



I do, I discover...

Inquiry Based Science Education with ISTIC and LAMAP

Published on *I Do, I Discover* (<http://istic-ibse.org>)

[Home](#) > Measuring wind pressure

Authors : Alain Chomat(plus d'infos)

Summary : On the basis of the question, "How to measure wind speed? "Participants have to imagine and produce a mechanism to answer the question. By doing so, they will be led to follow an investigation process, a process that they will subsequently characterise. They are asked to propose a sequence for class (or at least a session) taking into account the different moments of students' and teachers' activities related to this process. It is a first training session on the investigation process for school teachers but it can also constitute a piece of information for different members of the educational community.

Publication : 12 September 2012



Note :

No votes yet

Measuring wind pressure

Context

- Theme
 - Training of teachers on the investigation process on the basis of a mainly technological activity, "produce a mechanism to measure wind speed"
- Audience
 - About ten primary school teachers
- Durée : 3 heures

Unfolding

- **Preparation of the room :**
 - Spread the material on a table. It should be visible to every one
 - Caps, straws, skewers
 - Tape, glue, string, elastic
 - Scissors, paper punch, cutters
 - golf balls or tennis balls, polystyrene balls, skin balloons
 - modelling paste
 - Sand
 - Small empty plastic bottles
 - Etc.,
 - Prepare tables for groups of 3 to 4 persons
- **Distribution of forms**
- one copy per group
 - Stages of work (annex 1) (items 1 and 2 correspond to what can be done in the classroom)
 - Proposed task (annex 2)
 - Draw attention to the words "measure", "speed", and "wind" without discussing them immediately (this will be done later, during the analysis stage)
 - Estimate => qualitative
 - Measure => quantitative (the place of measurement in science may be a subject of further development)
- **Participants should elaborate an experimental protocol (allocated time: 30 minutes)**

- In writing
- Text + drawing
- Specifications / technical constraints / material needed
- In principle participants are allowed to take the material if the facilitator has agreed (consent if the written protocol is complete: diagram of the mechanism + material needed + procedure regardless of the validity of the proposal)
- If ideas are not forthcoming:
 - 1 member of the group comes and sees the available material
 - If it is of no effect, he can take some material, which enables the group to "explore"
- Participants elaborate their mechanism (about 30 minutes)
 - Pay attention to written records: if the mechanism evolves, the notebook must show this evolution (importance of written records)
 - Trials: does the final mechanism respond to the need?
- The various groups present their achievements (10-15 minutes per group)

Each group appoints a rapporteur who presents the group' work in 10 minutes.

Some examples of proposed mechanism:

- A ball hanging by a thread, the ball goes higher or lower depending on the speed of the wind;
- The same but with several balls of different masses;
- A reel that runs faster or slower;
- A reel which, while turning, wraps a greater or lesser length of string;
- A straw sliding on a taut wire, which is more or less far;(if the friction is greater, the straw does not move, if the wind speed compensates or is greater than the friction, it moves to the end of the wire, regardless of its length)

Discussions and questions during presentations: it is the trainer plays a regulating role, not to give the right answer but to prompt discussion.

- Analysis of implemented mechanisms (1 hour)

It is, firstly, an awareness of the path which led to a proposed answer to the assigned task:

Pre-requisite: What is the knowledge and know-how that you need to answer the question?

- - Come back to the words "measure", "speed" and "wind"
- What are the notions or knowledge that can be constructed on the basis of this activity?
 - Scientific point of view
 - Measure:
 - Choice of unit
 - Choice of instrument
 - Equality of measures (can they be compared?)
 - Sum of measures (can speeds be added for instance? Still not for speed, it depends on the wind direction)
 - Force:
 - Mechanism with a ball: the higher it rises, the more the stronger the wind (in this case the force of the wind compensates for the weight of the ball - remember that weight is the expression of the force of gravity)
 - Mechanism with a reel: the more it turns, the more the stronger the wind (in this case the wind produces an effect in form of kinetic energy)
 - Wind
 - Association of air and movement
 - Association of air and matter
 - Technological point of view
 - Does the device respond to needs? => Use function
 - Is it + or - beautiful than another? => esteem function
 - Is it + or - solid than another? What are the interactions between the different elements? => technical functions
 - can it be made with less components, inexpensive components? => economic function

Conceive an object: stages, consciously or unconsciously followed by participants, and the trainer helps to generate them.

Need => idea => constraints => specifications => solutions => manufacturing

- some possible know-how:
 - Use a measuring instrument
 - break down the construction phases
 - Make a rotating device with a minimum friction
- Prepare a sequence (after 1 h 30 to 2 h) or a session of a given sequence
 - Reference to the syllabus
 - Cycle 1
 - Distinction object/substance
 - Act on the matter

- Manufacturing of objects
 - Cycle 2
 - Existence of air
 - Elaboration of scale models and constructions
 - Lengths and time measurements
 - Cycle 3
 - Air, the cumbersome nature
 - Simple examples of sources of reusable energy
 - measurement of time and units
 - Mechanical objects and transmission of movements
- Choice of a knowledge or a competence to give priority to
 - The situation is very rich, so there is a need to choose some knowledge and competences to demonstrate
 - Example, for the measurement, it can be the manufacturing of a measuring instrument
 - Draft of a sequence: in case the production is reduced to a session, it will be necessary to situate the session in a scheme of work (previous session, following session)
 - the situation or the initial question
 - students' task
 - organisation of students' work
 - moments of group work
 - moments of sharing
 - writings
 - moments of structuring
 -

Note : the DA2 sequence « [Teaching sciences in school](#) », « How to know where wind comes from? » could be cited as possible reference, so could constitute a support for this training session.

Stages of work

1 - Complete the requested task:

**Read the text of the task Conceive an experiment (Written protocol)
Choose the material among the ones proposed**

2 - Presentation of projects Discussions and questions

3 - Analysis of the experimental situation implemented Pre-requisites (What do you need to know to complete the task). The notions or knowledge that can be constructed Necessary competences or know-how

Include this experimental situation in a lesson

Place in students' school career

Choosing the knowledge or competence to give priority to

Draft sequence: the initial situation or question

Students' task

Organisation of students' work

Time for group work

Time for sharing

Writings

Time for structuring

(See also the document indicating the outline of a sequence)

Annex 2

MEASURING WIND PRESSURE

How to estimate wind pressure?

We propose a mechanism which enables estimating wind pressure and comparing different winds or the same wind at different times.

You have a set of materials that you can use or not at your disposal. You also have the possibility of adding other materials.

List of available materials:

Small empty bottle;

Skewer;

Toothpick;

Wooden stick;

Thin Cardboard;

Cap;

Pearl;

Polystyrene ball;

Thread;

Glue tube;

Scissors;

And Wind source.

Source URL: <http://istic-ibse.org/?q=en/node/14214>