GLIDER FEATURES

1. Identify and label the features of a glider on the image below.
2. Using different coloured pencils or pens, draw and label the forces that act on a glider in flight.
3. What force is missing from a glider in flight?
4. What can limit a glider's flight time?
5. What can limit a glider's distance?

HIDDEN FIGURES

Pretty Curious Resource

Classroom Activity Teachers' Notes

SUPPORTED BY:

RESOURCE PRODUCED BY:

INTOFILM.ORG

Lesson timings

You will need a 90–120 minute double lesson to complete this activity.

Lesson objectives

- To use scientific ideas about forces to explain the motion of a paper glider.
- To generate and test a prediction or theory of how wing area affects flight.
- To analyse and evaluate evidence from an investigation.
- To know that waste paper can be re-used and recycled.

You will need:

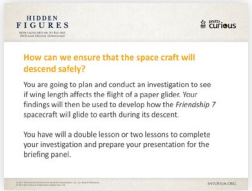
- Scrap paper (A4 and additionally in A3, A5, A6 and A1 sizes)
- Paper clips
- Sticky tape
- Measuring tapes
- Stop watches
- **Glider features sheet**
- **Investigation planning sheet**
- **How to make a paper glider activity sheet**
- A spacious room (with tables and chairs pushed to the back, or outside if possible).

Optional for the extension activities:

- Tablets/video cameras/ stills cameras
- **Record and Playback guidance sheet**
- **Pretty Curious investigation summary sheet**
- **STEM careers map homework sheet**

IGNITION
(INTRODUCTION TO THE SCENARIO)

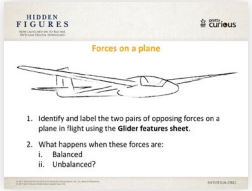
This refers to **slides 2 to 5** of the accompanying **Hidden Figures: Pretty Curious PowerPoint presentation**.

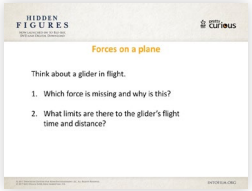


1. **Slide 1** of the accompanying **Hidden Figures: Pretty Curious PowerPoint presentation** is the title slide and slide 2 introduces this section. Explain to students that the lesson will be spilt into seven parts based on a rocket's journey.
2. Display **slide 3** and explain to students that they will now take on the role of 'computers' and engineers at Mission Control like the characters in the film. They will have to develop and undertake a scientific investigation based on the flight path of paper gliders, which will help to ensure that the descent of the rocket is a success.
3. You will need to explain to students that before the development of the technological computing equipment that we are used to today, organisations relied on humans to calculate every single equation that they used in their work! These humans were called 'computers'.
4. The clip from *Hidden Figures* on **slide 4** (DVD time code 01:23:19 - 01:23:33) will help young people to immerse themselves in role before they start planning their investigation.
5. **Slide 5** explains the task in more detail for students.
6. At this point you may wish to hand out the **Investigation planning sheets** to help learners to plan effectively.

LIFTOFF!
(STARTER ACTIVITY)

This refers to **slides 6 to 8** of the presentation.



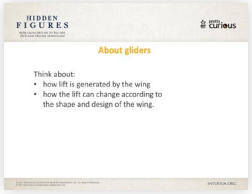


1. **Slide 6** is the section title slide for Liftoff! which is the starter activity.
2. Display **slide 7** and hand out the **Glider features sheet** for students to identify and label the two pairs of opposing forces on a plane in flight in small groups. Students should consider forward thrust versus backwards air resistance, and upwards lift (from the wings) versus downward gravity.
3. As they feedback to the rest of the class, you may wish to ask students to feed back by drawing and labelling the forces on the whiteboard.
4. Lead a discussion on what will happen to the plane if each pair of forces is (i) balanced, and (ii) unbalanced.
5. **Slide 8** tasks students with considering the forces that impact on a glider in flight. The answers to the questions posed are:
   - The force that is missing is forward thrust since a glider does not have a motor
   - The limits on the glider's flight time or distance is caused by the imbalance between lift and gravity. The glider will generate lift as long as it is moving but since air resistance slows it down, this lift reduces over time. As the glider slows down, the vertical forces become more unbalanced until the plane falls to earth under gravity.

Engine burnout
(Designing the investigation)

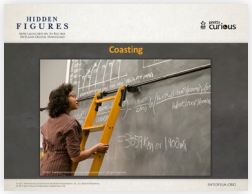
This refers to **slides 9 to 12** of the presentation.

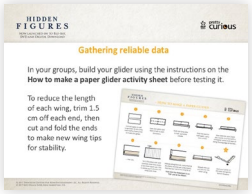
1. After displaying **slide 9**, which signals the start of the planning section, ask students to annotate the features of a glider as outlined on **slide 10**. You may prefer to ask students to annotate the features on their copy of the **Glider features sheet** in a different coloured pen or pencil to the one that they used to identify the forces in the Liftoff! activity.
2. After 10 minutes, lead feedback from groups or pairs using **slide 11**. Students should have identified the following:
   - The wings of gliders are long and thin
   - This is designed to generate lots of lift at low speed
   - The lift is increased with the area but this also depends on the shape and design of the wing.
3. Distribute copies of the **Investigation planning sheets** to each student and explain that they will now start to devise their own scientific question and investigation. **Slide 12** summarises this for students.
4. Allow time for students to discuss and plan their investigations and remind them to use the five bullet points on **slide 12** as their success criteria so that they can present their findings to the class after their investigations.

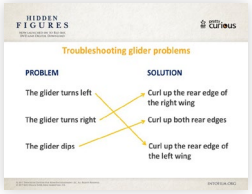


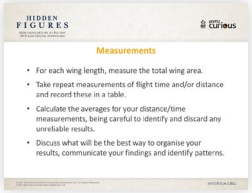
COASTING
(GATHERING RELIABLE DATA)

This refers to **slides 13 to 16** of the presentation.









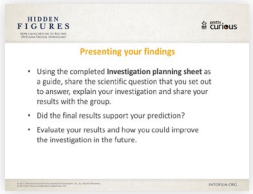
1. Introduce the next stage in the process which is called coasting and will involve learners collecting reliable data as shown on **slide 13**.
2. Ensure that each group has a copy of the **How to make a paper glider activity sheet** so that they can construct their crafts using scrap paper to a 5-minute deadline. **Slide 14** summarises the task for students.
3. Students should ensure that their gliders fly as straight as possible, so **slide 15** offers troubleshooting suggestions for students to predict, before the correct answers are revealed. (Please note that the answers will be revealed on the slide with each click on the PowerPoint presentation).
   - If the glider turns to the left, curl up the rear edge of the left wing.
   - If the glider turns to the right, curl up the rear edge of the right wing.
   - If the glider 'dips', curl up both rear edges.
4. Once groups have completed their construction they can test their gliders to see how well they fly.
5. **Slide 16** explains in detail how the data should be collected and encourages young people to consider how to organise their data.
6. At this point, you may wish to ensure that there is sufficient space in your classroom for the flights and data collection to take place. Young people should fill in their **Investigation planning sheet** as they go.

APOGEE AND EJECTION
(DISCUSSING THE RESULTS)

15–25 mins

This refers to **slides 17 and 18** of the presentation.

1. Allow students to regroup and to use **slide 18** to review their completed **Investigation planning sheets** and to answer their initial scientific question.
2. Invite groups to evaluate their results during their presentation to the larger group.
3. The presenters should suggest how they could improve their investigation including how they take measurements, how they can change the glider's wing area, etc.
4. If you have sufficient time, the rest of the group could suggest their own improvements for the experiment (peer evaluation).

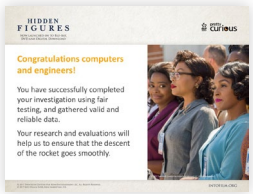


SPLASHDOWN
(PLENARY)

15 mins

This refers to **slides 19 to 21** of the presentation.

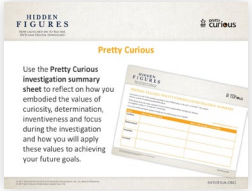
1. Display **slide 20** which asks students to discuss the relationship or patterns of their data.
2. The questions on the slide can be answered as a group and added to the **Investigation planning sheet**.
3. **Slide 21** finalises the investigation for the students.



RECOVERY
(EXTENSION ACTIVITIES)

15–25 mins

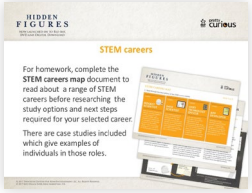
This refers to **slides 22 and 25** of the presentation.



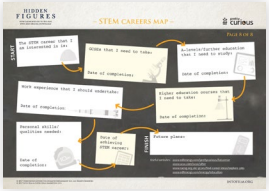
Slide 22 introduces this section of extension activities. These can be used in a follow-up lesson or as part of an extra-curricular STEM-themed Into Film Club or STEM club.

Slide 23 contains the EDF Energy Pretty Curious campaign trailer. After watching the video, young people can complete the activity on **slide 24** by filling in the **Pretty Curious investigation summary sheet** to show how they embodied curiosity, determination, inventiveness and focus during their investigation and how they can use these skills to achieve their future goals (and can be applied to the My STEM careers map task on the next slide).

You can divide your students into groups of four with each student taking on the one of the following roles featured in the film of computer, engineer, team leader or data scientist and holding a debrief session where they discuss how the Pretty Curious campaign trailer reflects the issues and values that were shown (a) in the film and (b) during their investigation.



Slide 25. Your learners can read through the STEM careers on the **STEM careers map** document which summarises a range of roles selected following the 2016 Jobs of the Future report by the Social Market Foundation for EDF Energy. Students can then read case studies of individuals currently in these roles, provided with the courtesy of the Royal Academy of Engineering and Queen Elizabeth Prize for Engineering, before conducting further research on the individuals, their inspiration and respective career journeys.

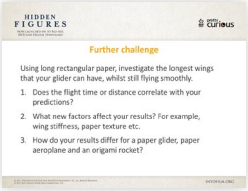


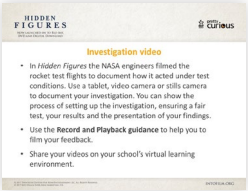
At home, young people can select and choose one of the careers and research routes into it and complete the **My STEM careers map** page. A list of useful websites is provided on the sheet. Once completed, students can share their findings with the rest of their class and add the map to their Record of Achievement for future reference.

Additionally, they can play EDF Energy's Pretty Curious Future Me game online at www.edfenergy.com/prettycurious/futureme/avatarbuilder. The Pretty Curious 360-degree virtual reality video also provides examples of three women in the fields of structural engineering, research engineering and coding www.edfenergy.com/prettycurious/futureme/virtualreality.

Slide 26
This slide explores a range of variables that can be changed in the investigation and asks your group how these could affect the results.

Slide 27
This slide explains how pupils can film their investigations using filmmaking equipment to document their results. These films can be shared on the school's virtual learning environment dependant on your school's safeguarding policy on sharing student videos online.





HIDDEN FIGURES

Pretty Curious Resource

Teacher Notes

SUPPORTED BY:

RESOURCE PRODUCED BY:

INTOFILM.ORG

About this resource

This lesson, assembly and active viewing guide will inspire young people aged 11–14 to consider a positive future though STEM by using the film *Hidden Figures* and EDF Energy's Pretty Curious programme activities to unlock their potential.

The **science lesson** helps students to develop their understanding of investigations and fair testing, and gather data that is valid and reliable. Students must use their understanding of forces acting on a glider to make a prediction that they will test in a hands-on investigation, concluding with an evaluation of their results. It is comprised of a teachers' notes document, activity sheets and a PowerPoint presentation with embedded clips from the film. It is spilt into seven parts, based on the flight of a rocket, and is to be completed over a double lesson period, or in a few Into Film Clubs or STEM clubs.

The assembly is based on the *Hidden Figures* trailer and EDF Energy's Pretty Curious film. It contains information for teachers and facilitators in the notes section of the PowerPoint presentation, and can be delivered as an assembly, within tutor time or during an extracurricular club session.

The **active viewing guide** supports watching of *Hidden Figures* in a club or class setting. It is recommended that you watch the film in its entirety before embarking on the classroom activity. Use the *Hidden Figures* active viewing guide to break the film down into four sections, and discuss the questions with your students. If you are using this in an Into Film Club or as part of another extra-curricular club, there are suggested extension activities that you might find useful.

Now launched on to Blu-ray, DVD and Digital Download

CONTENTS LIST

TEACHERS' NOTES

- This document – introduction to the full resource.

ASSEMBLY

- Hidden Figures: Breaking Boundaries assembly notes
- Hidden Figures: Breaking Boundaries assembly PowerPoint presentation

FILM VIEWING

- Hidden Figures active viewing guide for clubs

CLASSROOM ACTIVITY

- Hidden Figures: Pretty Curious teachers' notes
- Hidden Figures: Pretty Curious PowerPoint presentation

Broken down into the following seven activities and accompanying activity sheets:

1.	**Ignition**	(introduction to the scenario) page 3 and slides 2 to 5
2.	**Liftoff!**	(starter activity) page 4 and slides 6 to 8 Glider features sheet
3.	**Engine burnout**	(designing the investigation) page 5 and slides 9 to 12. Investigation planning sheet
4.	**Coasting**	(gathering reliable data) page 6 and slides 13 to 16. How to make a paper glider activity sheet
5.	**Apogee and ejection**	(discussing the results) page 7 and slides 17 to 18
6.	**Splashdown**	(plenary) page 7 and slides 19 to 21
7.	**Recovery**	(extension activities) page 8 and slides 22 to 27. Hidden Figures: Pretty Curious investigation summary • Map your career in STEM sheet (homework)

There are suggestions for extending learning within both the assembly and the lesson.

Safeguarding

Information on the film's age certification is detailed on the next page. You should watch the film and the relevant clips within the PowerPoint presentation prior to delivering these activities in class, to ensure content is appropriate for your students. We also recommend that you view content on external links in advance of sharing these with students as we are unable to accept responsibility for the content which may change, move or become unavailable without our knowledge.

Accessing film

As part of the launch of this resource, you have the opportunity to be sent a free DVD of *Hidden Figures*. Start a free Into Film Club today and if you're one of the first 200 registrants, you'll receive a free *Hidden Figures* DVD, courtesy of our partners 20th Century Fox Home Entertainment and EDF Energy:
https://id.intofilm.org/user/register?promo_code=hiddenfigures2017

Many of these activities require access to the film and wherever possible, activities reference DVD time codes to help you navigate the films with students. You can also download the **accompanying PowerPoint presentation**, which includes the clips, from www.intofilm.org/hidden-figures.

FREE DVD

You can order films for free through your Into Film Club account. Not yet Into Film? Joining Into Film is easy and free – go to the website to find out more and to register or email support@intofilm.org.

About Into Film

Into Film is a cultural arts education organisation, which seeks to put film at the heart of children and young people's learning. Our UK-wide programme gives every child and young person aged 5–19 in the UK the chance to experience film creatively, and supports educators to achieve a wide range of effective learning outcomes in the use of film.

The Into Film offer includes a network of extra-curricular film clubs, including access to thousands of films, teaching and club resources, training opportunities, and the annual Into Film Festival and Into Film Awards; all completely free for state-funded schools and organisations. Into Film is supported by the British Film Institute through Lottery funding, together with funding from Cinema First and a number of other film and education sources.

Find more about Into Film at www.intofilm.org

About EDF Energy's Pretty Curious Programme

Only 1 in 5 people working in core science, technology and maths (STEM) is female. Pretty Curious aims to inspire teenage girls to imagine a future where they use STEM to make a difference. We want to open their eyes to the varied career opportunities available if they pursue STEM subjects at school and beyond.

We are delighted to partner with Twentieth Century Fox Home Entertainment on their film *Hidden Figures*, an inspiring film which shares the same ambition as Pretty Curious; to highlight the need for more diversity within the STEM careers.

For more information on the Pretty Curious programme please visit www.edfenergy.com/prettycurious.

For more engaging classroom resources, go to www.jointhepod.org.

About Hidden Figures

Hidden Figures tells the trailblazing story of Katherine Johnson (Taraji P. Henson), Dorothy Vaughn (Octavia Spencer) and Mary Jackson (Janelle Monae) as the brains behind one of the greatest operations in history: the launch of astronaut John Glenn into orbit. This stunning achievement restored the nation's confidence, turned around the Space Race between Russia and the U.S.A., and galvanised the world. The visionary trio crossed all gender and race lines to inspire generations to dream big.

Hidden Figures is working with EDF Energy's Pretty Curious programme with the aim to inspire 2 million teenage girls and boys to consider a future through STEM.

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Hidden Figures

PG | 2016 | 127 MINS | RECOMMENDED FOR 11+

Set in the early 1960s, as NASA vied with the USSR for supremacy in the Space race, *Hidden Figures* is based on the true story of three African American mathematicians who contributed to the success of the first American to orbit Earth. Part of a women-only team performing mathematical calculations, Katherine Johnson, Dorothy Vaughan and Mary Jackson are seen battling racial and gender barriers at a time when the Civil Rights Movement was at its height. Suffering segregation when working, eating and going to the bathroom, it is not until the all-male research team request more help with their mission that the women are seen as equals and begin to breakdown the discriminative culture around them. Inspirational and uplifting, the film shines a light on a lesser known yet culturally important story about diversity during a key moment in America's history.

HIDDEN FIGURES

Pretty Curious Resource

Active viewing guide for clubs

SUPPORTED BY:

RESOURCE PRODUCED BY:

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HIDDEN FIGURES

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ACTIVE VIEWING GUIDE FOR CLUBS

ABOUT THIS GUIDE:

This resource is designed to be delivered over several club sessions to support the viewing of the film *Hidden Figures*. You can either use all of the suggested activities or cherry-pick the ones that most suit your group and available time. Alternatively, it could be viewed in class, if you wish.

ABOUT THE FILM:

Set in the early 1960s as NASA vied with the USSR for supremacy in the Space race, *Hidden Figures* is based on the true story of three African American mathematicians who contributed to the success of the first American to orbit Earth. Part of a women-only team performing mathematical calculations, Katherine Johnson, Dorothy Vaughan and Mary Jackson are seen battling racial and gender barriers at a time when the Civil Rights Movement was at its height. Suffering segregation when working, eating and going to the bathroom, it is not until the all-male research team request more help with their mission that the women are seen as equals and begin to breakdown the discriminative culture around them. Inspirational and uplifting, the film shines a light on a lesser known yet culturally important story about diversity during a key moment in America's history.

WHAT YOU WILL NEED:

- Your copy of *Hidden Figures* on DVD
- Colouring pencils/pen
- Poster paper.

SUGGESTED STRUCTURE:

- **Session one:** Introduce the film and view the first 40 minutes of it. Complete the activity if time allows.
- **Session two:** Watch the next section of the film and complete the activity if you wish.
- **Session three:** Watch the rest of the film and complete the **Review writing activity**.
- **Session four and beyond:** Try the **Filmmaking activity** over the next few club sessions.

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Session one:

Watch from the beginning of the film to 00:39:32.

Possible questions:

1. Why is it so important that the US got a man into space at this time?
2. What do we learn about the professional and personal lives of Katherine G. Johnson, Mary Vaughan and Mary Jackson?
3. The film is set in 1962 when life in the US was segregated (Caucasian and African-American people living separate lives). How is this shown in the film?

Activity

Choose a character from the film to create a profile for. Add as much detail as you can remember from the film, in addition to using the internet to research their lives.

Taking it further

Members can present their character profile creatively as a poster, short film or animation.

Session two:

Watch the film from 00:39:33 to 01:19:43.

Possible questions:

1. How does each woman get around the barriers that prevent them from getting ahead in the workplace?
2. What is the importance of their friendships with each other?
3. Re-watch Katherine's speech in the Space Task Group office after she is scolded for going to the bathroom. What different camera shots are used and how can we tell what each character is thinking or feeling?

Activity

Write a voiceover explaining what Katherine is thinking when she is running to use the ladies room in the West Campus.

Young people should try to include her thoughts on her new role in the Space Task Group, her colleagues and the issues that she is having.

Members can read their voiceovers over the scene playing on mute in the background.

Session three:

Watch the remainder of the film (from 01:19:43).

Possible questions:

1. Do you feel that the ending was satisfactory? Would you change it in any way?
2. What do you think the intended message of the story was?
3. Why do you think that this film won so many awards when it was released?

Review writing activity

Ask your members to write their reviews of *Hidden Figures*. There is guidance for writing good film reviews on the Into Film website at www.intofilm.org/resources/154.

You could submit your members' reviews to the Review of the Week competition. More details can be found at www.intofilm.org/clubs/review-of-the-week.

Session four and beyond:

Filmmaking activity

- In groups, students can plan a short film based on revealing the importance of the life and/or work of somebody. This person could have historical or cultural significance, or they could be a relative or friend.
- Ask members to refer to the **Into Film filmmaking pages** for guidance and exemplar films made by young people to use as inspiration. They can also submit their completed films into the Film of the Month competition.

  www.intofilm.org/films/filmmaking

  www.intofilm.org/competitions/1

HIDDEN FIGURES

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– HOW TO MAKE A PAPER GLIDER –

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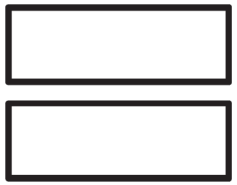
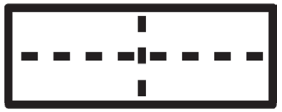
1



Cut A4 paper in half lengthways as you only need half a sheet of A4 to make this glider.

2



Take one piece and fold in half in both directions.

3

Fold one long side in half, up to the middle.

4

Fold this part in half again, up to the middle.

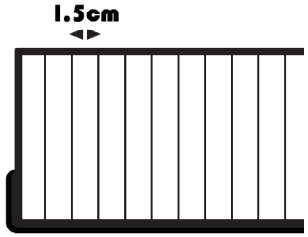
5

Now fold this part OVER the middle (marked with a triangular point) and tape all along the long edge of the fold...

6

... like this.

7



Turn the plane over and carefully draw lines every 1.5cm from each end. This is where you'll shorten the wing each time.

8

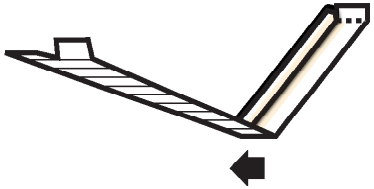
Halfway along the end, cut to the first line (here, the lines are underneath). Fold the rear half of the wing tip up.

Note that the folded part is on TOP and at the FRONT.

9

Repeat this cut and fold for the other wing.

10



Hold your glider at the back and gently launch forward.

Investigation planning

NAME:

SCIENTIFIC QUESTION:

PREDICTION:

INDEPENDENT VARIABLE (WHAT WE WILL CHANGE):

FAIR TESTING (WHAT WE WILL KEEP THE SAME):

Investigation planning sheet

EVIDENCE

Draw a table to organise your measurements. Take repeat measurements and calculate an average for each one. Remember to present your results as a graph.

Investigation planning sheet

CONCLUSION

Give a scientific explanation for your results and whether your prediction was correct.

Evaluation (how we would improve our investigation)

Give some ideas on how you could investigate this further

HIDDEN FIGURES: PRETTY CURIOUS INVESTIGATION SUMMARY

Currently just one in five people working in Core STEM today in the UK is a female*.
This means there is a pool of undiscovered STEM talent.

Think about how you have used the Pretty Curious values either during your Science investigation today or during your school day.

How you could use these values to help you to achieve your future goals?

*www.edfenergy.com/prettycurious

Value	How I used this today	How I will use this in the future
Curious		
Determined		
Inventive		
Focused		

HIDDEN FIGURES

NOW LAUNCHED ON TO BLU-RAY, DVD AND DIGITAL DOWNLOAD

RECORD AND PLAYBACK GUIDANCE SHEET

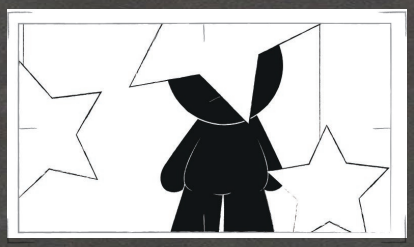
Record and playback involves performing two very basic actions:

PRESSING RECORD AND PLAYING BACK!

Top tips to make your recording a success:

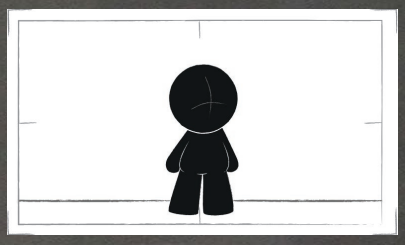
Camera positioning

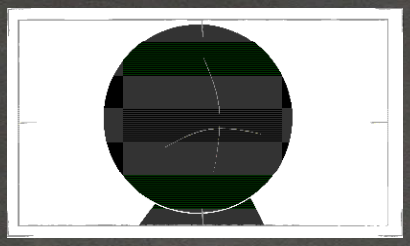
Where is the best place to position the camera to get a clear shot?



Camera framing

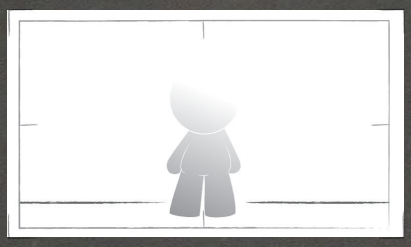
Would a long shot or close up suit best for the activity you have in mind?





Lighting

Are the people being filmed facing the light source rather than standing with their backs to it?



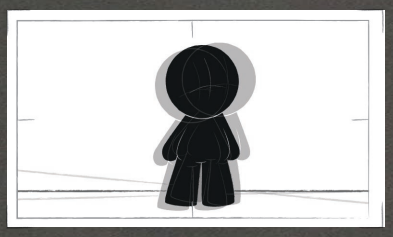
Sound

Have you chosen a suitable location to cut out background noise?

Is the mic close to the person who is speaking to camera?

Use of a tripod

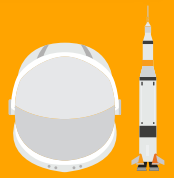
If you are without access to a tripod, have you minimised camera shake with your elbows on a table, shelf or wall?



STEM CAREERS MAP

1. Read through the descriptions of the STEM careers below.

CAREER:



ROCKET SCIENTIST

Have you heard of Katherine Johnson, Dorothy Vaughan or Mary Jackson? They used their maths skills to calculate orbit trajectories or strengthen the capsules as shown in the Hidden Figures movie. As a rocket scientist you too will work on exciting space programs.

CAREER:

DATA SCIENTIST

Love analysing data and following trends? Data scientists take big data and make it accessible and valuable to an organisation. The best business decisions will be data-based so you could play a very influential role in any company.

CAREER:

CHIEF TECHNOLOGY OFFICER

Love new technology? This role is vital to every organisation! You'll oversee technology set up, recommend the best devices for staff, fix issues when they arise, and most excitingly, monitor emerging trends to keep the business on the cutting edge of technology.

CAREER:

APP DEVELOPER

Working as an app developer you could find yourself working from London or Silicon Valley designing and testing new life changing apps. This is definitely one of the fastest growing roles in IT.

STEM CAREERS MAP

CAREER:

TECH STARTUP

Like coding? Love being the boss? Starting your own company is a bold but incredibly rewarding decision. You'll be responsible for choosing the people you employ, the creative direction and even where to locate your office.

CAREER:

ARCHITECT

As an architect you'll have the chance to create the next generation of iconic city structures. Modern materials and eco-friendly designs will be your brief – perfect if you love a challenge and working in a large project team.

CAREER:

CIVIL ENGINEER

Civil engineers shape the world by finding new ways of recycling waste, dealing with pollution, supplying electricity and gas to homes and providing and purifying clean water! They are the magicians behind our well run cities, villages and schools.

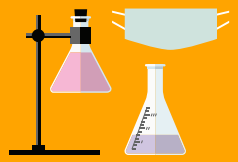
CAREER:

ELECTRICAL ENGINEER

As an electrical engineer, you'll be designing and developing new electrical equipment and solving problems. You could work on anything from a tiny microchip to a huge power station generator!

STEM CAREERS MAP

CAREER:



LAB TECHNICIAN

Want to find the latest cure? You could be working in a hospital or research lab and you'll be a key figure in providing patients with test results. You'll be performing chemical and bacterial tests to help give your diagnosis and enable appropriate healing medicines or actions to be taken.

CAREER:

BIOTECHNOLOGIST

Want to make a difference? You'll study animals, genetics, plants and biochemistry (the chemical processes that make up living organisms) to develop new products and make existing ones better for important areas such as agriculture and medicine.

2. Read the case studies of individuals currently in those roles on pages 4 to 7.
3. Select one of the careers and research the career path of the person in the case study. What qualifications did they achieve and how did they get to that position?
4. Using your research skills find out more about the skills, qualifications and pathways into that career in addition to listing who can help you on the **My STEM career map** on page 8 to create a timeline to share with your teacher and the rest of your class.
5. The completed map can also be added into your Record of Achievement for future reference.

The jobs compiled were from the 2016 Jobs of the future report by the Social Market Foundation for EDF Energy.

STEM CAREERS MAP

Godwin Benson
APP DEVELOPER

A Nigerian systems engineer, Godwin developed the Tuteria online platform following his own struggles as a tutor. Tuteria links students looking to learn a particular skill with qualified tutors in their local area. Since launching just over a year ago, the platform has connected more than 1250 students and tutors across 10 states in Nigeria. In May 2017, Tuteria was awarded the prestigious Africa Prize for Engineering Innovation.

Pooja Agrawal
ARCHITECT

Pooja Agrawal is an architect and urban designer working for the Mayor of London, and is responsible for overseeing several regeneration projects in north-west London. Prior to the Greater London Authority, Pooja worked as an architect at We Made That and Publica. She was responsible for leading award winning public realm and high street improvements, urban strategies and local economy studies. She is also a regular visiting critic and guest tutor at a number of leading architecture schools including University of Cambridge, Central St Martins and the Bartlett.

Professor Molly Stevens
BIOTECHNOLOGIST

Molly is the Research Director for Biomedical Material Sciences in the Institute of Biomedical Engineering, and a professor of Biomedical Materials and Regenerative Medicine at Imperial College London. Originally mentored by 2015 QEPrize winner Dr Robert Langer, Molly now heads up the Stevens Group, which is noted for developing artificial structures, or 'scaffolds' onto which new cells are encouraged to grow. By engineering tissues in a lab in this way, sections of bone, and even whole organs, may be grown outside of the body, ready to be transplanted during surgery to replace tissues damaged by disease.

STEM CAREERS MAP

Jack Stockdale
CHIEF TECHNOLOGY OFFICER

As Global Chief Technology Officer of Darktrace, the world's leading machine learning company for cyber security, Jack oversees the application of mathematical models and AI algorithms onto Darktrace's virtual 'immune system'. Just like the human immune system, Darktrace identifies and neutralises threats to computer systems. With a degree in computer science from Lancaster University, Jack has nearly 20 years of experience in software design and development.

Angela Crowther
CIVIL ENGINEER

Angela is a civil and architectural engineer with a passion for solving problems and buildings that move. She graduated from the University of Bath in 2008, with an MEng in Civil and Architectural Engineering and in 2012 worked with a team of architects and engineers to design and realise the Olympic Velodrome. She is currently leading Arup's multidisciplinary engineering team in the redevelopment of the old BBC headquarters, Television Centre in White City, into a mixed use masterplan.

Yang Lu
DATA SCIENTIST

Yang Lu, founder and CTO of Vivacity Labs, has developed an intelligent camera that gives real-time insight into traffic and commuter behaviour. The technology combines machine learning with the latest advances in high-tech computing to classify and identify images in real time. Yang's camera is the first to identify cyclists among other traffic, enabling real-time observations of how cyclists use the city and informing cyclist-friendly, smart infrastructure of the future. Yang graduated with a master's in engineering from the University of Cambridge and is one of the 2016 awardees of the inaugural RAEng 1851 Royal Commission Enterprise Fellowships.

STEM CAREERS MAP

Nike Folayan
ELECTRONICS ENGINEER

A chartered engineer with a doctorate in electrical engineering, Nike currently designs SMART systems and networks within the transport sector. With end users including the fire service, ambulance service and the police, her work contributes to saving lives. Nike is also the chair of the Association for Black Minority Ethnic Engineers in the UK, working to increase the number of BME engineers who succeed professionally and support young people to explore a career in engineering.

Jenna Hardwick
LABORATORY TECHNICIAN

Jenna is a biopharmaceutical associate and is currently working for an international pharmaceutical company. She studied science and maths to A-level before going on to study biology at university. Jenna's role as a laboratory scientist involves testing swab samples to ensure medicines are free from external contaminants and improving methods of testing products to make them as fast and as accurate as possible. Although the job is challenging, Jenna enjoys making medicines that help other people and is now working to become a biopharmaceutical engineer. She is also a technician member of the Institution of Chemical Engineers (IChemE).

STEM CAREERS MAP

Anita Bernie
ROCKET SCIENTIST

Anita is a rocket scientist. She studied aerospace engineering at Kingston University and worked at Airbus and at a telecoms company before starting her present job as Director for Spacecraft Platforms and Demonstration Missions for Guildford-based Surrey Satellite Technology Limited. She leads international activities for space missions in fields such as earth observation, science, technology demonstration, in-orbit servicing and lunar communication.

Brian Turyabagye
TECH START UP

Brian is a telecommunications engineer and social entrepreneur. A founder member of the MamaOpe, Brian has developed a fully automated, pneumonia-detecting jacket that can diagnose pneumonia in children up to three times faster than a doctor. Winner of 'Pitch@Palace Africa 2017', the time-saving device measures temperature and breathing rate, standardising readings and helping health workers make speedy and accurate diagnoses.

Profiles courtesy of Royal Academy of Engineering and Queen Elizabeth Prize for Engineering.
For more information, follow @RAEngNews and @QEPrize.

– STEM CAREERS MAP –

START

The STEM career that I am interested in is:

GCSEs that I need to take:

Date of completion:

A-levels/further education that I need to study:

Date of completion:

Higher education courses that I need to take:

Date of completion:

Work experience that I should undertake:

Date of completion:

Personal skills/ qualities needed:

Date of completion:

Date of achieving STEM career:

FINISH

Future plans:

Useful websites: www.edfenergy.com/prettycurious/futureme
www.ucas.com/ucas/after
www.raeng.org.uk/-gcses/find-career-ideas/explore-jobs