

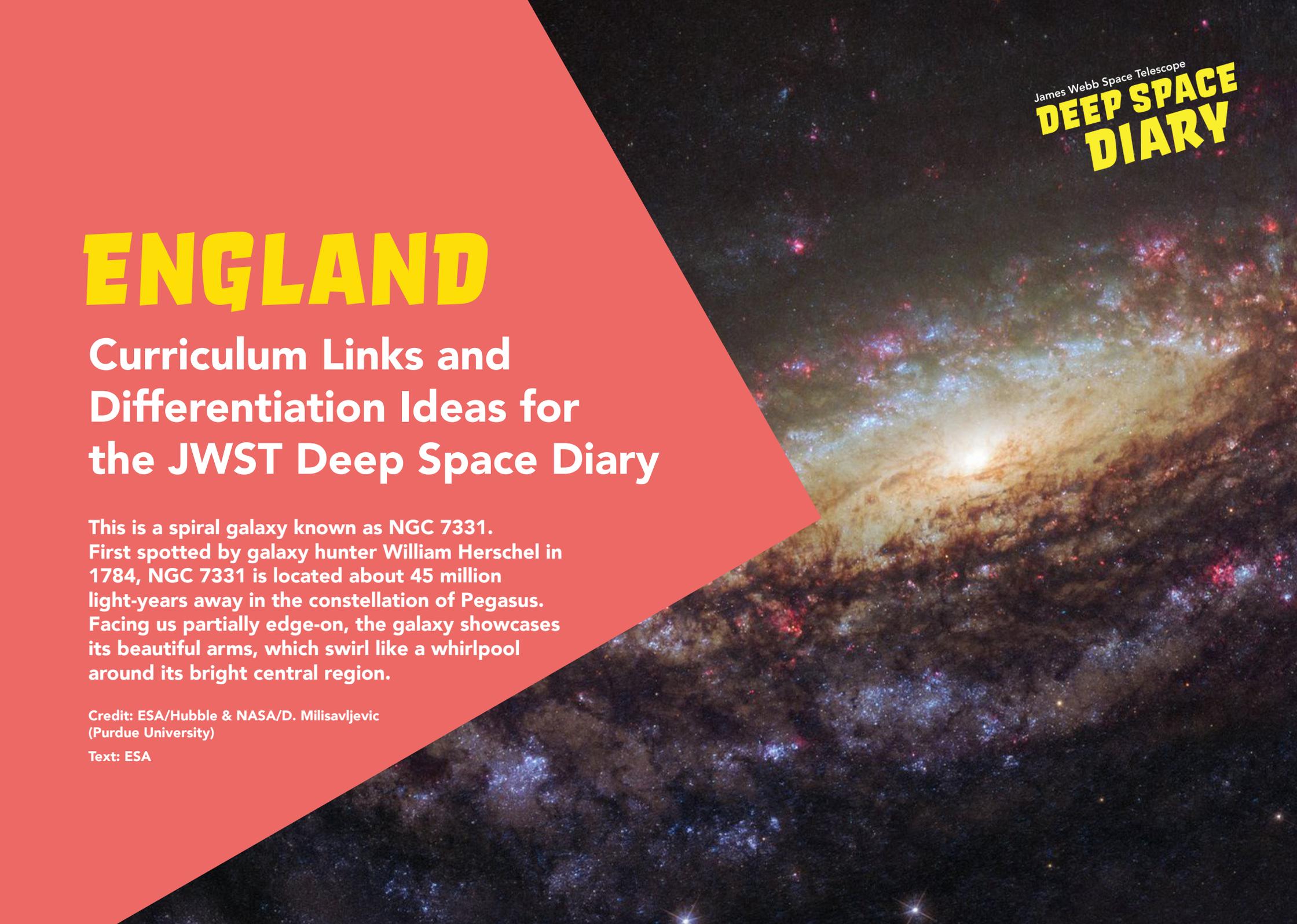
# ENGLAND

## Curriculum Links and Differentiation Ideas for the JWST Deep Space Diary

This is a spiral galaxy known as NGC 7331. First spotted by galaxy hunter William Herschel in 1784, NGC 7331 is located about 45 million light-years away in the constellation of Pegasus. Facing us partially edge-on, the galaxy showcases its beautiful arms, which swirl like a whirlpool around its bright central region.

Credit: ESA/Hubble & NASA/D. Milisavljevic  
(Purdue University)

Text: ESA



## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

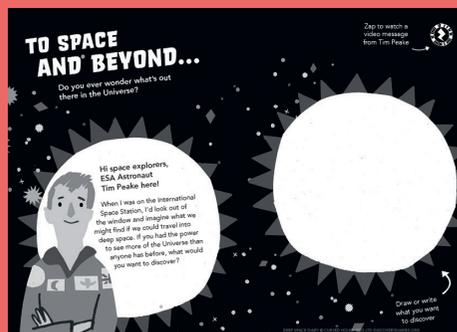
#### ACTIVITY 1.1 TO SPACE AND BEYOND

From Chapter One of the Deep Space Diary [discoverydiaries.org/activities/to-space-and-beyond/](https://discoverydiaries.org/activities/to-space-and-beyond/)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

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### Curriculum Links

#### **Science (Working Scientifically Lower Key Stage 2 Programme of Study):**

- Asking relevant questions and using different types of scientific enquiry to answer them

#### **Art:**

- Using materials and media

#### **Spoken Language:**

- Discussing ideas, conveying viewpoints, listening to others

## Differentiation

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#### **Support:**

- Support students by working in small groups.
- Provide students with vocabulary and a suitable glossary for celestial bodies, such as planet, sun, moon, star, exoplanet, asteroid, comet, atmosphere, black hole, galaxy, dark matter. Understanding of these terms could be further supported by providing definitions and images of each word. See the Deep Space Glossary for terms and definitions: [discoverydiaries.org/toolkit/deep-space-glossary/](https://discoverydiaries.org/toolkit/deep-space-glossary/)

## Upper Key Stage 2

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### Curriculum Links

#### **Science**

- Earth in Space (Year 5)

#### **Science (Working Scientifically Upper Key Stage 2 Programme of Study):**

- Planning different types of scientific enquiry to answer questions
- How knowledge in science supports innovation

#### **Art:**

- Using materials and media

#### **Spoken Language:**

- Discussing ideas, conveying viewpoints, listening to others

#### **Challenge:**

- Linked to the 'Planning an Enquiry' extension activity, ask students to write a Mission Request letter to Tim Peake, explaining what they want to discover, why they want to discover it and what they will need to complete their mission.
- Write a story about travelling further into deep space.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

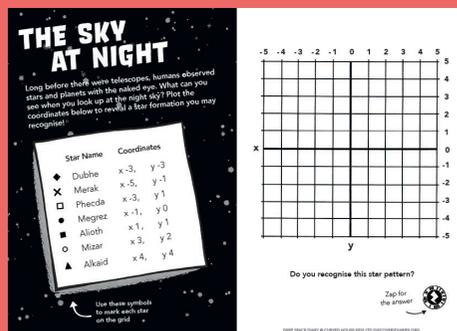
#### ACTIVITY 1.2 THE SKY AT NIGHT

From Chapter One of the Deep Space Diary [discoverydiaries.org/activities/the-sky-at-night](https://discoverydiaries.org/activities/the-sky-at-night)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### Maths (Y4):

- Count backwards through zero to include negative numbers
- Plot specified points and draw sides to complete a given polygon

#### Geography:

- Use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied (understanding location from the night sky)

## Differentiation

#### Support:

- Support younger students by working through the coordinates as a group. If you have an outdoor playground available, draw the graph in chalk and guide students in physically plotting coordinates by assigning seven students the role of 'star' and the rest of the class as 'astronomers'.
- Students can then work together to plot the asterism on their worksheets.

## Upper Key Stage 2

### Curriculum Links

#### Science

- Earth and Space focusing on Earth's rotation on its axis (Year 5)

#### Maths:

- Year 6: Describe positions on the full coordinate grid (all four quadrants)

#### Geography:

- Use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied (understanding location from the night sky)

#### History:

- Understanding how opinions change over time
- How stories are passed down over generations

#### Challenge:

- Recreate the graph on an A3 piece of paper, extending both axes five times to 25. Ask students to plot the Plough, labelling each star with its name. Next, ask students to find the position of Polaris – the North Star – which is located by drawing an imaginary line from Merak to Dubhe, then extending it for five times the distance between these two stars. Students can then identify the coordinates of Polaris.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 1.3

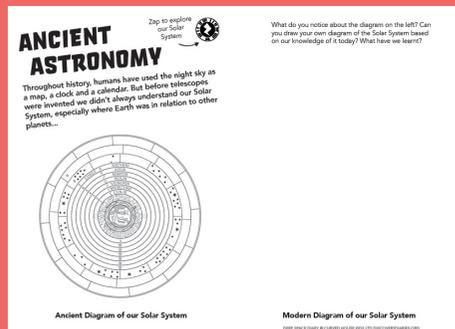
#### ANCIENT ASTRONOMY

From Chapter One of the Deep Space Diary [discoverydiaries.org/activities/ancient-astronomy](https://discoverydiaries.org/activities/ancient-astronomy)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### Science (Working Scientifically Lower Key Stage 2 Programme of Study):

- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
- Identifying differences, similarities or changes related to simple scientific ideas and processes

#### Maths:

- Know the number of seconds in a minute and the number of days in each month, year and leap year
- Compare durations of events

#### History:

- Devise historically valid questions about change, cause, similarity and difference, and significance
- Understand how our knowledge of the past is constructed from a range of sources

#### English:

- Apply growing knowledge of root words, prefixes and suffixes to understand the meaning of new words
- Spoken language: Consider and evaluate different viewpoints, attending to and building on the contributions of other.

## Differentiation

### Support:

- Support younger students by using a primer activity like [discoverydiaries.org/activities/the-solar-system/](https://discoverydiaries.org/activities/the-solar-system/) to revise the planets in our Solar System. Work in small groups or pairs to identify the order of the planets. Learn rhymes and patterns to revise the order.
- Provide students with cardboard circles of varying size to trace, to position the planets around the Sun.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Earth and Space (Year 5)

#### Science (Working scientifically Upper Key Stage 2 Programme of Study):

- Identifying scientific evidence that has been used to support or refute ideas or arguments

#### Maths:

- Year 5: Identify 3-D shapes from 2-D representations

#### English:

- Spoken language: Consider and evaluate different viewpoints, attending to and building on the contributions of other
- Apply growing knowledge of root words, prefixes and suffixes to understand the meaning of new words

#### History:

- Devise historically valid questions about change, cause, similarity and difference, and significance
- Understand how our knowledge of the past is constructed from a range of sources

### Challenge:

- Introduce higher ability students to Astronomical Units – the unit of measurement used to measure the distance of planets from the Sun – [discoverydiaries.org/activities/going-the-distance/](https://discoverydiaries.org/activities/going-the-distance/)
- Challenge students to accurately represent the distance of each planet from the Sun, using a compass to draw each orbital path
- Investigate how long it takes each planet to orbit the Sun

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 1.4

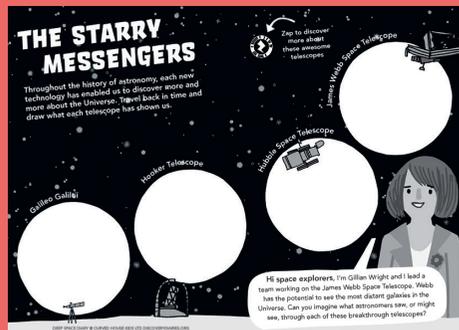
#### THE STARRY MESSENGERS

From Chapter One of the Deep Space Diary [discoverydiaries.org/activities/the-starry-messengers](https://discoverydiaries.org/activities/the-starry-messengers)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### Science (Working Scientifically Lower Key Stage 2 Programme of Study):

- Identifying differences, similarities or changes related to simple scientific ideas and processes

#### History:

- Devise historically valid questions about change, cause, similarity and difference, and significance
- Understand how our knowledge of the past is constructed from a range of sources

## Differentiation

#### Support:

- Work as a class or in small groups, using the visual prompts provided in the PowerPoint slides. Use a washing line to pin up key dates and changes in telescope discovery to support the students visually.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Earth and Space (Year 5)

#### Science (Working scientifically Upper Key Stage 2 Programme of Study):

- Identifying scientific evidence that has been used to support or refute ideas or arguments

#### History:

- Devise historically valid questions about change, cause, similarity and difference, and significance
- Understand how our knowledge of the past is constructed from a range of sources

#### Challenge:

- Add annotations to the diagrams to explain what the telescopes have shown us.
- Ask more capable students to research each telescopes' capabilities independently.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

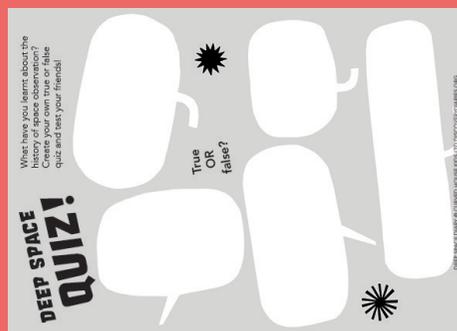
#### ACTIVITY 1.5 DEEP SPACE QUIZ

From Chapter One of the Deep Space Diary [discoverydiaries.org/activities/deep-space-quiz](https://discoverydiaries.org/activities/deep-space-quiz)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

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### Curriculum Links

#### **Science (Working Scientifically Lower Key Stage 2 Programme of Study):**

- Asking relevant questions and using different types of scientific enquiries to answer them
- Using straightforward scientific evidence to answer questions or to support findings

#### **History:**

- Devise historically valid questions about change, cause, similarity and difference, and significance
- Understand how our knowledge of the past is constructed from a range of sources

#### **English**

## Differentiation

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#### **Support:**

- Write questions in pairs.
- Students create top trumps style Q&A cards to support recollection of learning.

## Upper Key Stage 2

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### Curriculum Links

#### **Science:**

- Earth and Space (Year 5)

#### **Science (Working scientifically Upper Key Stage 2 Programme of Study):**

- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

#### **History:**

- Devise historically valid questions about change, cause, similarity and difference, and significance
- Understand how our knowledge of the past is constructed from a range of sources

#### **Challenge:**

- Ask students to research one question of their choice. Set them the challenge of proving why it is true or false and present their findings to the class.
- Provide students with a quota for True and False questions, such as three False questions, to ensure that they think creatively about the questions they formulate.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 2.1

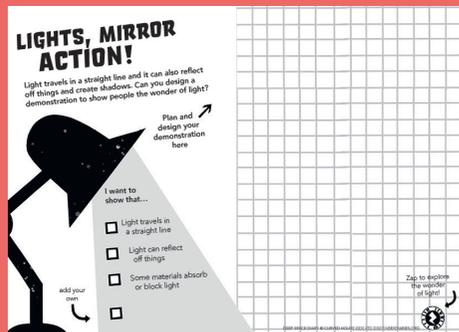
#### LIGHTS, MIRROR, ACTION

From Chapter Two of the Deep Space Diary [discoverydiaries.org/activities/lights-mirror-action](https://discoverydiaries.org/activities/lights-mirror-action)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### Science:

- Light (Year 3)

#### Science (Working Scientifically Lower Key Stage 2 Programme of Study):

- Asking relevant questions and using different types of scientific enquiries to answer them
- Reporting on findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
- Using straightforward scientific evidence to answer questions or to support findings

## Differentiation

#### Support:

- For support, students could work in a guided group and be given suggested activities to use for their demonstration. They could then work independently to create and write up their plan and carry out their demonstration. For greater challenge, students could include additional information on their plan and use scientific vocabulary.
- Students could be in mixed ability groupings.
- Provide a word bank for students to select vocabulary from to annotate their drawing.
- Students could be given ideas prompt cards to help scaffold their learning if needed.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Earth and Space (Year 5)
- Light (Year 6)

#### Science (Working scientifically Upper Key Stage 2 Programme of Study):

- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

#### Challenge:

- Students could physically carry out their demonstrations. They could verbally explain what they have done and answer other students' questions.
- Students could include a detailed plan using scientific vocabulary.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

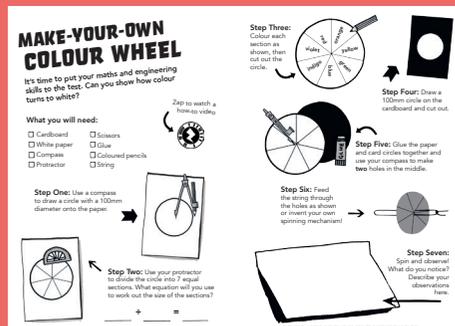
#### ACTIVITY 2.2 MAKE-YOUR-OWN COLOUR WHEEL

From Chapter Two of the Deep Space Diary [discoverydiaries.org/activities/make-your-own-colour-wheel](https://www.discoverydiaries.org/activities/make-your-own-colour-wheel)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://www.discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### Science:

- Recognise that we need light in order to see things and that dark is the absence of light (Year 4)

#### Science (Working Scientifically Lower Key Stage 2 Programme of Study):

- Asking relevant questions and using different types of scientific enquiry to answer them
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

#### Design and Technology:

- Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.

## Differentiation

#### Support:

- Circles could be provided rather than require students to draw and cut out their own circles.
- Lines could be pre-marked on the circles if students do not have experience in using a protractor (angle measurer).
- Students could be given a template to draw around to create a circle instead of using a pair of compasses.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Recognise that light appears to travel in straight lines (Y6)

#### Science (Working scientifically Upper Key Stage 2 Programme of Study):

- Planning different types of scientific enquiry to answer questions, including recognising and controlling variables
- Taking measurements, using scientific equipment, with increasing accuracy, taking repeated readings
- Reporting and presenting findings including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms
- Identifying scientific evidence that has been used to support or refute ideas or arguments

#### Maths:

- Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles (Year 5)
- Draw given angles and measure them in degrees (Year 5)
- Illustrate and name parts of circles and know that the diameter is twice the radius

#### Design and Technology:

- Select from and use a wider range of tools and equipment to perform practical tasks accurately.

#### Challenge:

- Students could work through the steps independently.
- By making other colour wheels with limited colours (e.g. only blue and green or red and yellow), students could investigate what happens when not all colours are present.
- Students can extend their experience of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 2.3

#### RECIPE FOR A RAINBOW

From Chapter Two of the Deep Space Diary [discoverydiaries.org/activities/recipe-for-a-rainbow](https://discoverydiaries.org/activities/recipe-for-a-rainbow)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)

#### RECIPE FOR A RAINBOW

A colour wheel turns colour into white, but how can we turn white light into colour? In other words, how do we make a rainbow? The ingredients are simple – a light and a prism. But how exactly do we cook up a rainbow from that? Create a step-by-step guide and don't forget to include a colourful diagram!

Zap to explore the colour spectrum

## Lower Key Stage 2

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### Curriculum Links

#### Science:

- Recognise that we need light in order to see things and that dark is the absence of light (Year 3)
- Notice that light is reflected from surfaces (Year 3)

#### Science (Working Scientifically Lower Key Stage 2 Programme of Study):

- Asking relevant questions and using different types of scientific enquiry to answer them
- Setting up simple practical enquiries, comparative and fair test
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

## Differentiation

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#### Support:

- Provide only one type of light source and one type of prism to guide students when creating their own experiments.
- Provide a word bank for students to select vocabulary from to annotate their drawing.

## Upper Key Stage 2

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### Curriculum Links

#### Science:

- Recognise that light appears to travel in straight lines (Year 6)

#### Science (Working scientifically Upper Key Stage 2 Programme of Study):

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Recording data and results of increasing complexity using scientific diagrams and labels
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results

#### Challenge:

- Provide a range of resources, some of which are not particularly relevant, to enable students to develop the skills to identify what is useful and what is not.
- Students could physically carry out their demonstrations. They could verbally explain what they have done and answer other students' questions.
- Students could include a detailed plan using scientific vocabulary.
- Ask students to explore the idea that there could be more than seven colours in the light spectrum.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

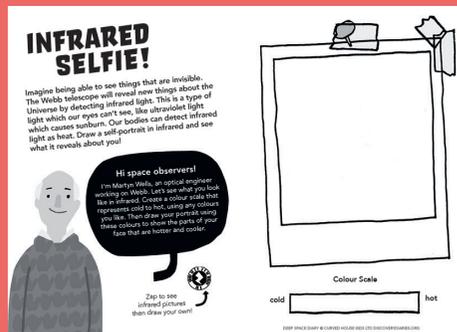
#### ACTIVITY 2.4 INFRARED SELFIE

From Chapter Two of the Deep Space Diary [discoverydiaries.org/activities/infrared-selfie](https://discoverydiaries.org/activities/infrared-selfie)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### Science:

- Light (Year 3)

#### Science (Working Scientifically Lower Key Stage 2 Programme of Study):

- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables

## Differentiation

#### Support:

- Create the colour scale together and model the task on the board.
- Demonstrate blending techniques and allow students to practise blending colours together before they start.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Light (Year 5)

#### Science (Working scientifically Upper Key Stage 2 Programme of Study):

- Recording data and results of increasing complexity using scientific diagrams and labels
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results

#### Challenge:

- Students create the colour spectrum more independently, with less teacher input.
- Students could use watercolour pencils.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 3.1

#### BLUEPRINT FOR SPACE

From Chapter Three of the Deep Space Diary [discoverydiaries.org/activities/blueprint-for-space](https://discoverydiaries.org/activities/blueprint-for-space)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

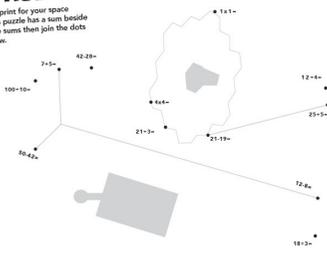
[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)

#### BLUEPRINT FOR SPACE

It's time to unveil the blueprint for your space telescope. Each dot in this puzzle has a sum beside it. Start by completing the sums then join the dots according to the key below.

KEY	
Antenna	Even Numbers
Secondary Mirror	
Primary Mirror	
Secondary Mirror	
Mirror Support Structure	Odd Numbers
Control System	

Some components are missing a visual key. Can you colour them on the diagram and add the colour to the key?



## Lower Key Stage 2

### Curriculum Links

#### Maths:

- Count backwards through zero to include negative numbers (Year 4)

### Differentiation

#### Support:

- Students to work with a partner or in small groups to answer the mathematical questions.
- Students to record each number on the worksheet.
- Differentiate by providing solutions; students to join up the dots (odds or evens) from the smallest to largest.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Earth and Space (Year 5)

#### Maths:

- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero (Year 5)
- Use negative numbers in context and calculate intervals across zero

#### Challenge:

- Students to work independently/with a partner to answer the mathematical questions.
- Students to add any other details to the blueprint, e.g.:
  - Label the Hot Side and Cold Side of Webb
  - Label the temperature range of each side
  - Using arrows, show the direction light of the Sun
- Can students come up with their own sums for the dot-to-dot solutions?

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 3.2

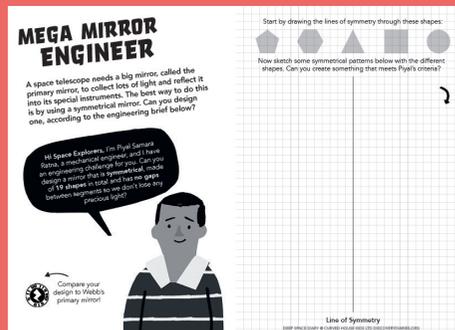
#### MEGA MIRROR ENGINEER

From Chapter Three of the Deep Space Diary [discoverydiaries.org/activities/mega-mirror-engineer](https://discoverydiaries.org/activities/mega-mirror-engineer)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

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### Curriculum Links

#### Maths:

- Identify lines of symmetry in 2-D shapes presented in different orientations (Year 4)
- Complete a simple symmetric figure with respect to a specific line of symmetry (Year 4)

## Differentiation

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#### Support:

- Provide children with a design for them to reflect.
- Cut out or draw around some physical shapes to plan your design.

## Upper Key Stage 2

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### Curriculum Links

#### Maths:

- Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed (Year 5)
- Draw and translate simple shapes on the coordinate plane, and reflect them in the axes (Year 6)

#### Challenge:

- Look for multiple lines of symmetry in the mirror designs beyond the given vertical line including horizontal and diagonal.
- Use more criteria for drawing the design (e.g. no right angles).

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 3.3 KEEP IT COOL

From Chapter Three of the Deep Space Diary [discoverydiaries.org/activities/keep-it-cool/](https://discoverydiaries.org/activities/keep-it-cool/)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)

**KEEP IT COOL**

The infrared camera is the "eye" of your telescope. It needs to be extremely cold to work properly. Can you experiment with different ways to keep it cool? Which methods might work in space?

I want to find out...  
-----

I will need the following materials:  
-----

My method will be to:  
-----

I predict...  
-----

Draw and label a diagram of your experiment.

## Lower Key Stage 2

### Curriculum Links

#### Science:

- Materials: Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) (Year 4)

#### Science (Working Scientifically Lower Key Stage 2 Programme of Study):

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Using straightforward scientific evidence to answer questions or to support findings

#### Maths:

- Convert between units of measure (Year 4)

## Differentiation

#### Support:

- Use the support frames for conclusion/table of results.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Earth and Space: The wider Universe (Year 5)

#### Science (Working Scientifically Upper Key Stage 2 Programme of Study):

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

#### Maths:

- Convert between units of measure (Year 5)

#### Challenge:

- Use the extension ideas to challenge thinking.
- Can they test conductors? Which increase the rate of heat loss?
- How can we apply this knowledge to make a spacesuit to keep an astronaut warm?

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 3.4

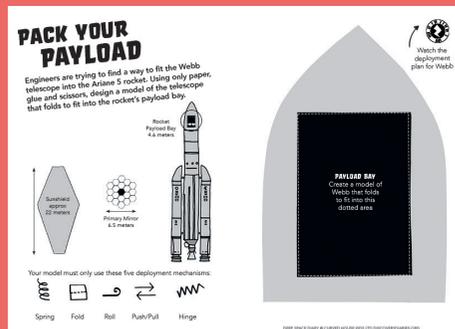
#### PACK YOUR PAYLOAD

From Chapter Three of the Deep Space Diary [discoverydiaries.org/activities/pack-your-payload](https://discoverydiaries.org/activities/pack-your-payload)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### **Design and Technology:**

- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- Generate, develop, model and communicate students' ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
- Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- Apply understanding of how to strengthen, stiffen and reinforce more complex structures

## Differentiation

#### **Support:**

- For support, students could work in a guided group/with a partner. Groups could be mixed ability.
- Students to be given ideas via prompt cards to help scaffold their learning if needed. These can include the different mechanisms.
- Students to create a planned drawing with mechanisms labelled on the plan. This will help to structure the learners and allow them to follow the plan.

## Upper Key Stage 2

### Curriculum Links

#### **Science:**

- Earth and Space (Year 5)

#### **Design and Technology:**

- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- Students generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
- Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- Apply understanding of how to strengthen, stiffen and reinforce more complex structures

#### **Challenge:**

- Students to work independently.
- Students can be given the opportunity to draw a quick plan on a whiteboard to follow if needed.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 4.1 PARKING SKILLS

From Chapter Four of the Deep Space Diary [discoverydiaries.org/activities/parking-skills](https://discoverydiaries.org/activities/parking-skills)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)

**PARKING SKILLS!**

Tap for answers

Congratulations! Your telescope is ready to launch! But where will you park it? Compare the four different options. Then follow the maze to find the best spot. Once you have the path, programme the commands below so Webb knows where to go!

<Top Secret Commands>		
Move	Direction	Distance (cm)
1	↑	1
2	↘	1
3		
4		
5		
6		
7		
8		
9		
10		

Manchester city centre

A desert mountain top

A cold, dark place in space four times further than our Moon!

Just above Earth's atmosphere

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## Lower Key Stage 2

### Curriculum Links

#### Computing:

- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts

### Differentiation

#### Support:

- Provide students with pros and cons cards to match with a particular site.
- Discuss as a class which would be the best.
- Have students work with a partner to write the sequence of commands.
- Provide some initial commands to model the activity for students to follow.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Earth and Space (Year 5)

#### Computing:

- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts

#### Challenge:

- Allow students to decide which location they need to travel to prior to completing the maze.
- Create a reverse series of instructions to describe an imaginary return journey.



## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

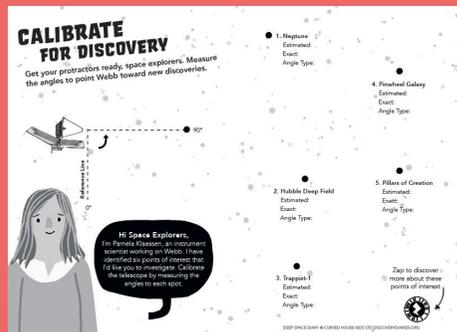
#### ACTIVITY 4.3 CALIBRATE FOR DISCOVERY

From Chapter Four of the Deep Space Diary [discoverydiaries.org/activities/calibrate-for-discovery](https://discoverydiaries.org/activities/calibrate-for-discovery)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### Maths:

- Recognise angles as a property of a shape or a description of a turn (Year 3)
- Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn (Year 3)
- Identify whether angles are greater than or less than a right angle (Year 3)
- Identify acute and obtuse angles and compare and order angles up to two right angles by size (Year 4)

### Differentiation

#### Support:

- To support younger students, draw and mark in the angles for the students first. They would then be able to complete the estimate and type of angle for each of the questions.
- It may be helpful for some students to have the line of each angle already drawn onto their sheet to ensure accuracy when measuring the angles.
- Some students may benefit from working in a guided group, working through the estimate, measure, name process for each angle with an adult to support and to ensure that they are using protractors correctly.
- Provide the students with the key vocabulary they will need e.g. acute, obtuse, right angle.
- Students could be provided with a range of angle measurements for them to select the correct measurements from.

## Upper Key Stage 2

### Curriculum Links

#### Maths:

- Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles (Year 5)
- Draw given angles and measure them in degrees (°) (Year 5)

#### Challenge:

- Students working at greater depth within age-related expectations could be given the opportunity to explore how to use a protractor to measure the angles.
- Students working at greater depth within age-related expectations could be asked to mark in different angles (including acute, obtuse and reflex) to identify their own points of interest.
- e.g. The Webb Telescope has spotted something at 84°C. Measure the angle and draw what the telescope has seen.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

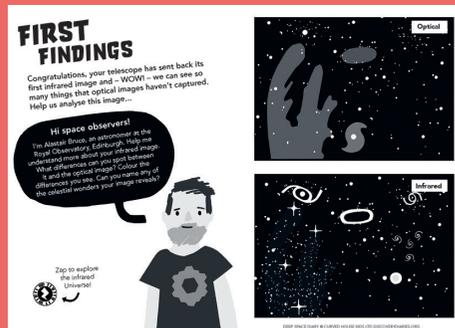
#### ACTIVITY 5.1 FIRST FINDINGS

From Chapter Five of the Deep Space Diary [discoverydiaries.org/activities/first-findings](https://discoverydiaries.org/activities/first-findings)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

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### Curriculum Links

#### Science:

- Light (Year 3)
- Working Scientifically Lower KS2 Programme of Study
  - Asking relevant questions and using different types of scientific enquiry to answer them

### Differentiation

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#### Support:

- Students can work in pairs to compare and contrast the two images.
- Provide adult support with navigating the web resources, such as the PowerPoint presentation.

## Upper Key Stage 2

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### Curriculum Links

#### Science:

- Earth and Space (Year 5)
- Light (Year 6)
- Working Scientifically Upper KS2 Programme of Study:
  - Identifying scientific evidence that has been used to support or refute ideas or arguments

#### Challenge:

- Peer assessment of completed paintings.
- Students could be given responsibilities in creating the class display creating labels, headings and short pieces of text to accompany the images.
- Research real life examples of infrared images taken by telescopes and how they have impacted on our understanding of the Universe.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 5.2 DATA DETECTIVE

From Chapter Five of the Deep Space Diary [discoverydiaries.org/activities/data-detective](https://discoverydiaries.org/activities/data-detective)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)

**DATA DETECTIVE**

Hi, space explorer! In this filter and study exoplanet! You have sensitive infrared telescope can see light through the atmospheres of exoplanets and from which determine that the atmosphere of exoplanets. And from which determine that the atmosphere of exoplanets. And from which determine that the atmosphere of exoplanets. And from which determine that the atmosphere of exoplanets.

Look at the clues in Dataset 1. What are the atmospheric gases? Can you find out more about them?

One of the planets is made up of carbon + 1 oxygen and the other is carbon + 2 oxygen. Which is which? There's a clue in the name!

Analyse Dataset 2 and colour code the planets into three categories:

- Definitely no life here
- Probably to support life
- Need more data to support life

Gas	Clue	Characteristics
carbon dioxide	☁️ & 🌱	
water vapour	☁️ & 🌊	
carbon monoxide	🔥	
methane	🌱 & 🔥	

Dataset 2: Atmospheric Data from 10 Exoplanets

10 bar charts showing atmospheric data for exoplanets 1-10. Each chart has a scale from 0 to 100 and shows the relative amounts of different gases.

## Lower Key Stage 2

### Curriculum Links

#### Science (Working Scientifically Lower Key Stage 2 Programme of Study):

- Identify differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings

#### Maths:

- Interpret and present data using bar charts, pictograms and tables (Year 3)
- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs (Year 4)

#### Spoken Language:

- Articulate and justify answers, arguments and opinions
- Use spoken language to develop understanding through speculating, hypothesising, imagining and exploring ideas

#### Computing:

- Solve problems by decomposing them into smaller parts; analysing, evaluating and presenting data and information

## Differentiation

#### Support:

- Give students fact files for water, carbon dioxide and carbon monoxide, to support their initial research.
- Work together as a group to explore the atmospheric data.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Earth and Space (Year 5)
- Working Scientifically Upper KS2 Programme of Study: — Identifying scientific evidence that has been used to support or refute ideas or arguments

#### Maths:

- Complete, read and interpret information in tables, including timetables (Year 5)

#### Spoken Language:

- Articulate and justify answers, arguments and opinions
- Use spoken language to develop understanding through speculating, hypothesising, imagining and exploring ideas

#### Computing:

- Solve problems by decomposing them into smaller parts; analysing, evaluating and presenting data and information

#### Challenge:

- Allow independent research.
- Present the atmospheric data of Earth and other planets in the Solar System.
- Justify each exoplanet's likelihood to support life, with reasons. Can students use scientific evidence to justify their answers?



## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### ACTIVITY 6.1

#### DEEP SPACE DAILY

From Chapter Six of the Deep Space Diary [discoverydiaries.org/activities/deep-space-daily](https://discoverydiaries.org/activities/deep-space-daily)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

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### Curriculum Links

#### **Science (Working Scientifically Lower Key Stage 2 Programme of Study):**

- Light (Year 3)
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

#### **English:**

- Retrieve and record information from non-fiction
- Organise paragraphs around a theme
- In non-narrative material, use simple organisational devices
- Use and understand the grammatical terminology in English Appendix 2 accurately and appropriately when discussing writing and reading

## Differentiation

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#### **Support:**

- Group work/shared writing with the teacher/educator or paired work.
- Provide students with word banks for challenging vocabulary.
- Give students a particular 'discovery' to write about.
- Voice recorders could be used during the planning session to help students develop their ideas.
- Pupils with Specific Learning Difficulties could use dictation software.

## Upper Key Stage 2

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### Curriculum Links

#### **Science (Working Scientifically Lower Key Stage 2 Programme of Study):**

- Earth and Space (Year 5)
- Light (Year 6)
- Reporting or presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

#### **English:**

- Retrieve, record and present information from non-fiction
- Noting and developing initial ideas, drawing on reading and research where necessary
- Using further organisational and presentational devices to structure text and guide the reader (for example, headings, bullet points, underlining)
- Use and understand the grammatical terminology in English Appendix 2 accurately and appropriately when discussing writing and reading.

#### **Challenge:**

- Students to type up and present their newspaper report using MS Publisher.
- Students to read their report to another class.
- Students to include a relevant web-link in the article.
- Students to record sources in a bibliography to be handed in with the article.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

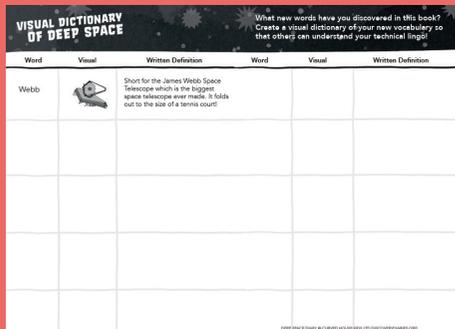
#### ACTIVITY 6.2 VISUAL DICTIONARY OF DEEP SPACE

From Chapter Six of the Deep Space Diary [discoverydiaries.org/activities/visual-dictionary-of-deep-space/](https://discoverydiaries.org/activities/visual-dictionary-of-deep-space/)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)



## Lower Key Stage 2

### Curriculum Links

#### English:

- Using dictionaries to check the meaning of words read
- Apply growing knowledge of root words, prefixes and suffixes (etymology and morphology) as listed in English Appendix 1, both to read aloud and to understand the meaning of new words
- Read further exception words, noting the unusual correspondences between spelling and sound, and where these occur in the word
- Students check that the text makes sense to them, discussing their understanding and explaining the meaning of words in context

### Differentiation

#### Support:

- Work as a class or in groups to find definitions, assigning words to students.
- Create cards to match word and definition.

## Upper Key Stage 2

### Curriculum Links

#### Science:

- Earth and Space (Year 5)

#### English:

- Apply growing knowledge of root words, prefixes and suffixes (morphology and etymology) as listed in English Appendix 1, both to read aloud and to understand the meaning of new words
- Students check that the text makes sense to them, discussing their understanding and exploring the meaning of words in context

#### Challenge:

- Individually locate the word definitions.
- Ask students to use printed dictionaries, rather than searching online for definitions.
- Use the words in context by writing sentences.
- Use the words to create a quiz or write a report using the technical language.

## ENGLAND

### CURRICULUM LINKS & DIFFERENTIATION IDEAS

#### WORD SEARCHES

Located throughout the Deep Space Diary

Chapter Two: [discoverydiaries.org/activities/chapter-two-word-search/](https://discoverydiaries.org/activities/chapter-two-word-search/)

Chapter Three: [discoverydiaries.org/activities/chapter-three-word-search/](https://discoverydiaries.org/activities/chapter-three-word-search/)

Chapter Four: [discoverydiaries.org/activities/chapter-four-word-search/](https://discoverydiaries.org/activities/chapter-four-word-search/)

Chapter Five: [discoverydiaries.org/activities/chapter-five-word-search/](https://discoverydiaries.org/activities/chapter-five-word-search/)

#### LEARNING LEVEL

KS2, P5-7, Y4-6

[discoverydiaries.org/resources/teacher-toolkit/](https://discoverydiaries.org/resources/teacher-toolkit/)

## Lower Key Stage 2

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### Curriculum Links

**English:**

- Learn to spell new words and practise spelling them

### Differentiation

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**Support:**

- Work as a class or in groups to find definitions, assigning words to students.
- Work as a class or in groups to create a song using vocabulary from the chapter.
- Provide hidden words to students.
- Give clues to the words to help students identify them.

## Upper Key Stage 2

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### Curriculum Links

**Science:**

- Earth and Space (Year 5)

**English:**

- Continue to understand and apply the concepts or word structure so that students can draw on their knowledge of morphology and etymology to spell correctly

**Challenge:**

- Once students have completed the word searches, ask them to develop their own using their Visual Dictionary of Deep Space. They can then test a classmate with their word search. Differentiate by giving clues as the whole word, the first letter or a clue/definition of the word. A word search template is available in the Teacher Toolkit here: [discoverydiaries.org/toolkit/word-search-template/](https://discoverydiaries.org/toolkit/word-search-template/)