Learning objective	Reasoning skills	Curriculum link
• Work systematically to solve problems involving time durations.	• Working systematically • Finding all possibilities • Making connections	📊 Measures: time

The problem

School trip

Imagine you are planning a school trip to a local medieval castle.

- We want the total cost of the trip to be no more than £11.00 per child.

- I know we need to leave school at 9:00 a.m. and be back for 3:30 p.m.

- It takes 30 minutes to travel each way and we must do at least three different things.

Look at the list of things we could do, their cost and time. I wonder how many different ways there are to spend the day at the castle?

Things to think about

- Which things in the day can't you change?
- How long do you have?
- Can you exchange some activities for others?

Your challenge

Plan as many different ways of spending the day at the castle as you can.

RISING STARS
Maths

Year 3

Problem Solving and Reasoning

Background knowledge

- This activity involves children calculating with and comparing time intervals, alongside calculations involving simple amounts of money.
- Children are provided with a set of different activities (Resource sheet 13.1) which they could undertake on a medieval themed trip to a castle. Each activity has a time period associated with it. These time periods have been planned so that they are exchangeable, e.g. a medieval pottery activity (70 minutes) could be exchanged for medieval painting (50 minutes) and medieval artefact handling (15 minutes).
- Alongside the time periods, each activity also has a cost associated to it. The children are challenged to create a timetable for the school trip that costs under £11.00 per child and fits within the timeframe 9:00 a.m.–3:30 p.m.
- The children should be secure in the knowledge that there are 60 minutes in an hour in order to carry out this activity.

Launching the activity

1. Begin by asking the children what's the same? What's different? between 60 minutes and 1 hour. Through the discussion that follows establish that there are 60 minutes in 1 hour.

2. Introduce the prompt poster 13a to the children and share the list of activities with the children. Give children time to initially discuss the problem with their partner, considering how they could approach the problem.

3. Ask: *'How long do we have for the school trip?'* and *'How long do we have at the castle?'*

4. Discuss with the children what things they **must** include in their timetable (travel and lunch).

5. Provide time for children to work on the activity, ideally working in pairs to encourage discussion and develop reasoning.

6. Once children have developed one plan for the day, ask them to develop 'another another, another' encouraging them to use the relationships between the different time periods and costs of the activities to easily create alternative plans.

7. Towards the end of the activity, ask pairs to compare their different plans for the day. What's the same? What's different?

8. Finally, discuss the different methods children have used, drawing attention to relationships and 'exchanges' possible between the different durations of the activities.

Developing reasoning

➤ *What do you notice about the durations of these activities?*
➤ *What's the same, what's different about the duration of* [x] *and* [y] */about these two plans for the day?*

➤ *Give me a possible plan for the day. **Another, another, another**.*
➤ *Give me a **silly answer** for the plan for the day? Why is it silly?*
➤ ***Zooming in.** Give me a plan for the day which includes … a packed lunch … and handling medieval artefacts … and medieval dress up …*
➤ ***Convince me** that you have met both the cost and time criteria.*

Providing differentiation

Support
Children who are struggling with the combination of the duration and cost element could use problem 13b and Resource sheet 13.2, which removes the cost element, to focus on time durations.

Extension
Children should be encouraged to find as many related plans as possible, using the relationships between the different durations of events and costs which other schools could choose from.

Key strategies

2 Another, another, another
3 Convince me
9 Silly answers
10 What do you notice?
12 What's the same? What's different?
13 Zooming in

Problem-solving approaches

Paired work

Taking it further

This activity could be used as the springboard into further work around planning a school trip, including working out the number of buses needed, the total cost of the trip and the potential for some statistics work around children's preferred trips/activities, etc.

This activity also works well alongside problems that involve calculating with money as well as those which involve working systematically, for example problems 1 and 2 (there are others in the resource).