along any instruments of any age to find out what they do, their age, their origin and their potential value. From clocks and barometers to calculators and measuring equipment; anything and everything relating to the sciences is welcome for a morning of discovery. Colin Young MRICS can be contacted on 01476 565118 or 07976 977169

Mon 24 September

An Evening of Science with Sir Isaac Newton

Woolsthorpe Manor

7pm - 9pm. Tickets: £25

The National Trust invite you to an evening visit to Woolsthorpe Manor to meet Isaac Newton and watch his scientific demonstrations. Sir Isaac Newton's Show recounts his work on Fluxions, The Spectrum of Colours, The Reflecting Telescope, Gravity, and other forces, and presents a history of the exciting times in which he lived. Light refreshments provided. A chance to meet Isaac in his own home. Please ring Kim Barnett 01476 862823 to book.

Sat 29 / Sun 30 September Alchemy in a Material World

Woolsthorpe Manor

11am - 5pm

Tickets: Free to National Trust Members. £6.65 adults, £3.35 children, £16.65 family ticket

Meet the alchemist and help him with his studies. Experiment with properties of different materials. Jack Greene, the travelling alchemist, will set up shop in the grounds of Woolsthorpe Manor. Help him use various substances to create different potions. Can you walk on custard? Can you stand in a bubble? Find out the answers to these any many more questions at Isaac Newton's birthplace.

Tickets available from www.nationaltrust.org.uk/woolsthorpe or 01476 862823

Educational Venue Partners

Grantham College

Grantham College is proud to support the Gravity Fields Festival. The college is committed to providing high quality education and training opportunities for the people of South Kesteven and this festival compliments this aim in bringing science and art to the whole community in a variety of accessible media. It's an exciting opportunity for Grantham to put itself firmly on the map.

Grantham Museum

Grantham Museum is hosting the Ladybird Science paintings exhibition, acting as a venue for the Royal Mint presentation, and offering additional workshops to schools through the festival. The Museum is a hub of activity through the festival week and we hope festival goers will come and see the unique exhibition we are hosting and that schools will take advantage of our science activities through the week.

Kesteven and Grantham Girls' School

Kesteven and Grantham Girls' School is delighted to be taking part in the workshop and education programme. Look out for the telescope in the processions. The school is very pleased to be

hosting the Dambusters talk and to be providing an opportunity to support women in science.

Kings School

The King's School is delighted to support and commend the 2012 Gravity Fields Festival and we are delighted that we are able to provide both a venue and administrative support to this commemoration of Grantham's scientific links. Sir Isaac Newton was a pupil of The King's School and it is fitting that we should participate actively in this event. Sadly, due to essential and long-planned renovation works to our Grade 1 Listed Old School's roof, we are not able to open that facility this year but we are delighted that our newly refurbished school hall will be used as a venue this year.

The Head Master, Governors, staff and pupils wish you a very warm welcome to the King's School for Gravity Fields 2012!

Walton Girls' School

Walton High School and Sixth Form are delighted to be involved in the Gravity Fields Festival. The Performing Arts are one of our three specialisms so we needed no persuading in being involved in an event that celebrates both Science and the Arts. It is an opportunity for us not

only to develop students' knowledge and understanding of the world in which they live but also to celebrate and showcase their many talents.

At Walton we believe in ensuring all students have the opportunity to reach their potential in all areas, and through our broad curriculum together with numerous enrichment and extra-curricular activities we truly feel we achieve this aim.

The Gravity Fields Festival provides our students with further opportunities to work with professionals, and educationalists outside of school but more importantly to have fun and be involved in a huge community extravaganza.

Woodlands Trust

The Woodland Trust is the UK's leading woodland conservation charity. Its Grantham headquarters employs a number of local people. As a member of Grantham is Great the Trust believes the Gravity Fields Festival is very positive; an event showcasing Grantham's history and modern talent, and encouraging the wonders of science. The Trust is pleased to be part of what it hopes will become a regular experience.



gravity

fields

festival 2012



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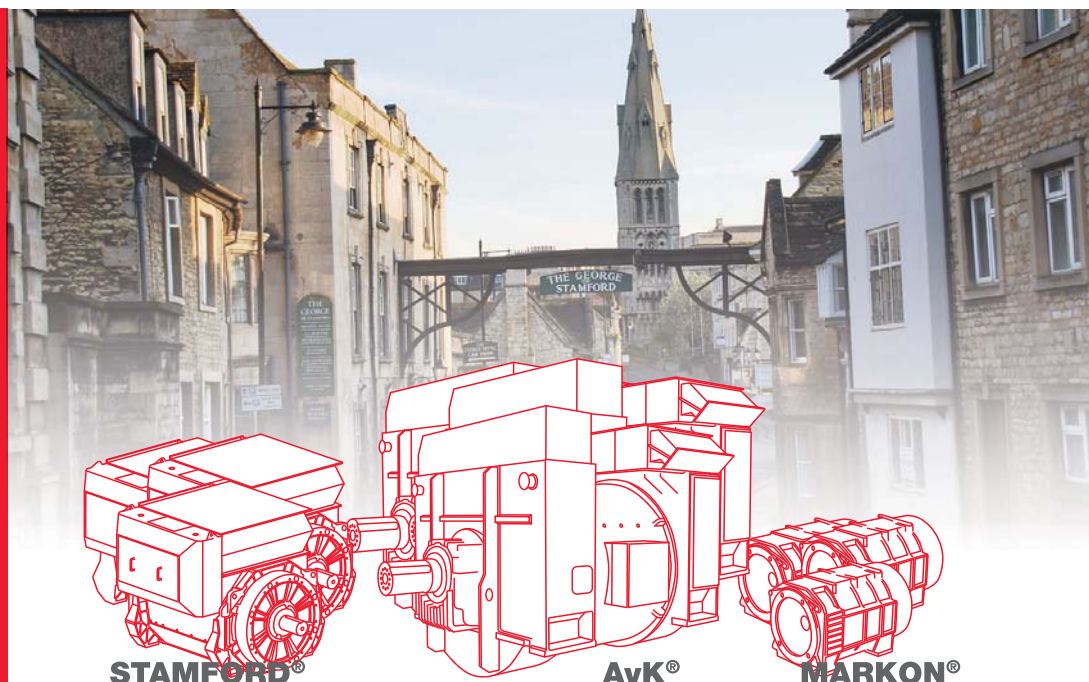
Sunday
10.00am - 2.00pm
*(Restaurant, Tropicana Tan and Feelgood Fitness)



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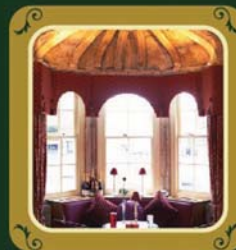


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www.angelandroyal.co.uk
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Harlaxton Manor

For further details, please contact:

Simon Hawkes, Programmes and Events Manager

Harlaxton Manor, Harlaxton, Grantham, Lincolnshire NG32 1AG

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Email: shawkes@harlaxton.ac.uk



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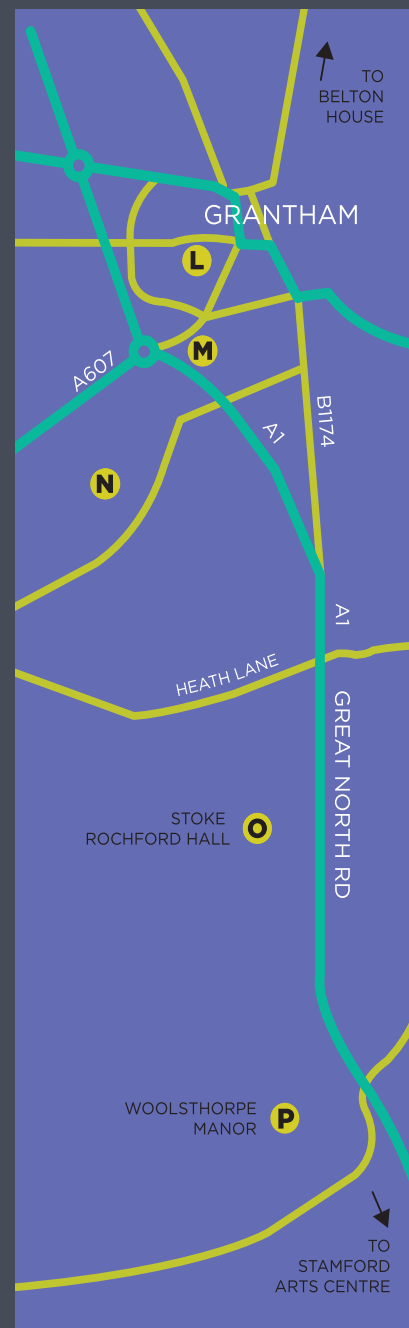
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FESTIVAL MAP

- A** Grantham Guildhall
Theatre & Ballroom NG31 6PZ
- B** The George Centre
NG31 6LH
- C** Angel and Royal Hotel
NG31 6PN
- D** St Wulfram's Church
NG31 6RR
- E** South Kesteven D.C.
Council Chamber
NG31 6PZ

- F** Grantham Museum
NG31 6PY
- G** Kesteven & Grantham
Girls' School
NG31 9AU
- H** Masonic Hall
NG31 8BL
- I** King's School
NG31 6RP
- J** Priory Business Venue
NG31 6LJ
- K** Grantham College
NG31 9AP

- Z** Grantham Baptist
Church
NG31 6BA
- L** Woodland Trust HQ
NG31 6LL
- M** Walton Girls' School
NG31 7JR
- N** Harlaxton Manor
NG32 1AG
- O** Stoke Rochford Hall
NG33 5EJ
- P** Woolsthorpe Manor
NG33 5PD





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Festival contact details:

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