**Spring Term Overview – Computing**

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| **Spring Term Book – One Day On Our Blue Planet - Antarctica** |
| **Topic(s) - Coding – Preparing for Turtle Logo** |  **Guide Time = 6 weeks** |
| **Assessment:** | Assessment for Learning based on: lesson involvement; recollection of VIPs and key knowledge and skills from previous lessons; application of new skills, knowledge and VIPs; and work produced in books. Teachers to refer to Focus Education progression of computing skills documents for Year 1 and 2. |  **Very Important Points (VIPs):**An algorithm is a set of instructions for a computer.Debugging means finding and fixing mistakes.Codes can be used to shorten algorithms.A quarter turn is a 90 degree angle turn (Year 2).  **Fat Questions:**Is there any use for Algorithms (or controllable devices) in Antarctica? When might people need to give directional algorithms to get from place to place? If the Adelie penguin was to explore Pontefract, where might she go and what might she see?Do we de-bug in every day life? How does this show good resilience?How can children/schools with no internet access still learn about algorithms? |
| **Links to prior learning (sequencing) and canon book** | **Year 1** will have learnt how to log onto a computer safely and have been introduced to the concept of personal information and online safety. They will have used computers to create a piece of digital art and have begun to understand how technology can be used in both a creative and a helpful way. They may have had experience playing with remote control and programmable toys during their time in EYFS. **Year 2** will be able to confidently log onto a computer and have a good understanding between how computers can do things that humans do and can be used in both helpful and creative ways. They will have a good understanding of internet safety and will have some understanding of coding and algorithms (some gaps due to lockdown and school closure).Clear links will be made to the canon book as children practise their oral and written algorithms by moving a penguin around a map of Antarctica / the ocean. |
| **Links to other learning (cross fertilisation)** | During this unplugged unit, children will focus on their speaking and listening skills when giving and following algorithms. They will apply their skills regarding positional language (maths), instructions (English) and directions (maths/geography).The World Beyond us: Do you have to be in the same room as someone/something to give it an algorithm to follow? How do you think algorithms and remote controlled devices can help us explore hard to reach places? (ocean floors and space/planets etc)The World Around Us: Can you think of examples of people or objects that use algorithms in school/at home/ in the local area?Modern Britain: Can you think of any jobs that require people to give or listen to algorithms?Healthy Bodies & Healthy Minds: Do we de-bug in every day life? How does this show good resilience?Culture: How can children/schools with no technology still learn about algorithms?Technology in Action: How are algorithms used in remote control toys? Can you think of any computer games that use algorithms? |
| **Links to future learning** | This unplugged unit is aimed at preparing the children for when they use Turtle Logo and Scratch later in the year. It will introduce the Year 1 children to the concept of algorithms and debugging. The Year 2 children will further embed their understanding of algorithms and develop their skills of giving and following more complex algorithms. This will then benefit both year groups when they use both Turtle Logo and Scratch later in the year. |
| **Character/Wider Development ('50 things', cultural capital, skills)** | 50 ThingsChildren will be able to apply their understanding of giving and following specific instructions when:Following a dance routine (OH)Finding their way with a map and compass (HP, DL, TR, CP)Practising new sports skills such as learning to skip (OH), riding a bike (LH), learning to swim (LH),Becoming a circus performer (OH)Growing plants (LH, TR, HP)Flying a kite (DL, TR, HP)Cooking a meal (DL, CP) |

**OVERVIEW OF TEACHING SEQUENCE**

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| **Key Facts/****Learning**  | **Learning Focus or Key Question** | **Learning Outcomes (NC)** | **Key Words/****Vocabulary** | **Greater Depth/SEND**  | **Misconceptions** | **Activities and Resources** |
| Lesson 1 – To move forwards and backwards and make turns. | What can the penguin see when travelling forwards and backwards and turning left and right?To listen to and follow algorithms to move the penguin counter forwards and backwards on an Antarctica map and discuss what it is pointing in the direction of when turned left and right. | NC Link: C1 = understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructionsC2 = create and debug simple programs | AlgorithmInstructionsStep by stepPreciseForwardsBackwardsTurn  | Children to work in pairs so HA can support LA.SEND to focus on forwards and backwards and counting the correct amount of squares.GD to debug algorithms of partners, come up with and follow algorithms containing more steps, and practise reading algorithms.SEND can access programmable toys and apps (bee-bot etc) as a pre-teaching tool. | Confusion of which way to turn.Miscounting squares when moving across the map.Not returning to correct starting point. | Children will follow slides and listen carefully to oral algorithms. They will practise standing in a space and moving/turning on command. They will look at a map, listen to directional algorithms and discuss with a partner where they think the movements will take the character.**Y1** With a partner, they will look at an A3 gridded map. They will use a penguin ‘counter’ to follow the directional algorithms given by the teacher. They will turn their penguin and discuss what it is pointing towards. They will record 1 thing each time in their book.**Y2** With a partner, they will look at an A3 gridded map. They will use a penguin ‘counter’ to follow the *multi-step* directional algorithms given by the teacher. They will turn their penguin *left and right* and discuss what it is pointing towards. HA/GD children will also be given written algorithms to follow independently. They will then record their work in their books.Children from both classes will then have time to work with their partner to take it in turns giving and listening to algorithms, similar to those they just practised.**Resources Needed:**A3 gridded image of AntarcticaPenguin counters Labelled penguin counters to support directions (left/right)**Deepen the Moment**How do you think remote control devices can help us to explore hard to reach places?*Children should also be given access to programmable toys and apps to apply these skills in different situations.* |
| Lesson 2 – To use half and quarter turns, left and right. | Can you help the penguin visit her friends?To follow and give algorithms involving moving forwards (and backwards) and making quarter/90 degree (and half/ 180 degree) turns.  | NC Link: C1 and C2 as above.Also C3 = use logical reasoning to predict the behaviour of simple programs | AlgorithmDebuggingInstructionsForwardsBackwardsLeftRightQuarter turnHalf turn90 degree turn (y2) | Children to work in pairs so HA can support LA.SEND to focus on left and right turns with a ‘counter’ that supports this.GD to debug algorithms of partners, come up with and follow algorithms containing more steps, and practise writing algorithms in codes. | Confusion of left and right/clockwise/ anti clockwise, especially in multi-step instructions and the counter is no longer facing upwards.Confusion of quarter turn and half turn.Miscounting squares when moving across the map.Not returning to correct starting point. | Children will follow slides, recap previous learning and VIPs and listen carefully to oral algorithms. They will practise standing in a space and turning left/right quarter turns. They will look at a map, listen to directional algorithms and discuss with a partner where they think the movements will take the character.**Y1** With a partner, they will look at an A3 gridded map. They will use a penguin ‘counter’ to follow the directional algorithms given by the teacher. They will move their penguin across the grid and discuss where it ends up each time. Children will be encouraged to debug their mistakes.**Y2** With a partner, they will look at an A3 gridded map. They will use a penguin ‘counter’ to follow the *multi-step* directional algorithms given by the teacher. They will be given a starting point then an algorithm that involves 3 or more steps (moving, turning and moving again). HA/GD children will also be given written algorithms to follow independently. Children will be encouraged to debug their mistakes.Children from both classes will then have time to work with their partner to take it in turns giving and listening to algorithms, similar to those they just practised.**Resources Needed:**A3 gridded image of AntarcticaPenguin counters Labelled penguin counters to support directions (left/right)**Deepen the Moment**Can you think of examples of people or objects that use algorithms at home or school?*Children should also be given access to programmable toys and apps to apply these skills in different situations.* |
| Lesson 3 – To create and write a coded algorithm for the penguin to travel through Antarctica. | Can you create an algorithm to help the penguin reach X, passing 3 friends on the way?To create and write a coded algorithm that directs the penguin across the map, passing various animal friends on the way, using the codes F, B, R, L (and 90). | NC Link: C1, C2 and C3 as above. | AlgorithmDebuggingPreciseDirectionsCoded Forwards (F)Backwards (B)Left (L)Right (R)90 degree turn (90) | Children to work in pairs so HA can support LA.SEND to focus on left and right turns with a ‘counter’ that supports this.GD to debug algorithms of partners and come up with and follow more complex algorithms. | Confusion of left and right/clockwise/ anti clockwise, especially in multi-step instructions when the counter is no longer facing upwards.Confusion of quarter turn and half turn.Miscounting squares when moving across the map.Not returning to correct starting point.Losing track of position/direction whilst writing. | Children will follow slides, recap previous learning and VIPs and listen carefully to oral algorithms. They will look at a map, read coded directional algorithms and discuss with a partner where they think the movements will take the character. They will then practise giving oral coded algorithms as a class and with a partner. **Y1** With a partner, they will look at an A3 gridded map. They will use a penguin ‘counter’ to recap reading and following coded algorithms before moving onto creating their own coded algorithm They will record their coded algorithm in their book.**Y2** With a partner, they will look at an A3 gridded map. They will use a penguin ‘counter’ to recap reading and following multi-step coded algorithms before moving onto creating their own coded algorithm They will record their coded algorithm in their book**Resources Needed:**A3 gridded image of AntarcticaPenguin counters Labelled penguin counters to support directions (left/right)**Deepen the Moment**How can children in schools with no technology learn about algorithms?*Children should also be given access to programmable toys and apps to apply these skills in different situations.* |