



Lorry Loading

Teacher notes



Overview:

The aim of this activity is to highlight the importance of maths skills in Logistics careers. It links to the Key Stage 3, 4 and 5 Maths Curricula and supports Gatsby Benchmark 4.

This resource is not intended to last for a whole lesson. It best used as a lesson/topic starter or at the end of a lesson/topic or as a problem-solving exercise. Alternatively, it could be used as part of a carousel of activities along with, 'Flow' and 'Conveyor Belt'.

The resource is intended to create discussion!

Curriculum links:

- Reasoning mathematically
- Solving problems
- Model situations mathematically
- Select appropriate concepts, methods and techniques to apply to unfamiliar problems
- Algorithms (Bin packing)

Suggested ways to use the resource:

Ask the students why do they think that it is important to load the lorries as efficiently as possible? Handout the worksheet (page 2) and/or project the questions (using pages 3/4).

Optional things to consider:

Given the number of packages, with algorithms where you sort the packages by size first – what problems might that solve? Cause? Which algorithm might be best for putting cars on a ferry?

Should you just be concerned about weights of packages? What else is there to think of? How could you account for that in an algorithm?

Career info: A **loadmaster** is responsible for properly loading, securing and escorting cargo (and passengers) on to aircraft and ships. They might work for an Airline, in the military or on cargo ships or passenger ferries even. They must take into account a lot of factors such as distance, fuel, cargo and passenger weight. They ensure everything and everyone is safe and secure. To demonstrate what can go wrong search for images of 'plane/container ship loaded incorrectly.

For further curriculum linked careers resources visit: <https://amsp.org.uk/teachers/11-16-maths/resources/linking-curriculum-learning-to-careers/>

Using algorithms to pack lorries as efficiently as possible.

The delivery company DPDazon no longer use pallets when loading their items for delivery. Instead, they place items straight into the lorries. Your job is to use a simplified model to investigate the efficiency of two different lorry loading algorithms.

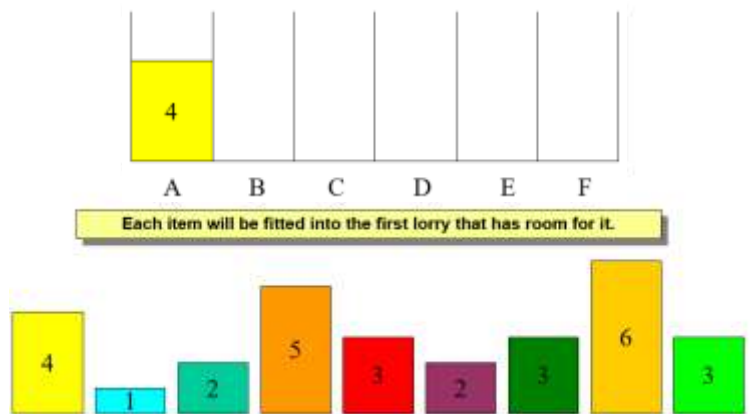
Lorry Loading – First fit algorithm

The “First Fit” Algorithm

Each lorry (A–F) has a capacity of 6.

Starting with the **first** object (on the left), fit each object into the first lorry that has room for it. How many Lorries are needed?

Draw the items inside the lorries. The first item has been done for you.



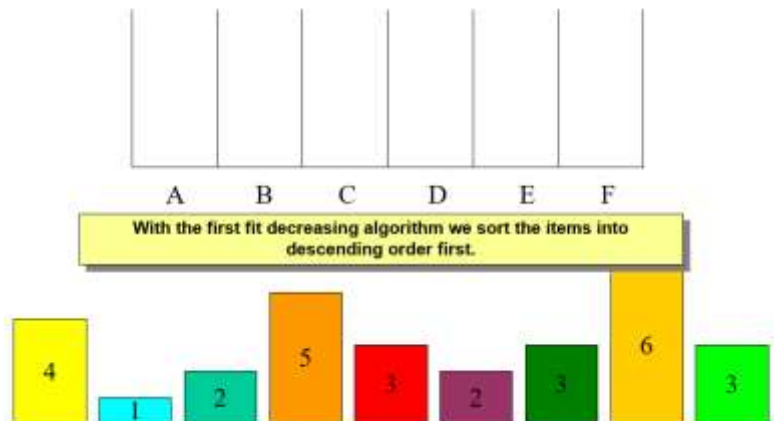
Lorry Loading– First fit decreasing algorithm

The “First Fit Decreasing” Algorithm.

Each lorry has a capacity of 6.

Starting with the **largest** object (and then the second largest etc), fit each object into the first lorry that has room for it. How many Lorries are needed?

Remember to start with the biggest item and work your way down.



Questions to consider:

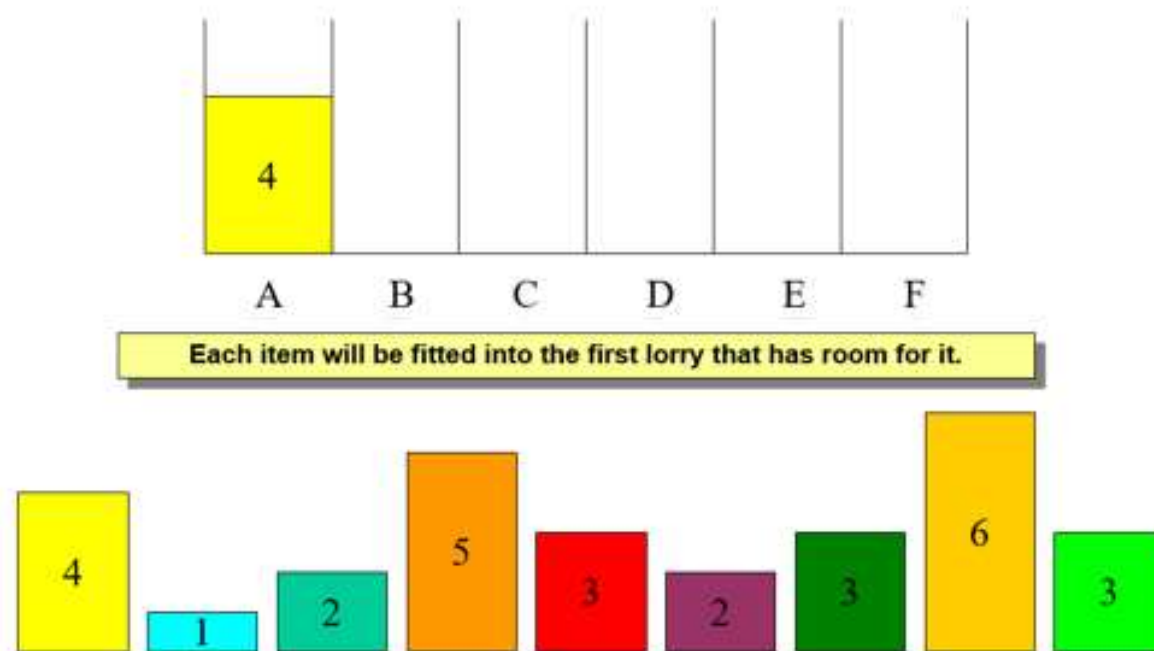
- Which algorithm was the most efficient for loading the lorries?
- What advice would this lead you to giving DPDazon when loading their lorries?
- What are the limitations of this model for this purpose? Does this change the advice you would give?

The “First Fit” Algorithm

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How many Lorries are needed?



The “First Fit Decreasing” Algorithm

Each lorry (A-F) has a capacity of 6.

Starting with the largest object (and then the second largest etc), fit each object into the first lorry that has room for it.

How many Lorries are needed?

