The scenario

Subject	**Acoustics / Chladni Plates**
Length	6:18
Main objectives	To analyse the properties of bodies and sound, to recognize the resonance characteristics of the body.
Detailed objectives	
Structure and description of experiments:	
1. Introduction	Description: The motivation for the experiment will be to investigate the properties of sound, changing the frequency of sound and the effect of changing the frequency on the behaviour of vibrating bodies.
2. Main subject	Description: Get to know the resonance frequencies of oscillating plates, places that are at rest and which oscillate and the individual shapes of Chladni plates at individual resonance frequencies.
Part 1	
(0:40) **Experiment 1 (0:54)**	**Tools:** vibrating speaker, tin plate, grains of salt, frequency generator - mobile phone **Description:** Place a metal plate on the vibrating speaker, pair the speaker with a mobile phone that will generate sounds of certain frequencies. Sprinkle grains of salt evenly on the vibrating plate and watch what happens to the grains. In places where the plate vibrates, the grains bounce off and cluster in places where parts of the plate do not vibrate (we start with a frequency of 140 Hz). Then we gradually increase the frequency of the sound and watch how the individual grains of salt rearrange themselves. In the case of sound amplification - resonance, we stop the increase in frequency for a while and observe the patterns that have formed at the given resonance frequency (e.g. 390 Hz). The places where the grains of salt have settled on the board do not vibrate. If we sprinkle grains of salt on places where there is no salt, they will immediately bounce from the given positions - these are the places where the plate oscillates - vibrates. Subsequently, we increase the frequency of sound and vibrations of the board and observe how the patterns change - the vibrations of individual places of the board (e.g. 630 Hz). At the next resonance frequency (795 Hz), we sprinkle salt grains in places where they are not and observe how they bounce. We ended our experiment at 1550 Hz, but in practical implementation we can also proceed to higher frequencies. **Questions:** Why do the grains of salt stay still in some places on the board and not in others?

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	Conclusions: Depending on the board and the sound frequency at certain resonant frequencies, so-called Chladni plates that characterize the places of the plate that are at rest during the vibrations of the plate.
3. Summary, evaluation and notes	The task is suitable for elementary school children who like to pour salt on the board and are unable to cover the entire board, because at the resonance frequency of the board, the grains of salt bounce off the oscillating points of the board. **Level**: primary school (ISCED 2 / 9th grade)

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