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| **Night stargazing** | | | | | | |
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| A night stargazing activity to find and identify star constellations | | | | | | |
| **Stay safe** | | | | | | |
| Whether you are a scientist researching a new medicine or an engineer solving climate change, safety always comes first. An adult must always be around and supervising when doing this activity. You are responsible for:    • ensuring that any equipment used for this activity is in good working condition  • behaving sensibly and following any safety instructions so as not to hurt or injure yourself or others    Please note that in the absence of any negligence or other breach of duty by us, this activity is carried out at your own risk. It is important to take extra care at the stages marked with this symbol: ⚠ | | | | | | |
| **Subject(s):** Design & Technology, Science  **Approx. time:** 50 - 60 minutes (including after dark activity) |  | | | **Key words / Topics:**   * James Webb Space Telescope * Constellation * Star * Compass * Stargazing | | |
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| **Suggested learning outcomes** | | | | | | |
| * To know what a star constellation is * To be able to find North, East, South or West on a compass * To be able to look and identify star constellations in the summer sky | | | | | | |
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| **Introduction** | | | | | | |
| This is one of a set of resources developed with the theme of the James Webb Space Telescope (JWST) to support the delivery of the primary national curriculum. This resource is based on night stargazing and identifying star constellations in the summer sky.  The James Webb Space Telescope (JWST) will be the largest, most powerful telescope ever launched into space. It follows in the footsteps of the Hubble Space Telescope as the next great space science observatory, designed to answer outstanding questions about the Universe and to make breakthrough discoveries in all fields of astronomy.  The JWST will reveal the hidden Universe to our eyes: stars shrouded in clouds of dust, molecules in the atmospheres of other worlds, and light from the first stars and galaxies. With its suite of state-of-the-art instruments, it will push the frontiers of our knowledge of the Solar System, of how stars and planets form, and of galaxy formation and evolution, in new ways.  The telescope will launch on an Ariane 5 rocket from Europe’s Spaceport in French Guiana. From there it embarks on a month-long journey to its destination orbit around the second Lagrange point (L2), about one and a half million kilometres from Earth. In the first month after launch, Webb will unfold its sunshield, which is the size of a tennis court, and then deploy its 6.5-metre primary mirror that can detect the faint light of distant stars and galaxies with a sensitivity a hundred times greater than that of Hubble.  This activity introduces the concept of finding direction and identifying star constellations in the summer night sky. It should be noted that this needs to be carried out after nightfall, on a clear night when the moon is not too bright – as such it is especially suited to be carried out as a homework activity (providing there is access to a controlled safe area to carry it out ⚠) or during any activities that are extended overnight (such as school ‘sleep-overs’ or residential trips). | | | | | | |
| **Purpose of this activity** | | | | | | |
| The JWST will be able to see in detail deep into the universe – however, even with our eye some stars can be seen. In this activity, learners will discover the key star constellations in the summer sky. They will know how to use a star chart, use a compass to find a direction and find star constellations.  This activity could be used as a main lesson activity, to teach learners about the star constellations contributing to learning in maths and science. Additionally, this could be used to start a discussion on the solar system and the position of planets and the sun. | | | | | | |
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| **Activity** ⚠ |  | | | **Teacher notes** | | |
| **Introduction (5 minutes)**  Teacher to introduce the activity, to explore the summer night sky and discover the key star constellations using a constellation check sheet.  **Demonstration (10-15 minutes)**  Teacher to discuss what star constellations are and some of the main ones (18) that can been seen in the summer. Teacher may refer to the UK night sky chart.  This is an outdoor activity and learners will need to be suitably dressed in warm clothing with access to an appropriate safe and controlled area.   * Step 1 – Choose a clear night when the moon is not too bright. A crescent moon is best. If possible, stay away from bright streetlights. It will take 20 minutes for the eyes to adjust to the dark. Use a compass to find the right viewing direction. * Step 2 – Find north and look into the sky to find Ursa Major, the plough. * Step 3 – Explore the sky in the east, south and west. Learners to tick off each constellation as they find them.   **Performing the Activity (After dark, 25 minutes)**  Learners to carry out the stargazing activity when it gets dark at home.  **Plenary (following day, 10-15 minutes)**  Learners to share their experiences about the stargazing activity. How many constellations did they see? Which stars were the clearest and brightest? |  | | | **Night stargazing activity**  Print the activity sheet onto paper and distribute to the learners.  A UK night sky chart is available from the **Astronomy Now** website (refer to additional websites below).  Step 1 – Teacher may wish to demonstrate how to find the direction using a compass. Start looking North to find Ursa Major, the plough. Either use an actual compass or a compass app on a smartphone.  If time is available, another way to view the star constellations is to use the circular constellations on the activity sheet. Cut each one out and poke a hole through each star with a sharp pencil and an eraser behind it. Then place the disc on the end of a torch, with the black towards the torch. In a darkened room the constellation will appear on the wall. This approach is particularly useful if this activity is being demonstrated so it can be set as a homework. | | |
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| **Differentiation** |  | | |  | | |
| **Basic** |  | | | **Extension** | | |
| * Provide learners with pre-cut circles from the activity sheet for each constellation. |  | | | * Learners to use the internet to research the individual constellations and find out where they got their names from. * Watch **YouTube**: [How to find the Summer Constellations (3600)](https://www.youtube.com/watch?v=EieqUGAJHMw) | | |
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| **Resources** |  | | | icon-ppt**Required files** icon-docicon-pdf | | |
| * Printed activity sheets * UK Star Chart * Compass * Thin card * Pencil * Eraser * Binoculars/telescope |  | | | Night stargazing presentation  icon-doc Night stargazing handout | | |
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| **Additional websites** |  | | |  | | |
| * **Astronomy Now**: [UK Night Sky Chart](https://astronomynow.com/uk-sky-chart) * **NASA on the** [James Webb Space Telescope](https://www.youtube.com/watch?v=6VqG3Jazrfs) * **Intro facts (3 minutes)** [to inspire the next generation](https://www.youtube.com/watch?v=D8TRoLImYUY) * **YouTube**: [Crash Course Kids: The Zodiac Constellations](https://www.youtube.com/watch?v=eBIS17Va9sA) * **YouTube**: [Crash Course Kids: Constellation Location](https://www.youtube.com/watch?v=BbzCA0Lgf3Y) * **YouTube**: [How to find the Summer Constellations (3600)](https://www.youtube.com/watch?v=EieqUGAJHMw) | | | | | | |
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| **Related activities (to build a full lesson)** |  | | |  | |
| **Starters** (Options)  To introduce star constellations:   * Watch **YouTube**: [Crash Course Kids: The Zodiac Constellations](https://www.youtube.com/watch?v=eBIS17Va9sA) * **YouTube**: [Crash Course Kids: Constellation Location](https://www.youtube.com/watch?v=BbzCA0Lgf3Y) * Show an example of the [UK Night Sky Chart](https://astronomynow.com/uk-sky-chart) | | **Extension** (Options)   * Learners to use the internet to research the individual constellations and find out where they got their names from. * Watch **YouTube**: [How to find the Summer Constellations (3600)](https://www.youtube.com/watch?v=EieqUGAJHMw)   **Plenary**   * Learners to share their experiences about the stargazing activity. How many constellations did they see? Which stars were the clearest and brightest? | | | |
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| **The Engineering Context** film |
| * Travellers have used the stars to navigate for many years. Engineers have helped by making navigational tools, such as the sextant, that use star positions to calculate the position of a ship at sea. * The JWST will allow us to look into the universe in greater depth and detail than ever before, increasing our knowledge of the Solar System, of how stars and planets form, and of galaxy formation and evolution. |

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| **Curriculum links** | |
| **England: National Curriculum**  Science  KS2 – Earth and space   * describe the movement of the Earth and other planets relative to the sun in the solar system | **Northern Ireland Curriculum**  KS2 – The World around us  Science and technology   * Sources of light |
| **Scotland: Curriculum for Excellence**  Science  KS2 Space  SCN 2-06a   * observing and researching features of our Solar System   SCN 3-06a   * the number of stars in the universe | **Wales: National Curriculum**  Science  KS2 The sustainable Earth  the relative positions and key features of the Sun and planets in the solar system |
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| **Assessment opportunities** | | |
| * Informal formative assessment of the plenary feedback. | | |
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