



Chain Drive Mechanism: Leonardo da Vinci' Bicycle

Age group/class: 15 – 16 years old

Lesson title: Chain Drive Mechanism: Leonardo da Vinci' Bicycle

School Discipline: Mechanics

Key concepts: application of mechanics in real life

Aims:

- Recognize the practical applications of mechanics' studies
- Introduce Leonardo da Vinci' discoveries

Skills developed: observation, analysis and research

Materials/Equipment needed:

- <https://www.youtube.com/watch?v=9xtuXJo364> (to be used in the introduction activity to provide some basic information about Leonardo da Vinci)
- <https://eloquent-ramanujan-887aa5.netlify.app/da-vinci.html> (to be used for the practical VR experience)
- VR headset
- VR video / link
- <https://www.youtube.com/watch?v=b7hylqLxvPQ> (to be used for the follow-up activity)
- <https://www.youtube.com/watch?v=fShZebTq8qk> (to be used for the follow-up activity)

Lesson plan:

Stages	Description of activity	Time
Preparation before the lesson	<p>If this is a first VR experience for students – go through the safety rules:</p> <ul style="list-style-type: none">– Learners are to sit down whilst using the VR glasses and not hold anything in their hands, unless the experience is of such a nature that it requires you standing, in which case, ensure enough space is allowed around all students.– Learners will be told to expect a feeling of vertigo. If it gets worse, students must remove VR glasses.– Learners need to know how to adjust the viewing focus before using the headsets.– Learners must not use the headset when they are: tired, need sleep, under emotional stress or anxiety, when suffering from cold, flu, headaches, migraines as this can worsen their susceptibility to adverse reactions.– Learners should be given the choice to opt out of using VR.	





Introduction	<p>Share Learning Intentions with students</p> <p>The aims of the current lesson plan are the following:</p> <ul style="list-style-type: none"> – Recognize the practical applications of mechanics’ studies – Introduce Leonardo da Vinci’ discoveries <p>School subjects are usually felt as far from real-life, especially in students’ perception. The reality is completely different, as what is written in school books has a direct application in real life. And some of the objects students are more familiar with are the natural descendants of inventors’ discoveries. The same inventors who populate their school books. The current lesson plan aims at making this link even more evident.</p>	10 min.
Initial Immersive Experience	<p>“Let’s move to Florence and let’s enter the Leonardo da Vinci museum”: https://eloquent-ramanujan-887aa5.netlify.app/da-vinci.html</p> <p>Learners put on the VR headsets and explore the video at their own pace for about 10 minutes.</p>	10 min.
Guided Immersive Experience	<p>After a free exploration of the VR resource, teacher asks students to focus on the first Leonardo’ discovery analysed within the video: the chain drive mechanism.</p> <p>The chain drive mechanism and its functioning are fully explained by the teacher.</p>	20 min.
Follow up	<p>1) Work group</p> <p>Students are divided into 2 groups and are asked to list the possible real-life applications of the chain drive mechanism.</p> <p>2) The extraordinary history of Leonardo da Vinci’ Bicycle</p> <p>Students are asked to watch a video focusing on Leonardo da Vinci discoveries. Amongst them, one of most debated ones is that of the bicycle: https://www.youtube.com/watch?v=b7hylqLxvPQ (minutes 15 to 18).</p> <p>3) Practical applications of mechanics</p> <p>Mechanics is everywhere: https://www.youtube.com/watch?v=fShZebTq8qk</p>	<p>10 min.</p> <p>10 min.</p> <p>10 min.</p>
Formative Assessment	<ul style="list-style-type: none"> – “What is the chain drive mechanism?” – “How many alternatives are there for the chain drive systems?” – “List 3 discoveries done by Leonardo da Vinci” – “List 3 practical applications of mechanics in real life” 	5 min.

