4. Space Race

Activity Structure – 45min

Activity	Timing
Warm up Game	5 mins
Introduce Project	5 mins
Main Activity	30 mins
Final test & debug	throughout
Finishing Up	5 mins

Overview

Make a space race. Use speed blocks to make several Rockets race across the screen – can the children create a race across several screens? Children will consolidate their learning from previous weeks using Wait, Show and Hide blocks to create the seamless movement of the race between the screens.

Learning Objectives

- To use speed blocks
- To move characters across several scenes seamlessly.

National Curriculum Links

Computing

- Children will understand that programs execute by following precise and unambiguous instructions

Speaking & Listening

- To critique, evaluate and test their ideas and products and the work of others.

Warm Up: Traffic Light Game

- Use the 'Wait', 'Stop' and 'Speed' cards. Ask the children to jog on the spot (slow pace). Explain that you're going to hold up different cards and they will need to carry out the corresponding action.
- 'Stop' – they stop; 'Wait' – they stop and wait while you count to 5, then continue to jog; 'Speed' – adjust their jogging speed accordingly.
- Depending on space and how mature your children are, you could make it more fun by allowing them to walk/jog around the room or make it calmer by having the children sit down and clap in rhythm according to the cards, e.g. stop clapping, clap quickly/slowly, etc.

Introduction (discuss the project together, share ideas and create excitement)

- Today we are going to make space races. Show the Easy race. *Who do you think will win the race?* Get the children excited by encouraging them to make predictions about who will win the race. *Who won the race? Was it who you thought? Which code block changed the speed of the character? Which direction are the rockets travelling in? What do you think the rockets line of code might look like? Would it have been easier to predict the winner if we saw the code first?*
- Show the Space Race Main. First look at the code for the different characters on page 1 & 2. *Who will finish first/last? How do you know?* Watch the race and address any misconceptions about who won and why by comparing the code of the different characters. You may need to watch the race and examine the code a few times. *How many times does a character go Up 'fast'? Why do you think the rocket won?*
- How do the rockets switch page seamlessly? *Why do we need a wait block?* Discuss the length of time for the wait blocks
- Show the advanced race. Look at the code; *Can we predict who the winner will be?* Encourage children to predict (this can be with a show of hands). Watch the race. Were our predictions, right? What speed blocks did the winner have?
- What code blocks are we using today? Invite the children to select the blocks from the flashcards and display them in the room for reference. What start block are we using? What movement block do we need?

4. Space Race
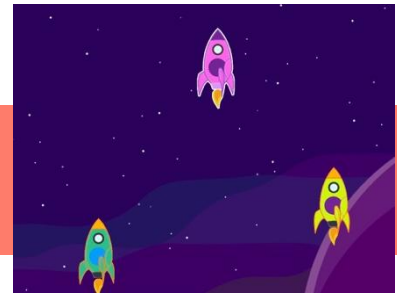
Main Activity Key questions and teaching

1. Select the space background. Experienced coders may like to use the paint editor to personalise their background. Select the same background for scene 2
2. Add 3 rockets from the library and using the paint editor, make each rocket a different colour.
3. Position and resize the characters lining them up at the bottom of the screen. Drag the three rockets from scene 1 to scene 2.
4. Code the first character. *Which movement block will you need to move the rocket up the screen? How many times 'Up' will your character need to move? How can you work this out?* Children can either use the grid and count how many squares the character will need to travel, (remember the first block is in the centre of the character) or children can pull down a move 'Up' block to tap and count until the rocket is at the top of the screen. Have a piece scrap of paper to hand to record this number.
5. Now you need to divide this number into two or three unequal "chunks" For example if it the character moves Up 15 – Up 5, Up 7, Up 3. Allow the children to tinker with this.
6. *Who is going to win the race? Which speed block will you use for the winner? Which speed block should we use for the loser? How can we make sure each character finishes the first part of the race at a different time?* Discuss the idea of using different speed blocks for different characters.
7. Allow the children to tinker with making their character(s) travel at different speeds. Tell the children how long they have left and encourage them to start the second scene.
8. *When the first character reaches the top of the page they will "Go to scene 2" To look like it is travelling seamlessly between the scenes.*
9. *Give the first rocket the new code to finish the race. [Start on Green Flag, Fast Speed, Up3, Medium Speed 3, Fast 5]*
10. *The other rockets are behind the first so we want them to appear in scene 2 after the first. For this we will use the wait block and Hide and Show.*

8. Hide the second rocket. Give the rocket the code to finish the race. [Start on green Flag, Wait 4 Show, Slow, Up 2, Medium, Up 4, Fast Up 5]
9. *Repeat step 8 for the third rocket*
10. When all the characters have the code to finish the race, test and debug. *Do your characters all reach the top of the screen? Do they all reach it at different times?* Do the rockets appear to move seamlessly between the scenes?
11. Test and Debug

Teaching points
- Some children may find it hard to predict the outcome of their code so the winner may not be who they intended.
- To ensure there's progression and learning encourage the children to code the first character with support, do the second character with less support, and attempt to code the third character independently.
- Encourage children to test and debug throughout.

Possible Extensions
- Use wait blocks and a recorded "Ready Steady Go!" to start the race.
- The rockets can travel over 3 scenes, The first character to reach the end of Scene 1, uses screen switch to second scene. Then use 'Wait' 'Hide' and 'Show' for the other characters to join the race at the appropriate time. Repeat this for scene 3.
- Have a celebration page for the winner of the Race.
- Have 4 Rockets but initially start with 2 or 3 and then add the other characters if time as this is a challenging project.

To Simplify
- Use one or two speed blocks for each character.
- Support the children to determine how far the character needs to travel across the screen.
- Pull the code blocks down for the children and they can put them in the correct order and then independently select the speed for each character.
- The race is just on one screen.
- Code the race and, if time as a challenge, add a "Ready Steady Go" start.

Finishing up
- Children show their races to one another. Select one project to share with the group. Look at each of their three race characters' code. *Who will win this race? How do you know?*
- Recap the blocks used in the lesson.