

# Three-stage study modules in Finnish physics education at secondary school

*Antti Lehtonen, Kirkkoharju school, Kirkkonummi, Finland*

## How to get the mp3 device to be more hearing-friendly?

### 1. Scenario

Magazine article **The burden on young peoples' hearing**, dealing with noise which can damage hearing when the exposure is long-lasting. The article deals especially with mp3 devices.

To sum up, it would be wiser to buy good quality, personally adapted headphones, than turn the sound up to be able to listen to all the frequencies of music.

### 2. Inquiries

Students explored sound production and propagation. For example, the influence of the medium was observed with a mobile phone and a freezer bag.



Equipment used in the module for studying sound

### 3. Decision making

Based on the knowledge learnt, students answered the following questions: Why can earphones easily damage hearing and how can they be made more hearing-friendly? Finally, in groups, students planned their own earphones.

### Experiences

Students (7<sup>th</sup> graders) liked this form of study. The three-stage model functioned well, the students learned the properties of sound and three-stage model also supported students' thinking and decision making.

## What is the best way to spin a generator?

### 1. Scenario

It is a grey and stormy autumn night. You have decided to arrange a party at home. You would like to get the "partyglitter" to glitter properly when the bright light reflects on it. .

..You ensure the function of lights by installing a generator to act as a spare source of energy. With the use of a board, construct a model of the place where the party is to be held and install one LED lamp on the ceiling. How will you get the room lit up?

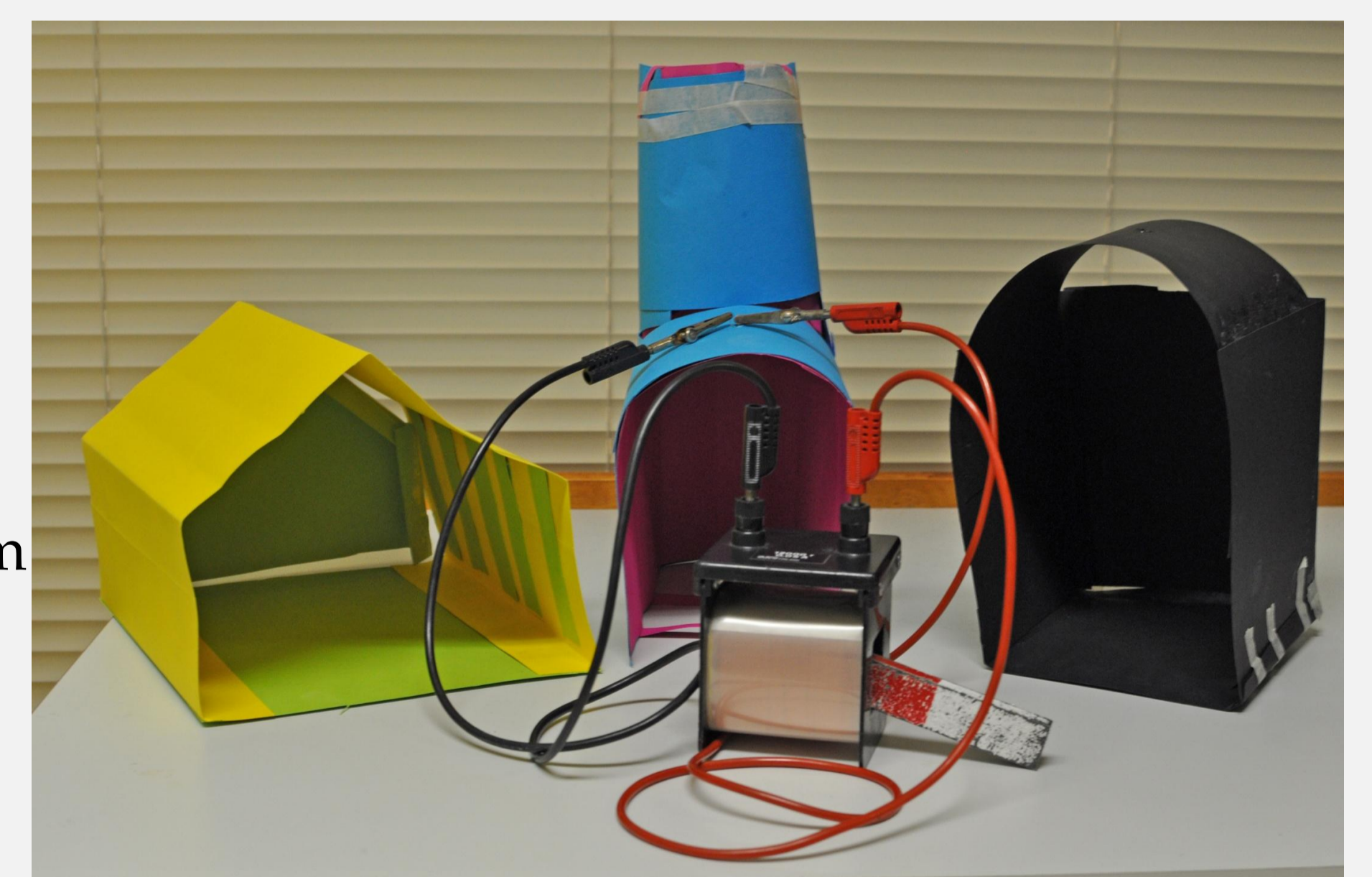
### 2. Inquiries

Students experimented with electricity production and electromagnetic induction using coils, bar magnets, wires and voltmeters. Both closed and more open experiments were used.

We actually got electricity!  
Some models of the party room made by the students.

### 3. Decision making

Students used their knowledge about electromagnetism, deciding what would be the best way to spin a generator and why.



### Experiences

Students (9<sup>th</sup> graders) participated well in the work. If someone in the group didn't understand something, other students were able to help and the teacher had enough time to observe and evaluate the students' work. Students who didn't normally participate in lessons, were eagerly involved in this study.



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