

TEACHER'S GUIDE

VOLVO





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Experience a technological design challenge in the comfort of your own classroom. Create an invention that will enable you to move a mass using wind power OR make an invention that will allow a light ball to reach the ground without lighting up.

Invent, create, test... and have fun!

Duration : 1 school period (60 or 75 minutes)



Are you familiar with the Fabrik exhibition/ workshop? What if part of Fabrik came to you, in the comfort of your own classroom?

Educators from the Montréal Science Centre are offering to visit your class and present some creative challenges involving invention and the assembly of all kinds of objects. Based on the tinkering movement, these challenges, lasting one period, relate to the Québec Education Program and offer students an experience where the joy of learning leads to the acquisition of new competencies. Working alone or in teams, visitors of all ages must come up with technological solutions and build them from the hodgepodge of materials at their disposal. It might be a racing car, a parachute, a catapult or a floating structure...anything is possible. Participants think, experiment, and above all, have fun, because in Fabrik, no idea is a bad idea.



Available exclusively to schools located between 80 km and 200 km from the Montréal Science Centre AND

Offered exclusively to special education classes in the greater Montreal area (ASD - TEACCH, SLD-RD, SSM-BD) Activity specially adapted to the student's needs

WHAT IS TINKERING?

Tinkering, one of the key trends in the maker movement, involves learning with your hands. When you tinker, you are using principles that patent makers have applied in Quebec for generations.



Test Quickly and Often

Does it work? There's only one way to find out: test it! So you construct, you test... and you begin again! At Fabrik, we experiment with materials. And we love iterations.



Collaborating and Pollinating Ideas

We often compete with our peers, but not at Fabrik where collaboration is the rule. And the emphasis is on the creative process rather than on performance. There are no "corporate secrets" here: knowledge sharing is encouraged and imitation is permitted. "Good artists copy; great artists steal," said Steve Jobs, who "borrowed" that quotation from Picasso.



Mistakes Allowed

A mistake is a learning opportunity. There are no "right answers", but an infinite number of solutions. A mistake is viewed as an opportunity to learn and to improve the prototype. It has positive value.



Autonomy

Students are given an initial goal that they can modify as they go along without continually referring to the educator or the teacher for advice. It is up to the students to experiment. Did they finish early? No problem! A series of supplemental challenges will test the mettle of even the most adept.



Authenticity

To make objects, you need real tools and real skills. You also need to be careful and it can be noisy Fortunately, our experienced educators are there to oversee the entire process.



Enjoyment

... is key. Your students will be involved as never before and will persevere despite the occasional frustration. Your challenge will be to get them to stop.



A FOUR-STEP PEDAGOGICAL APPROACH

O Challenge

With very few instructions, the class is quickly given a challenge:

- Protect a ball from shock in free fall.
- Construct a wind-powered engine capable of moving a mass.

Output Construction

Working in teams of 2 or 3, students practice the principles of tinkering. "Creativity means inventing, experimenting, taking risks, breaking rules, making mistakes and having fun," said Mary Lou Cook, artist, minister and more. That sums it up.

The first challenge provides instant success for everyone, after which the students' ingenuity — including that of little geniuses — will be put to the test through a series of increasingly difficult challenges. The progression is adapted to the rhythm of each pupil (differentiation).

OPresentation

After about half an hour of intense work, each team presents their prototype. On what principles did they base it? What are they most proud about? What difficulties did they face and how did they overcome them? You will be amazed at what your students can accomplish. In the end, whether the prototype passes the test or not, it attests to the tenacity and creativity of each student.

Dismantling

Everything that was assembled must be disassembled. This encourages students to put things away at home and at school, to the delight of parents and teachers. Now it is up to you to follow up with additional tinkering challengers that are easy to do. Who said science has to be complicated?



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DO KIDS LEARN AT FABRIK?

Tinkering is an excellent way to put the disciplinary competencies of the *Quebec Education Program* in science and technology into practice, while at the same time making connections to elements of the *Progression of Learning*.

Tinkering triggers the retention of concepts while creating an emotional link with the student. Your students will remember their innovations and will be better able to contextualize their learning.

Closely related to Pratical component of science and technology curriculum

Links to several aspects of the Progression of Learning, depending on the proposed prototypes:

- Gravity.
- Friction.
- Mechanics.
- Assembly techniques.
- Etc.