Leonardo Da Vinci Bridge

General information	
Respective blueprint	Leonardo Da Vinci bridge
Description	In this lesson, pupils will build a Leonardo Da Vinci bridge. Students will discover how it works and the historical background to its invention.
Learning objectives	At the end of this session, pupills will be able to : • understand how Leonardo Da Vinci bridge works in its own cultural and historical contexts
Related curricular subjects	Mathematics – Sciences - History
Duration	2 hours

Level of difficulty	Basic	Medium	Advanced
	☐	☑	☑

Inclusivity guidelines	
How to integrate students with SLD	• Formulate short, simple instructions that only require one action at a time. For example, place stick 4 below stick 2 and 3. Check that the pupils complete the construction step by step. • When you give instructions (written), make sure to highlight the word of action so pupils know what they are expected to do → In this example, **place** stick 4 **below** stick 2 and 3. You can highlight the verb of action and the position. • When it's possible, you can show the expected result of the manipulation. • When creating groups, try to place students who are having difficulties with students who are generally more advanced so that they can help each other (a dyspraxic student will have a lot of difficulty with the fitting of the bridge elements).
How to integrate students who work faster	• Ask the pupils who finished their tasks earlier to do some research on Leonardo Da Vinci inventions that are still used now. They can present their findings to the class orally or with a poster.

Step by step description of the lesson

Step 1: Introduction	**Estimated time: 10 min**

Show photos of different works by Leonardo da Vinci (the Mona Lisa, the parachute, Vitruvian Man, the ancestor of the helicopter) and ask the pupils what these different works have in common.

Some pupils should recognise the Mona Lisa, but if they can't work out what they have in common, let them ask you questions or do some online research.

Step 2: Leonardo da Vinci's identity card	**Estimated time: 25 min**

In small groups of no more than 2-3 students, ask them to do some research (via the Internet or a collection of documents you have compiled) to complete Leonardo da Vinci's identity card.

First name Last name :

Place and date of birth :

Short biography :

Profession(s) :

His best-known inventions:

Step 3: Historical and geographical context	**Estimated time: 25 minutes**

➔ Europe and Italy at the time of the Renaissance: compare a 15th century map with a current map and highlight the differences and similarities.

➔ The Renaissance: Identify the historical period in which the Renaissance took place, the historical context of the country during the Renaissance, conflicts in Europe during the Renaissance.

Step 4: Military engineering by Leonardo da Vinci	**Estimated time: 10 minutes**

Context: Leonardo da Vinci, although he disliked war, was employed by European leaders who regularly asked him to invent new weapons of war.

Show photos of weapons of war and ask if they recognise the tools, then show a photo of a self-supporting bridge and ask the pupils what the advantages of this bridge are.

- There are no nails or screws
- Easy-to-find materials
- Easy to assemble and dismantle quickly

Explain that Leonardo da Vinci designed this bridge so that people could move around quickly in wartime and leave no trace behind.

The teacher suggests that groups of 2 pupils build self-supporting bridges like those designed by Leonardo da Vinci.

Step 5: Construction of the bridge	**Estimated time: 35 minutes**

Pupils follow the construction plan and build in groups of 2. Variations can be made between groups; some have to build a longer or shorter bridge, using different materials, etc.

When the bridge is built, pupils can test its solidity by trying to place small objects on it.

Step 6: Feedback on the manipulation	Estimated time: 15 minutes

After the experiment, the teacher asks the pupils questions to find out how the experiment went (did you find it difficult, etc.) and how the bridge works (how does it hold together on its own, why do we not need nails or glue, etc.).

Explanation:

Leonardo's bridge owes its stability solely to friction between the various embedded construction elements. If pressure is exerted on the bridge, the force of friction also increases, so the bridge stabilises even under load - although the maximum load is limited by the strength of the construction material.

Assessment activies

Activity 1: Self-assessment activity

Ask the students to self-assess their performance during the group activity, using the grid on page 8.

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

Activity 2: Assessment of the search for information to create an identity card for a historical figure.

Students can be assessed on the quality of their research (whether online or using a document collection) with the aim of creating an identity card for a historical figure (for example, on another great master of the Renaissance).

Different skills can be assessed (formatively or certifiably if the skill has already been explained and worked on)

- Ability to find relevant information;
- Ability to synthesise information;
- Accuracy of historical facts;
- Correct location of historical facts on a map of Europe;
- Ability to work in a team;
- Written expression.
➔ See evaluation grid page 9.

Attachments

- Introduction pictures
- Leonardo da Vinci's identity card
- Military engineering by Leonardo da Vinci

References:

Rodesch, J., & Glesener, L. (2014). Construisez un pont de Léonard !
https://www.science.lu/fr/experience-historique/construisez-un-pont-leonard
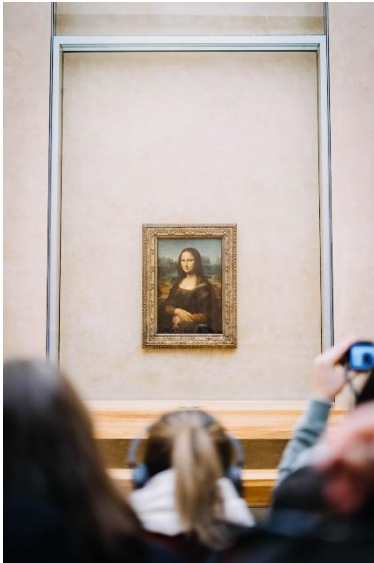
Figure 1 Dyson, Z. (2019, May 30). le persone di fronte al dipinto della Monna Lisa erano appese al muro all'interno della stanza. Unsplash. https://unsplash.com/fr/photos/q8sTwttqKFY

Figure 2 Vitruvian Man. (n.d.). Canva. https://www.canva.com/photos/MAEJFs_x55o/

Figure 3 Da Vinci Parachut. (n.d). Canva. https://www.canva.com/photos/MAC8xycTfmA/

Leonardo da Vinci's identity card

Picture

Name and last name : ....

Place and date of birth : ....

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Short biography : ....

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Profession(s) : ....

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His best-known inventions:

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Military engineering by Leonardo da Vinci

Figure 4 Da Vinci crossbow. (n.d). Canva. https://www.canva.com/photos/MAC4blnVy5I/

Figure 5 British museum. (n.d.). Tank from Leonardo Da Vinci [Leonardo da Vinci manuscript]. British Museum. https://www.sciencesetavenir.fr/archeo-paleo/patrimoine/la-preuve-par-la-3d-du-genie-de-leonard-de-vinci_137910

Figure 6 Leonardo Da Vinci Bridge. (n.d). https://aleteia.org/2017/06/20/how-to-build-a-bridge-leonardo-da-vincis-style/

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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ID card – evaluation grid

	Note
Written expression (on the material presented)	
My sentences are well constructed.	/2
My handwriting is neat and legible.	/1
I didn't leave any spelling mistakes.	/2
Team work	
I cooperated actively within the group.	/1
I respected the other group members at all times.	/1
I respected the deadlines	/1
I was able to recognise and accept the skills and knowledge of the other members of the group.	/1
I knew how to ask for help when I needed it	/1
Research and presentation of information	
The historical facts presented are accurate.	/1
All the information can be found on the identity card (surname, first name, age, date and place of birth, short biography).	/5
I have summarised the information presented, selecting the most important.	/1
I have correctly located the historical facts on the map of Europe.	/1
The historical facts are correctly placed on the timeline.	/1
The information presented is sufficient and useful for understanding	/1
	/ 20

STEAM IN TIMES

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