**The carillon mechanical clock**

**Age group/class:** 14 years old

**Lesson title:** The carillon mechanical clock

**School Discipline:** History

**Key concepts:** Carillon, Clock history

**Aims:**

* Historical Time Measurers
* What is a carillon clock?
* Classic Mechanical Clocks

**Skills developed**: observation, analysis and research

**Materials/Equipment needed**:

* VR headset
* VR video / link  [https://eloquent-ramanujan-887aa5.netlify.app/palat.html](https://eloquent-ramanujan-887aa5.netlify.app//mediterranean-vegetation%20%20)
* External links Isaac Habrecht's Carillon Clock: The Rolls-Royce of Renaissance clocks - <https://youtu.be/M8sFjXeGPSI> (The British Museum)

**Lesson plan:**

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| --- | --- | --- |
| **Stages** | **Description of activity** | **Time** |
| **Preparation before the lesson** | If this is a first VR experience for students – go through the safety rules:   * 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** | Share Learning Intentions with students  The aims of the current lesson plan are the following:   * Historical Time Measurers * What is a carillon clock? * Classic Mechanical Clocks   Teacher is asked to provide students with some basic information  The Sundial  sundial animation  The sundial is probably one of the earliest ways in which people were able to keep track of time. It utilized the angle of the sun in the sky to cast a shadow from the gnomon (the part of the sundial that sticks up) onto the dial. The time was then determined by where the shadow was laying when the gnomon was facing north. Because the sundial is dependent upon the sun's location in the heavens it has several flaws. The most obvious one is the fact that it requires direct sunlight to even give the time at all so on an overcast day the time would have been relatively unknown.  The other main flaw a sundial has is that the length of the hour changes with the seasons of the earth. This has to do with the fact that daylight lasts longer in the summer than in the winter and that the orbit of the sun is not circular, or in other words "uniform". So if one wanted to have everyday be the same length then the mean time would have to used rather than the apparent time which sundials naturally give.  Another flaw with sundials is that they have to be made specifically for a certain location because the angle the sun has in the sky is different at all latitudes on the earth. For instance, "a sundial brought to Rome (41°54? N) from Catania Sicily (37°30? N), in 263 B.C. told Romans the wrong time for 100 years" (encyclopedia Britannica). | 5 min. |
| **Initial Immersive Experience** | “Let’s immerge into the Palace of Culture in Iasi, Romania and discover together a carillon mechanical clock”:  https://eloquent-ramanujan-887aa5.netlify.app/palat.html  Learners put on the VR headsets and explore the video at their own pace for about 10 minutes. | 10 min. |
| **Guided Immersive Experience** | After a free exploration of the VR resource, the Guided Immersive Experience is aimed at identifying some features  Classic Mechanical Clocks  Most of the modern clocks now utilize these next few methods for keeping time. All but the quartz watchs use a device known as an escape mechanism. This escape mechanism serves a very inportant purpose because it regulates the forces applied to turn the clock gears in such a way that they move only a certain amount per second. I will give a brief overview of the physics behind escape mechanism but for a very in depth look into their function and how to design your very own I would recommend reading the "Clock Escape Mechanisms" link to the right, it is very insightful and readable.  The escape mechanism works by transfering the force driving the gears to turn (whether it that force is caused by trasfering the gravitational force from a weight or the force transformed from battery power) into an oscillating mechanism which could be in the form of a pendulum, a spring, or a verge-and-foliot. Each oscillating mechanism has its own frequency of oscillation and period of movement which are used to determine the amount of time each oscillation takes. The oscillating pieces work as the clock's counting mechanism and through the use of gears - or in the case of digital watches electronics - the clock is able to keep accurate time.  SPRING LOADED  wokings of a spring clock  PENDULUM / WEIGHT POWER  wokings of a pendulum clock  *History - Origins*  The carillon originated from a combination of traditions. In medieval times, swinging bells were first used as a way of notifying people of the time of day, imminent church services, and other events such as fires, storms and wars. In the 14th century, clockworks were connected to newly invented weight-driven, revolving drums. Outfitted with pegs, they trip wires that in turn strike a small set of bells with hammers.[46] Clock chimes eventually began playing simple melodies (like the Westminster Quarters) preceding the hour strike. The Low Countries—present day Belgium, the Netherlands, and the French Netherlands—were most interested in the potential of using bells to make music. In this region, bellfounding had reached an advanced stage relative to other regions in Europe.  The earliest records of bells being played with some form of primitive keyboard date to the turn of the 16th century. On 30 December 1482, the city of Antwerp appointed a man named Eliseus to play a small set of bells in St. Michael's Abbey, which had been outfitted with a system of "ropes and sticks". In 1510, Jan Van Spiere, a prominent local clockmaker, installed "a keyboard in the tower to chime" the set of nine bells in the Oudenaarde Town Hall.  Drawing of a man playing a carillon.  Oldest known picture of a person playing a carillon, from De Campanis Commentarius (1612) by Angelo Rocca | 20 min. |
| **Follow up** | Once students have a clearer idea about the carillon mechanical clock, it’s time to improve their skills.  Teacher presents the following text:  *A carillon (*[*US*](https://en.wikipedia.org/wiki/American_English)*:*[*/ˈkærəlɒn/*](https://en.wikipedia.org/wiki/Help:IPA/English)[*CARE-ə-lon*](https://en.wikipedia.org/wiki/Help:Pronunciation_respelling_key)*or*[*UK*](https://en.wikipedia.org/wiki/British_English)*:*[*/kəˈrɪljən/*](https://en.wikipedia.org/wiki/Help:IPA/English)[*kə-RILL-yən*](https://en.wikipedia.org/wiki/Help:Pronunciation_respelling_key)*;*[*[2]*](https://en.wikipedia.org/wiki/Carillon#cite_note-FOOTNOTE%22Carillon.%22_''Oxford_English_Dictionary''-2)*) is a*[*pitched percussion instrument*](https://en.wikipedia.org/wiki/Pitched_percussion_instrument)*that is played with a*[*keyboard*](https://en.wikipedia.org/wiki/Musical_keyboard)*and consists of at least 23*[*cast bronze*](https://en.wikipedia.org/wiki/Bell_metal)[*bells*](https://en.wikipedia.org/wiki/Bell)*in fixed suspension and tuned in*[*chromatic order*](https://en.wikipedia.org/wiki/Chromatic_scale)*so that they can be sounded*[*harmoniously*](https://en.wikipedia.org/wiki/Harmony)*together. Housed in*[*bell towers*](https://en.wikipedia.org/wiki/Bell_tower)*, carillons are usually owned by churches, universities, or*[*municipalities*](https://en.wikipedia.org/wiki/Municipalities)*. The bells are struck with clappers connected to a keyboard of wooden batons played with the hands and*[*pedals*](https://en.wikipedia.org/wiki/Pedal_keyboard)*played with the feet. Often, carillons include an automatic system through which the time is announced and simple tunes are played throughout the day.* | 15 min.  . |
| **Formative Assessment** | * Which ares the origins of a Carillon? | 5 min. |