

History of platform scale

General information			
Respective blueprint	Scale		
Description	In this lesson, pupils will build a platform scale. Students will discover how it works and the historical background to its invention.		
Learning objectives	At the end of this session, pupils will be able to : <ul style="list-style-type: none"> • explain how a platform scale works • compare the masses of different objects • understanding the use of scales in its own cultural and historical contexts 		
Related curricular subjects	Mathematics		
Duration	1 hour		
Level of difficulty	Basic	Medium	Advanced
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inclusivity guidelines			
How to integrate students with SLD	<ul style="list-style-type: none"> • Formulate short, simple instructions that only require one action at a time. • If you give oral instructions, make sure you keep track of them in the form of pictograms or written on the board. • At the beginning of the lesson you can explain the aims of the lesson. • When you give instructions (oral or written), make sure to highlight the word of action so pupils know what they are expected to do. • When it's possible, you can show the expected result of the manipulation. 		
How to integrate students who work faster	<ul style="list-style-type: none"> • You can ask them to find objects in the classroom and compare their mass using the scales. When they have finished, let them explain to the rest of the class what they have discovered. • Get them to think about other ways of building a scale. 		

Step by step description of the lesson

Step 1: Introduction

Estimated time: 10 minutes

Form groups of pupils and give them all objects to classify from the lightest to the heaviest. For some objects, it will be easy to do this by weighing, as the difference will be marked, but others will have to find another solution. The pupils will naturally suggest using a weighing scale.

Step 2: Scale history

Estimated time: 15 minutes

The teacher gathers the pupils' initial conceptions by asking them if they know when scales were invented? The teacher can show various images of scales so that they realise that the tool has evolved considerably over time. The teacher briefly tells the story of the scale.

“ A scale or balance is a device used to measure weight or mass. These are also known as mass scales, weight scales, mass balances, and weight balances.

The traditional scale consists of two plates or bowls suspended at equal distances from a fulcrum. One plate holds an object of unknown mass (or weight), while objects of known mass or weight, called weights, are added to the other plate until static equilibrium is achieved and the plates level off, which happens when the masses on the two plates are equal. The perfect scale rests at neutral. A spring scale will make use of a spring of known stiffness to determine mass (or weight). Suspending a certain mass will extend the spring by a certain amount depending on the spring's stiffness (or spring constant). The heavier the object, the more the spring stretches, as described in Hooke's law. Other types of scales making use of different physical principles also exist.

Some scales can be calibrated to read in units of force (weight) such as newtons instead of units of mass such as kilograms. Scales and balances are widely used in commerce, as many products are sold and packaged by mass. (Wikipedia contributors, 2023)”

The teacher asks the pupils what type of scale would be useful for comparing the weight of two objects quickly and easily. The teacher suggests that they build a scale together.

Step 3: Construction of the scale

Estimated time: 35 minutes

The teacher asks the pupils if they have any ideas of how to make a scale and shows them the materials they have (a clothes hanger, cups, wool).

Build the scales according to the construction plan (can be done in small groups). Once the balance(es) has/have been built, let the students experiment by comparing the mass of several small objects that fit into the cups. Then try to choose very different objects (a fairly large, light object compared with a small, much heavier object) so that the pupils realise that mass does not depend on the size of the objects.

Step 4: Extension of the sequence

Estimated time: /

To extend the sequence, the pupils can be asked how exactly to define the mass of objects. The teacher asks if it is possible to define the exact mass of an object using a balance like the one we have built.

The students suggest using a digital balance. This is a good way of introducing the concepts of grams and kilograms and then constructing the mass chart.

Assessment activities

Activity 1: Self-assessment activity

Ask the students to self-assess their performance during the group activity, using the grid on page 7.

Self-assessment encourages learning and improves performance. Self-evaluation is systematically formative. Its aim is to highlight areas for improvement.

Activity 2: Mass comparison

You can suggest a number of different objects to be classified from the lightest to the heaviest. The pupil must use a weighing scale to compare the weights of the objects and verbalise their actions. This will enable the teacher to check that the pupils have understood the concept of mass and how a platform scale works.

Attachments

- Photos of different types of balance

References:

Wikipedia contributors. (2023). Weighing scale. Wikipedia.
https://en.wikipedia.org/wiki/Weighing_scale

Images of different types of scales



Figure 1 Weegschaal (unster) met 2 gewichten in brons. (50–200 B.C.E.). Gallo-Roman museum, Tongres, Belgium.

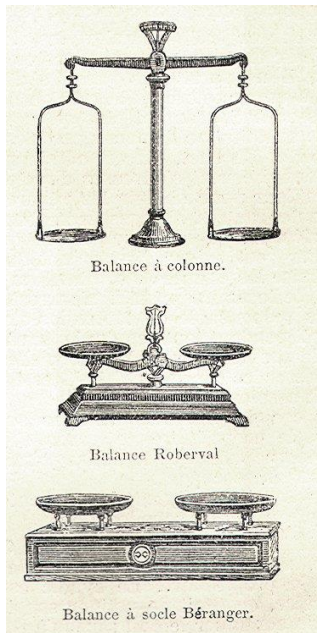


Figure 2 Three types of weighing scale (By A. Seigneurie). (1904). Wikipedia.
<https://commons.wikimedia.org/wiki/File:Balance.jpg>



Figure 3 Poussin, J. (2007, February 16). Balance à tabac. Wikipedia. https://commons.wikimedia.org/wiki/File:Balance_%C3%A0_tabac_1850.JPG



Figure 4 Balance a Fleau. (2006). Wikipedia. https://commons.wikimedia.org/wiki/File:Balance_a_fleau.jpg



Figure 5 Balance romaine. (2012). Palais du Louvre, France.

Self-assessment grid

Work in group

	😊	😐	☹️
I took part in organising and carrying out the task.			
I cooperated actively within the group.			
I respected the other group members at all times.			
I was able to recognise and accept the skills and knowledge of the other members of the group.			
Everyone took part in our group discussions			
We asked the other members of our group for help when we needed it.			
I respected the deadlines			
I've finished my work.			
I've made an effort and I did my best			
I knew how to ask for help when I needed it			
The manipulation helped me understand the concepts			
I'm proud of my work and the result I've achieved			
I enjoyed taking part of this activity !			

😊 = Absolutely / 😐 = Partially / ☹️ = Not at all

Teacher's comments :

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