



# ***THE CHALLENGE***

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## at Waddesdon C of E Secondary School

At Waddesdon, our ambition is to support the academic, cultural and personal growth of all our students. The intention of The Challenge is to guide you through independent activities recommended by Subject Leaders to advance your capabilities in, and understanding of, your academic subjects and their place in the wider world. We hope that you find the challenges designed for you exciting, enjoyable and useful – and that they inspire you to continue seeking out exciting opportunities beyond the classroom.

We encourage you to complete as many challenges as possible. Once you have completed a challenge, you need to ask somebody at home – maybe a parent, guardian, or another relative – to sign the box next to it. On the next page, you will find a place for you to collect the signatures of different staff members, depending on how many challenges you have completed, so make sure you keep track of all your accomplishments.

Good luck – and enjoy!

# Record of Achievement

Achievement	Signature and comment
Completion of ten individual advanced learning opportunities	Form Tutor's Award  Date:     /     /
Completion of twenty individual advanced learning opportunities	Head of Year's Award  Date:     /     /
Completion of five subjects' advanced learning opportunities	Deputy or Assistant Head's Award  Date:     /     /
Completion of ten advanced learning opportunities	Headteacher's Award  Date:     /     /

When you complete all the challenges of a subject area, show your subject teacher and they will sign their box below

Art	Biology	Chemistry	Citizenship	Computer Science
Drama	English Language	English Literature	Food Technology	French
Geography	History	Mathematics	Music	Physical Education
Physics	Product Design	Religious Studies	Spanish	Textiles

# Art

/ɑ:t/ - noun

The expression or application of human creative skill and imagination, typically in a visual form such as painting or sculpture, producing works to be appreciated primarily for their beauty or emotional power.

Challenges	Signature
Using ordinary or coloured pencils, create a portrait of somebody you know. It might be a family member, a friend, or even a pet! Look up the drawings of Hans Holbein and Leonardo da Vinci to see how artists use pencils to create amazingly lifelike portraits.	
Look up the work of Giuseppe Arcimboldo, an artist famous for his 'fruit faces'. Just using what you've got in the house, create your own fruit face. Make sure you photograph it!	
Take a close-up photograph, or make a painting, of something in the natural world – it might be a flower, a leaf, the bark of a tree... Take a few and play around with the light and different angles to find your own favourite style.	
Take a part of your favourite story, or create your own, and turn it into a comic strip. Break it down into its key moments and illustrate each one to create a continuous narrative. Manga and DC Comics both give excellent examples of comic strips in different styles.	
Experiment with linear perspective drawing, which is a technique used by artists to create depth in their work. Have a look at <i>Paris Street, Rainy Day</i> by Gustave Caillebotte as an example.	
Origami is the art of paper folding, which is often associated with Japanese culture. Look up some paper-folding patterns and see what you can create.	
Visit an art gallery, either in person or virtually. London's major galleries are free, as are the biggest galleries in the world, if you visit them online: New York's Guggenheim Museum, Washington DC's National Gallery of Art, Florence's Uffizi Gallery and many more offer free virtual tours online. As you tour the gallery, take note of the pieces you like and research them further.	

# Biology

/bʌɪˈɒlədʒi/ – noun

The study of living organisms, divided into many specialised fields that cover their morphology, physiology, anatomy, behaviour, origin, and distribution.

Challenges	Signature
Plant some seeds and grow a plant. Research the best conditions to keep your germinating seeds in, and how to care for your growing plant. See if you can produce any flowers, fruit or vegetables, and don't forget to take a photograph!	
Investigate your local habitat – go outside, and peer under rocks, logs, in long grass, in and under plant pots, in ponds and rivers... What plants and animals can you find? Take photos of them, and use the internet to research what they could be.	
Humans have a huge impact on ecosystems, and therefore on animal species. Research how many species have become extinct in the last year, the last 5 years, and the last 10 years, and why. What species are currently in danger due to human activity, and why? What is being done to save them, and how successful is it?	
Some foods taste better than others – but it's not just our tongues which taste: 80% of food flavour is down to smell. So next time you eat, hold your nose; does your food taste different? Can you tell the difference between apple, pear, and potato?	
Everything in the world is made up of cells. Use your own research to identify some of the different types of cells – such as bacteria, fungi, and viruses... Viruses are currently defined as non-living, but why is this? Use your research to find out, and write up your findings with clear diagrams.	
Biology is the study of living things – but not every species looks similar between infancy and adulthood. Research the life cycle of an animal which goes through an epic metamorphosis between its birth and being fully grown. You might want to look at butterflies, peacock spiders, giant pandas, or flamingos. Draw a lifecycle, and explain what happens at each stage.	

# Chemistry

/'kɛmɪstri/ - noun

The branch of science concerned with the substances of which matter is composed, the investigation of their properties and reactions, and the use of such reactions to form new substances.

Challenges	Signature
Acids are corrosive and sour – vinegar, lemon juice, and tomato juice are all acidic liquids. Pennies are made from copper which tarnishes (turns dark) over time when exposed to oxygen. Placing copper pennies in an acid will remove the copper oxide and make them shiny again. Experiment with different acids and dull pennies; which acid cleans most effectively? Write up your conclusions.	
Fill a large sandwich bag with ice, and add $\frac{1}{2}$ cup of rock salt. In a <b>different, smaller bag</b> , add $\frac{1}{2}$ a cup of double cream, $\frac{1}{2}$ tsp of vanilla essence, 1 tbsp of sugar, and flavourings. Press the air out of this bag, and close it <b>tightly</b> . Place it in the ice-salt bag. Adjust the ice so it surrounds the smaller bag, press out the air, and close the ice-salt bag. Now shake! After 5 minutes, check the ice cream. If it's not frozen, continue shaking! After you enjoy it, research why salt speeds up the freezing process, and write an explanation why.	
Why are elements named the way they are? Pick three elements, and find out about their properties, uses, and the history behind their names. Record your findings with explanations and diagrams.	
How does temperature, and salt, affect how liquids move? Fill a container with water and add some food colouring – record how the food colouring spreads. Then experiment with heating the water to different temperatures and adding different amounts of salt – how does that impact the spread of the food colouring?	
Anything that flows is a fluid – but Oobleck (a non-Newtonian fluid) doesn't follow the usual rules of fluid behaviour. Pour some cornflour into a bowl, and stir in small amounts of water until it becomes a thick paste (you can also add food colouring). How can you make it behave like a solid? What defines a solid, and what defines a liquid and a gas? Carry out some research to explain why Oobleck is a non-Newtonian fluid, and what that means.	

# Citizenship

/'sɪtɪzən,ʃɪp/ - noun

The study of democracy and government, the law, rights and responsibilities, and how we live together in society.

Challenges	Signature
<p>December 10<sup>th</sup> is Human Rights Day. Using your own research, create an infographic or information poster to display in the corridors about what human rights are, and what the purpose of having a Human Rights Day is. You might want to think about the laws that exist in the UK to protect our human rights, what rights children have in the UK, and how human rights are protected – or abused – in different countries around the world.</p>	
<p>"The Hate U Give" by Angie Thomas was the 2018 Waterstones Children's Book Prize winner. Inspired by the Black Lives Matter movement, this is a powerful, gripping and piercingly relevant young adult novel that covers inequality, police violence, 21st century prejudice and one girl's struggle for justice. Talk to the library about borrowing this book, and write a book review once you've read it. What did you learn, and why would you recommend it?</p>	
<p>The Netherlands is the so-called bicycle capital of the world, with upwards of 20 million bicycles for a population of 17 million. That's more than one bike for every person. Amsterdam, the capital city, has around 320 miles of dedicated cycle lanes! Research why cycling is so popular in the Netherlands, the impact which the extra exercise has on the people's health and happiness, and come up with some suggestions as to how Aylesbury could encourage more people to cycle. Think about financial schemes, advertising campaigns, and new engineering designs.</p>	
<p>The UN (United Nations) is an international organisation to which 193 governments belong, and aims to maintain international peace and security, develop friendly relations among nations, achieve international cooperation, and join countries together through positive action. Have a look at their Twitter feed (@UNGeneva) and read about the recent work they have been doing. Why is it important that the UN continues to work for positive change?</p>	

# Computer Science

/kəm'pjʊ:tə/ /'saɪəns/ - noun

The study of computers and computing, including their theoretical and algorithmic foundations, hardware and software, and their uses for processing information.

Challenges	Signature
<p>Our day-to-day number system uses the denary numbers that range from 0 to 10. Binary numbers consist of only two numbers, 1 and 0. The reason behind this is that 1 suggests 'on', and 0 suggests 'off'. These are the only two states our modern computing devices can process and understand. Can you research how denary numbers are converted into binary and vice versa (you might find YouTube helpful here). Write down all the key steps necessary.</p>	
<p>Computers interpret data differently from human beings. They process all information in the form of binary numbers: 1 and 0. It is therefore important for us to know certain mechanisms that computers use to encode or decode binary information and pass it on to us in a human-friendly way such as text information or colours. Computers use the ASCII system to translate binary into text. Research this coding method, and use it to create a secret message for a friend – how long does it take them to break it?</p>	
<p>The 'internet of things' is the concept of networking lots of devices so that they can collect and transmit data. The idea that any object or living being can be uniquely identified on the internet is central to the concept. By automating the capture of information, greater quantities of it can be stored and processed. Your task is to research examples of this in the food industry, surveillance, military, and agricultural engineering. Can you then illustrate how the devices work in conjunction with one another to help with their given purpose?</p>	
<p>Visit the website called Overclockers UK, and explore what components are responsible for building a gaming PC. How is it different from an ordinary PC? Can you provide a clear explanation why you need to buy a particular component to build a PC specially designed for gaming?</p>	



# Drama

/'dra:mə/ - noun

The study and activity of acting, a practical art form in which ideas and meaning are communicated to an audience through choices of form, style and convention.

Challenges	Signature
Research the theatre of Ancient Greece. Why is this an important period of time for the development of theatre? Which styles of play developed, and how have they influenced modern, Western forms of theatre? Write up your explanations.	
Design a set, either for a play or musical of your own choosing, or for a play which you have studied in class. This might be in 2D or 3D form, but you will need to think carefully about how you want the stage to look and how you might move different components of the set for different scenes. Don't forget to label your model or drawing.	
Large-scale puppets are increasingly used in theatre. From <i>War Horse</i> to <i>The Lion King</i> , there are some incredibly talented puppeteers who use their skills to bring animals to life on the stage. Research how puppets are constructed for the stage, how they are operated, and what it takes to be a puppeteer.	
Find and learn a section of a play – either a monologue individually, or a whole scene in a group. Take time to consider all of your character: what values do they have? What motivates them? How do they behave towards others? Consider costumes, make-up, and props to reflect your characters, and then film your performance so you can watch it back. What did you do particularly well, and is there anything you would do differently?	
Costumes are essential to theatre as they allow actors to portray their characters effectively. Sometimes costumes are very elaborate, and sometimes they are very simple. Research the costume design behind the musical <i>Hamilton</i> . Who were the costume designers, where did they seek inspiration, and how did they reach their final designs?	

# English Language

/'ɪŋɡlɪʃ/ /'ləŋɡwɪdʒ/ - noun

The study of how the English language is used to communicate.

Challenges	Signature
<p>Anyone who makes an important speech will pay careful attention to both the words that they speak, and how they speak. Language is essential to making a speech both impressive and impactful. On YouTube, look up Barack Obama's 2004 speech at the Democratic National Convention. Look closely at what he does with his body, how he uses the tone and volume of his voice, and listen to how he phrases his words and stories. Why does this speech get such tumultuous applause? Have a go at writing and delivering your own speech about something you believe in.</p>	
<p>Language isn't fixed; it is always evolving. The English language has changed dramatically over the last 100 years, for lots of different reasons. Research which words are new to the English language, and why – where did they evolve from? Can you find any examples of words or phrases in the English language which we no longer use? Why did they drop out of use?</p>	
<p>Persuasive texts include advertisements, reviews, articles, posters and leaflets produced by mass media companies such as TV and film companies, as well as newspaper and magazine publishers and charities. Their purpose is usually to encourage purchasing or participation. Have a close look at some of the adverts you see online or in print; what techniques do they use to encourage you to buy something? Would you be persuaded or not?</p>	
<p>What is Standard English? When and where is it appropriate to use? Listen to the BBC News, either on TV or on the radio – what do you notice about how the news reporter speaks compared to how you speak to your friends? Why do you think there is a different way of speaking in different circumstances?</p>	
<p>Closed form poetry uses patterns of rhymes and stanzas, whereas open form poetry is freeform. Find an example for both, and read them aloud – what do you notice about how each sounds and flows? Pick a style and have a go at writing your own.</p>	

# English Literature

/'ɪŋɡlɪʃ/ /'lɪt(ə)rətʃə/ – noun

The study of literature written in the English language.

Challenges	Signature
Time is an American news magazine and news website which has compiled a list of the top 100 young adult novels of all time. The list has been put together by respected authors, libraries, and independent booksellers. Look up the list online and read one of the titles listed which you haven't heard of before. Would you agree that it is one of the best books of all time, or not? Why?	
A diverse knowledge of literature is so important – so why not read some translated works? Try <i>The Book of Pearl</i> , by Timothée de Fombelle, <i>The Beast Player</i> by Nahoko Uehashi, or <i>The Day My Father Became a Bush</i> , by Joke van Leeuwen. Or, research your own international title. Then write a review – what did you think of it, and will you read the author's other works?	
Create a list of recommended books aimed at your age group. For each book you list, you will need to give it a rating out of 5, a short description of the author, and a short synopsis of the story. You might want to complete this independently or in a group.	
'Hey YA' is a podcast created by book website Book Riot, which focuses on the latest in the world of young adult novels. Hosts Eric and Kelly discuss everything from new releases to forgotten classics, on-screen adaptations and even current issues in the genre. Listen to an episode, or a few, and then read one of the books they mention. Do you have the same opinion, or not?	
Many, many books and plays have been adapted into TV series, films, and theatre productions. Ask your English teacher to recommend a title for you – read the book, then watch the adaptation. Which did you prefer, and why? What did you like or dislike about it? What would you have done differently?	
Create your own piece of writing – perhaps a novel, maybe a poem, or maybe a play? Don't worry if you're not happy with the first version, as authors always go through many drafts. Keep writing and editing, using rich vocabulary – and don't forget a title!	

# Food Technology

/fu:d/ /tek'nɒlədʒi/ - noun

A science which deals with the techniques and principles involved in the production, preservation, quality control and research and development of the food products.

Challenges	Signature
Different countries have different national, or favourite, dishes. Use your research skills to find out the dishes which different countries are famous for and have a go at cooking one from scratch. You might want to start with French crêpes, Hungarian goulash, or Israeli falafel.	
Veganism is growing in popularity. Research what it means to be vegan, why people choose to be vegan, and how a vegan diet has to be carefully designed to ensure that it is balanced and still provides all the nutrients that a body needs. Create a possible vegan menu which is both healthy and balanced.	
Wealthy Elizabethans in the 16 <sup>th</sup> Century used to enjoy making their sweet foods look like savoury foods – for instance, sugar paste could be shaped to look like bacon. Can you design, or even cook, a pudding which looks like a main course?	
Have a go at making butter. Pour a pint of whipping cream into a jar with a tightly fitting lid, or into a mixer. Shake the jar, or whip the cream, until you see that the butter has solidified. Pour off the buttermilk (the liquid) and rinse the butter by pouring ice water over it and pressing out the remaining buttermilk with a small spatula or a spoon. Pour off the water and repeat the process. Keep rinsing and squishing the butter with the ice water until the water runs clear. Then add some salt if you like and work that through the butter. Ta-da! Enjoy your fresh butter.	
Bread is eaten across the world, in countless different forms. Different countries prefer different forms of bread – for instance, Denmark enjoys rugbrød (rye bread), while Japan prefers milk bread. Research the different sorts of bread that exist, and have a go at making one of them yourself.	

# French

/frɛn(t)s/ – noun

The study of the language of France, also used in parts of Belgium, Switzerland, and Canada, in several countries of northern and western Africa and the Caribbean, and elsewhere.

Challenges	Signature
Enter the LanguageNutz competition, and see how high you can climb in the school and world leagues – can you do well enough to earn a prize from your French teacher?	
Download the Duolingo app, and see how much progress you can make. Can you keep up an unbroken streak for a whole month?	
A classic French dish is a croque monsieur. Look up the recipe, and have a go at making your own – feel free to make your own alterations based on your preferences, and, once you've perfected it, write and illustrate your own recipe!	
Take a virtual visit to the Louvre Museum, the world's largest art museum and a historic monument in Paris, France. Visit the Mona Lisa, and so much more. Other art galleries and museums that you can visit from an armchair are the Fine Arts Museum of Lyon, the Musée d'Orsay, the Pompidou Centre, the Lascaux Caves, Le Mont Saint Michel, and Musée l'Orangerie. Don't forget to record your favourite artworks and artists to research later.	
Follow the Tour de France during July 2022. Can you retrace the cyclists' routes through France? What are the different regions they travel through famous for? Create an illustrated route map with the information you find.	
Listen to some French music artists. Then find out about the Fête de la Musique, which takes place in June each year. How does French music differ from what we hear in the UK?	
29 countries have French as an official language. How many of them can you name, and where in the world are they? Dig deeper into 3 countries of your choice and see what you can find out about them.	

# Geography

/dʒi:'ɒɡrəfi/ – noun

The study of the physical features of the earth and its atmosphere, and of human activity as it affects and is affected by these, including the distribution of populations and resources and political and economic activities.

Challenges	Signature
<p>The Royal Geographical Society has produced a series of podcasts which are all free online, and are intended to broaden students' understanding of Geography in the real world. Pick one which interests you and listen to it – what did you learn that was new? Research an aspect of the podcast you listened to, and summarise your findings in a written report.</p>	
<p><i>Prisoners of Geography: Our World Explained in 12 Simple Maps</i> by Tim Marshall is the teenage version of his other best-selling non-fiction book, <i>Prisoners of Geography: Ten Maps That Tell You Everything You Need To Know About Global Politics</i>. Pick either one, and read it through. How has Tim Marshall's research changed your understanding of our modern world?</p>	
<p>Antarctica is a frozen, windswept continent, so hostile and remote that it has no permanent inhabitants, but around 1200 people spend the winter there. Research the work that is being done there, how the people live and survive, and the challenges of being in such an extreme environment for an extended length of time.</p>	
<p>What is COP26? Research what COP26 stands for, what its aims are, what is being done to fulfil those aims, and why it is such an important project. If COP26 succeeds, what will the benefits be? Conversely, what risks are there to COP26, and what will the negative effects on our world be if it fails to succeed?</p>	
<p>The UNDRR (UN Office for Disaster Risk Reduction) has produced an online game to help young people broaden their understanding of natural disasters and their aftermaths. What risks does the game teach you about, how can risks be lessened, and what defences and facilities can be built to protect the local population from short-term and long-term risks?</p>	

# History

/'hɪst(ə)ri/ – noun

The study of the past – specifically the people, societies, events and problems of the past – as well as our attempts to understand them.

Challenges	Signature
<p>History is all about asking questions – for instance, why do empires rise and fall? Research what an empire is, then pick one an empire from the past (Mongol, Byzantine, Ottoman, Persian...) and find out how it grew and took power, why it fell, and who its most significant leaders were. You could even create a timeline!</p>	
<p>Visit the WWI or WWII memorial closest to you. Note down which war is being remembered, and some of the names on the memorial. Research the major events of the war (or wars) and see if you can find any information about the men whose names you recorded (check the National Archives website for help with this).</p>	
<p>The podcast 'You're Dead to Me' is made by Greg Jenner, who worked on 'Horrible Histories'. Listen to an episode of it on Spotify, BBC Sounds, or Apple Podcasts, and write down at least five things you learned from it and at least two questions you now have. Go and research the answers to them!</p>	
<p>Read a piece of historical fiction (a story set in the past) that you've never read before, and carry out some independent research about the time period in which it is set – the library can help you here. Use your new knowledge to inspire your own story or poem set in the same time period.</p>	
<p>Read a non-fiction book by a historian, about any time period you like – the library can help you here. Write a book review – what did you find interesting about the period, and what did you learn that you didn't know before? Would you like to, or not like to, travel to this period of time – and why?</p>	
<p>The UK is full of amazing places to visit. Take a trip to a museum, a historic building, or a heritage site, and bring a notebook. As you walk around, note down interesting points about the place, what happened there, and why it's a significant location? Write up your findings in a report, or create a visitors' guide.</p>	

# Mathematics

/məθ(ə)'mætiːks/ – noun

The abstract science of number, quantity, and space, either as abstract concepts (pure mathematics), or as applied to other subjects such as physics and engineering (applied mathematics).

Challenges	Signature
A trillion is a pretty big number. Sometimes very big numbers are difficult to visualise. Write a report about interesting trillion facts to make it easier to understand how big a trillion is. For instance, if you were born a trillion seconds ago, how old would you be? How long would it take you to earn a trillion pounds if your annual salary is £100,000?	
Other large numbers also exist – for instance, a quadrillion, a googol, googolplex. Research how big each of these numbers is, and find out how long it would take you to count to each of them.	
Imagine you have a billion pounds, and want to donate this money to a charity over 30 years. Make up a scheme to work out how much you are going to invest, and when. Imagine then that the charity wants to invest this donation. Find out what it means to invest money, and how investments work. What are the risks, and the costs, of investing a large sum of money?	
In the mathematical statement $2 + 3 = 5$ , we have used mathematical symbols that are understood globally. Where do the symbols '+' and '=' originate from? Who were the first people to use them? Can you find out about these and other common mathematical symbols that are universally used?	
Apples are packed in boxes of 60. They could be packed, for example, in a box 4 apples high, 5 apples long and 3 apples wide. Find other boxes in which you could pack 60 apples. How many boxes can you find?	
Imagine you are planning a short holiday. You have a budget of £300. With that money, you have to pay for accommodation, food, transport and activities. Where would you go, and how long could you afford to stay? Plan an itinerary with a list of costs – but remember to stay within budget!	



# Music

/'mju:zɪk/ – noun

The art or science of composing or performing music, by combining vocal and/or instrumental sounds to produce beauty of form, harmony, and expression of emotion.

Challenges	Signature
<p>A score is the music we hear as a film takes place. It can happen when the actors speak, it can happen during a fight scene or a romantic scene. This type of music can creep in so gently, you might not even notice it, but it can also be the most intense part of the film – think about the music from <i>Jaws</i>! Pick a film and, as you watch, keep track of the music that is playing in different scenes. Use your Music vocabulary – what do you notice about the tempo, dynamics, and tonality at different points in the film?</p>	
<p>A musician should have a thorough understanding of their equipment as well as their technique. So if you play an instrument, research it – how it works, the materials used to make it, the names of the different parts, and the variety available. If you sing, research how the voice works – how to protect vocal chords, how to produce different sounds and volumes, how to breathe while singing... Produce an education poster to display in Music.</p>	
<p>Learn a piece of music on a new instrument, which you haven't played before. Use YouTube tutorials to help you to progress, and record a vlog to keep track of your progress.</p>	
<p>Create an original composition using a DAW (e.g. GarageBand, BandLab). You can even write your own lyrics and record your song in there too... can you create an original EP by the end?!</p>	
<p>Complete a listening journal, describing a different piece of music that you hear each day for a week. It may be a song you have chosen on your streaming app, something on the radio or even live music you have heard when you have visited somewhere. Research, and then use the 9 elements of music (instruments &amp; timbre; tempo, rhythm &amp; meter; dynamics; melody; harmony &amp; tonality; texture; structure; use of technology; context) to help you describe the music that you hear.</p>	

# Physical Education

/ˈfɪzɪk(ə)l/ /ɛdʒʊˈkeɪʃ(ə)n/ – noun

The practice of becoming physically competent at, and knowledgeable of, a wide range of individual and team activities, while cultivating positive values and attitudes.

Challenges	Signature
Develop an analytical eye and watch a team sport on TV such as football, netball, rugby or hockey. Pay particular reference to any half time analysis when they consider the technical and tactical skills being applied by the individual or team, reflecting on how you may use this to improve your own performance.	
Develop your aesthetic eye by watching gymnastics and dance performances. Consider the lines of symmetry that the athletes use when moving. What makes their body shape more appealing, and how do they achieve this?	
Practically map and monitor your own fitness using an app – for instance, Strava. There are loads of different forms of fitness which you can easily access to log in the app– for instance, 'Yoga with Adriene' (a YouTube channel dedicated to short yoga practices for all abilities), or parkrun (a free weekly community event every Saturday morning, in which you run, walk, or jog 5km).	
Read a sporting autobiography and consider what makes your chosen individual successful, the skills they have worked to develop, and what motivates them. What do you find inspiring about them? Are there any similarities which you can draw between their performance and your own?	
Look at the diet of an elite athlete and how this varies between different sports. Consider your own diet and nutrition by making a weekly diary, and consider what changes you may need to make – don't forget to include water intake!	
Look at the website, The High Performance Podcast, select an athlete, and listen to their story. What has driven them to succeed? What challenges have they faced? What motivates them to continue working to the best of their ability?	

# Physics

/'fɪzɪks/ – noun

The branch of science concerned with the nature and properties of matter, energy, forces acting upon substances, and the structure of atoms.

Challenges	Signature
<p>The website PhET has some absolutely brilliant virtual labs, in which you can conduct your own experiments. Explore the 'Simulations: Physics' section of PhET and have a play with the activity 'Circuit Construction Kit: DC – Virtual Lab'. Research the physics behind each of the experiments you conduct – why is it that some materials conduct electricity, and others do not? Write up an explanation.</p>	
<p>Explore the 'Simulations: Physics' section of PhET and have a play with the 'Energy Skate Park' activity to investigate gravitational and kinetic energy changes. What happens when you change the shape of the path, or the amount of gravity and friction? Why does this alter the performance of the skateboarder? Research your findings and write up an explanation.</p>	
<p>Explore the 'Simulations: Physics' section of PhET and have a play with the 'Projectile Motion' activity. Investigate the optimal conditions for projectile motion – what happens when you change the direction of the cannon, the object being fired, and the initial speed? Research why different factors affect the state of an object in motion. How far can you fire an object? How did you decide on that successful combination of factors?</p>	
<p>Use the website 'GridWatch' to track the national grid usage of different fuel types over the course of the year. Which fuel is used commonly, and which less commonly? Why do levels of fuel demand change? Research the different types of fuel used in the UK, and the pros and cons of each.</p>	
<p>Research what STEM means, and the careers that use STEM skills. Why do you think STEM industries are going to be particularly important in the next few decades?</p>	

# Product Design

/'prɒdʌkt/ /di'zʌɪn/ - noun

The process of imagining, creating, and iterating products that solve or improve users' problems or address specific needs in a given market.

Challenges	Signature
Research what a technical drawing is and how this skill is used in industry. Pick an item and have a go at forming a technical drawing of it yourself, replicating the skills that you have researched. Make sure you also look up some examples.	
Research what perspective drawing is and how this skill is used in industry. Pick an item and have a go at forming a perspective drawing of it yourself, replicating the skills that you have researched. Make sure you also look up some examples.	
Have a play with Google Sketch Up. This is free CAD software and is a useful piece of software to expand your digital design skills and ideas. What can create with it?	
Developing quality shading and rendering techniques is so important for designers. Research what it means to create a rendered drawing, then pick an item and observe where the light and shade falls on it. Using pencils and colouring pencils, have a go at creating a rendered drawing to portray it in 3D.	
Imagine you have been given a brief to create a new type of takeaway cup which is completely recyclable. Research which materials would be appropriate, and then create a technical drawing of your design with labels showing what each part of the cup is made from.	
The term 'ergonomic' means that special attention has been given to the design of an item to make sure it is the best possible fit for the user, the environment and the task. Think about a chair – how has it been designed to carefully suit the human body? Have a go at designing an item which is ergonomic; it might be a pen, a desk, or even a car. What would you include in your design to make it the best possible fit for the user, the environment, and the task. Don't forget to label your technical drawing with explanations and the materials you will use!	

# Religious Studies

/rɪˈlɪdʒəs/ /'stʌdɪz/ - noun

The study of religious beliefs, behaviours, and institutions. It describes, compares, interprets, and explains religion, while considering historic and cross-cultural perspectives.

Challenges	Signature
Can football ever be considered a religion? Given England's performance in the Euro 2020 finals, it is clear that football has an almost cult-like following. Is this in the same way as religion? Carry out some research (look specifically at some news articles), and write up a report of your findings.	
Norse Gods and myths are beliefs which are not covered often in Britain. Research beliefs about Valhalla, and where these beliefs came from, and consider what are the attractive features of this place and do they stem from the context of Norse people in the 13 <sup>th</sup> century or before?	
Buddhism is a religion which proposes Ahimsa (literally, No-harm) meaning violence is wrong. Can you explain how it is possible for Samurai in Japan to supposedly be Buddhist? If you really want to push yourself, have a go at reading the ideas presented in D.T Suzuki's <i>Zen and Japanese Culture</i> as a starting point!	
Research the idea of Confucianism. What is it? Can you find a connection to modern day politics? Present your ideas in a poster to explain what Confucianism is and how it is relevant today.	
Artwork is central to many forms of religion – but can artwork ever capture the true nature of the divine? Research how different religions use artwork in worship, and what restrictions different religions have around the use of art.	
Bahá'í is the third most popular Abrahamic faith in Africa, following Christianity and Islam. Carry out some independent research into the practices of Bahá'í, how it developed, and why it has become a persecuted faith.	

# Spanish

/'spanɪʃ/ - noun

The study of the language of Spain, also spoken widely in much of Central and South America, and across the world.

Challenges	Signature
<p>Spain is famous for its delicious food. Paella is a rice dish originally from Valencia – find a recipe for paella and have a go at cooking it for your family or friends. Then research Valencia – where is it, and what is it famous for?</p>	
<p>Gazpacho is a delicious cold soup made of raw, blended vegetables. It originated in the southern regions of the Iberian peninsula and spread into other areas, and it is now widely eaten in Spain and Portugal, particularly during hot summers, as it is refreshing and cool. Try making some, and serve it with bread (once the weather is warm!).</p>	
<p>Research some Spanish styles of dance, in particular Salsa, Flamenco and Bachata. Where do they originate from? Can you imitate the dance movements?</p>	
<p>The official language of Mexico is Spanish. Once you've found out why this is, find out about the Mexican lifestyle, and, in particular, their food and the arts. Mexican food varies widely between regions. Find out the key ingredients used in Mexico and sample some burritos, tortillas and chilli con carne.</p>	
<p>21 countries have Spanish as an official language. Where in the world are they? What can you find out about 3 of your chosen countries?</p>	
<p>The website AirPano allows you to virtually explore major European cities – including Madrid, Barcelona, San Sebastian, and Seville. See if you can find and identify the major landmarks of each city, and have a go at drawing or painting them.</p>	
<p>Make your own flashcards using Quizlet, practising language that you have learned in lessons. What other vocabulary can you learn to expand your mastery of Spanish?</p>	

# Textiles

/'tekstaɪlz/ - noun

The practice of creating, selecting, manipulating and applying a range of materials such as fibres, yarns and fabrics, and processes such as weaving, knitting, stitching and printing to create designs and products.

Challenges	Signature
<p>It is much kinder on the environment to re-purpose items, and create your own, compared to buying things new. Programmes like 'The Great British Sewing Bee' have also increased the popularity of 'making not buying'. With that in mind, research and undertake a project which you can complete using an old piece of clothing. You might want to make a cushion, a bag, or a pencil case – it's entirely up to you! Keep a record of each step of your journey, and illustrate it with diagrams and/or photographs.</p>	
<p>Knitting is a skill you can use to create an infinite number of items, in a huge number of different styles. Once you have researched how to cast on, how to knit in knit stitch, how to knit in purl stitch, and how to cast off, you have mastered the basics – but there are so many other types of stitch to give your items their own distinct look. Use your favourite to make a cosy scarf. Don't worry if it goes a bit wrong – just undo it, and start again.</p>	
<p>Royal School of Needlework has existed since 1872, and is committed to preserving and teaching the skill of hand embroidery. Today, they are based at Hampton Court Palace, where they undertake lots of restoration work. Research the work that they have completed, and how their embroiders work. Have a go at creating your own piece of embroidery, inspired by some of the Royal School of Needlework's projects.</p>	
<p>By 2030, we are expected to be discarding more than 134 million tonnes of textiles a year. Research some of the efforts that are being made to recycle textiles, and the different forms of recycling that take place. What processes are most and least effective? Make a poster to encourage your fellow students to be more environmentally aware when purchasing clothes – what guidance can you suggest to help them?</p>	



***THE CHALLENGE***