Railway route

Scratch lesson plan – Code Playground

Lesson overview

In this lesson, students will build a Scratch project called railway route, where they control a train's journey, manage energy and earnings, and make strategic decisions about the route. Students will learn to use selection, variables, and sprite interactions to create an engaging and interactive game. Teachers will guide students using the workbook and video.

Time	Key learning outcomes	Resources
40 mins	• Use selection blocks to create interactive decision-making • Program sprite movement and collision detection • Manage game variables for energy and earnings • Apply problem-solving and creativity to enhance gameplay.	• Laptops or desktop computers • Access to Scratch website - https://scratch.mit.edu

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Introduction

Today, we'll create a game where you control a train, make decisions about its route, and manage its energy and earnings.

We'll use selection to make decisions, variables to track energy and earnings, and movement blocks to control the train.

This project was created to celebrate 200 years of steam locomotion. You could tie this project into your history curriculum.

Class question

"What decisions do you think a train driver needs to make to keep their train running smoothly?"

How to tie these concepts to a real world example: This ties into the ideas of budgeting and managing resources. It can be used to show the trade off between completing tasks and managing your energy and ability to do so.

Scratch practical

Ask the children to log into Scratch and set up their work space as instructed in the workbook.
Show the railway route video as a guided lesson pausing regularly when the pupils need to catch up.

- Children should be able to follow along with the workbook or the guided lesson video
- By the end of the lesson children should be able to create a working program showcasing the Railway route game.

Activity – Railway route

This project uses a number of features to create a fun train driving game.

- Coding the train: Demonstrate how to program the character's movement so that the train follows the mouse pointer
- **Coding the environment:** Programming the landmarks to raise energy, pay money or provide passengers.

Collecting passengers increases money earned but the train's energy continually reduces.

By creating variables which are dependent on different actions this game teaches multiple uses for them.

Scratch practical

Using the video and workbooks support the children to follow the instructions and complete the coding project. Have them think of other ways to enhance the project if they have extra time.

Activity wrap up

Prepare to share your project with the class.

- What other interactions could you add to make the game more fun?
- Why do we need variables like Bank and Energy in the game?

Encourage customisation

Add sound effects, change the museum sprite's costume to landmarks near your school, or increase the difficulty by reducing money earned from each stop.
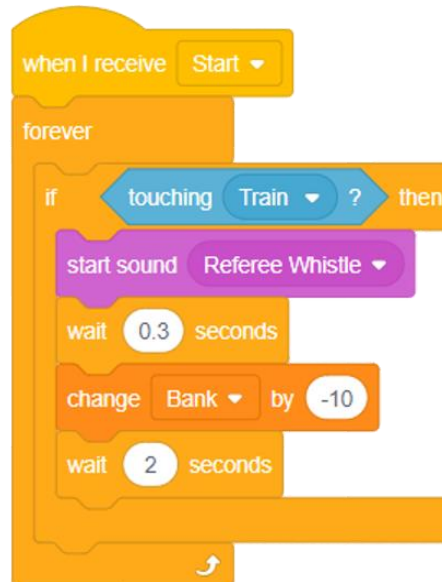
Extension ideas

- Add more landmarks with unique interactions
- Create a second level with faster trains and more complex tracks
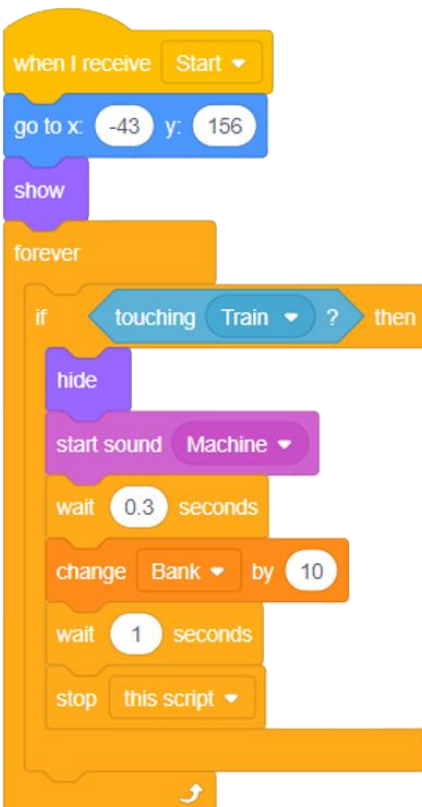- Introduce a timer to add urgency to the game.

Code snippets

Train sprite

```
when I receive  Start ▼
wait until  < touching  mouse-pointer ▼  ? >
repeat until  < touching  Station ▼  ? >
    point towards  mouse-pointer ▼
    move  10  steps
    wait  0.3  seconds
    if  < color ⬤ is touching ⬤ ? >  then
        move  -10  steps
```

Museum sprite

```
when I receive  Start ▼
forever
    if  < touching  Train ▼  ? >  then
        start sound  Referee Whistle ▼
        wait  0.3  seconds
        change  Bank ▼  by  -10
        wait  2  seconds
```

Passenger sprite

```
when I receive  Start ▼
go to x:  -43  y:  156
show
forever
    if  < touching  Train ▼  ? >  then
        hide
        start sound  Machine ▼
        wait  0.3  seconds
        change  Bank ▼  by  10
        wait  1  seconds
        stop  this script ▼
```

Summary

The following information is an example of what a child at an expected level would be able to demonstrate when completing these activities with additional examples to demonstrate how this would vary for a child with emerging or exceeding achievements.

Assessment guidance	
Differentiation – Lower ability/ASN • Focus on programming the train's movement and one passenger interaction • Provide pre-coded variables to simplify the setup • Pair students to collaborate on tasks.	**Differentiation – Higher ability/extension** • Challenge students to add additional landmarks and unique effects • Encourage them to optimise the code for efficiency • Ask them to add a scoring system or bonus rounds for creativity.

Plenary

• "What coding blocks did you use to manage energy and money in the game?"

• "How did you program the train to interact with passengers and landmarks?"

• "What new features could you add to make your game more exciting?"

Assessment questions

• How did you use variables to manage energy and earnings in the game?

• What selection blocks did you use to create interactions with passengers and landmarks?

• How would you improve the game's design or functionality?

• What challenges did you face, and how did you solve them?