



Saving gas means cheaper bill

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Agenda

- Boiling water and pasta
- Cooking pasta in a different way
- How micro:bit could be useful
- How to set up the experience: a proposal
- Conclusion



Boiling water and pasta



Boiling water & Pasta

In 1799 Sir Benjamin Thompson, Count Rumford analyzed some cooking process.

He discovered that these processes often rely on beliefs with no scientific basis



Photo Credit Patrice Lucenet Piprod Fotofolia



Boiling water & Pasta

Thompson discovered that cooking pasta is only related to the temperature reached by water.

If we keep water boiling during cooking process, accordingly with Thompson, we only waste combustible



Sir Benjamin Thompson, Count Rumford



Boiling water & Pasta

All the chemical processes beyond cooking pasta happens at temperatures lower than 100 degrees.

As a consequence is not useful to maintain water at a boiling temperature





Cooking pasta in a different way

Cooking pasta

There are three key factors in cooking pasta process:

1. The speed of penetration of water inside pasta
2. The gelatinisation of starch
3. The denaturation and coagulation of gluten

All these processes happen at a temperature lower than 100°
Celsius

Cooking pasta

As a consequence it is unuseful to maintain water boiling.

Fire could be turned off and if the pot maintain the right temperature for the right time, pasta could be cooked in the same way.

This could help to save gas, and if we think that almost everyday we are cooking pasta: the cost saving could be valuable.



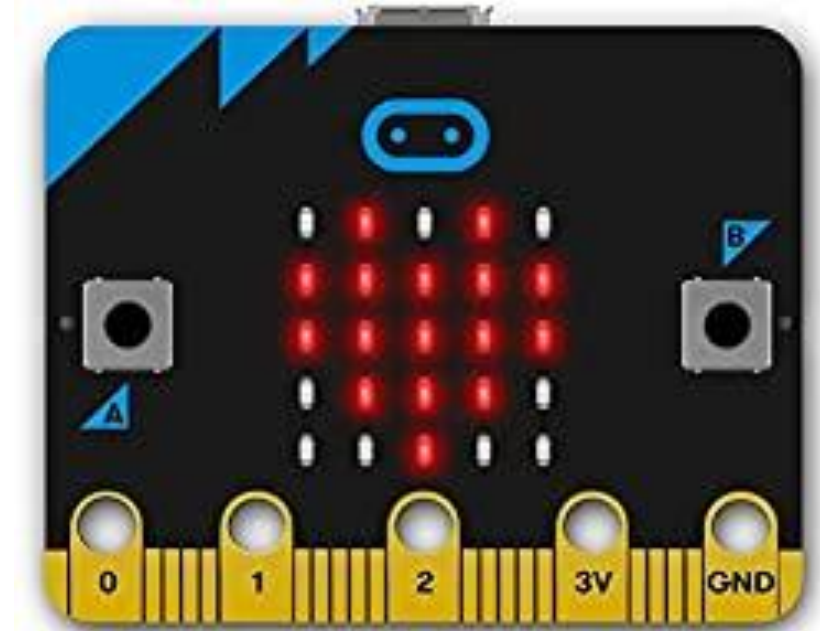
How Micro:bit could be useful?



How Micro:bit could be useful?

Micro:bit has a «in house» digital temperature sensor.

The sensor, for working properly, needs a coding activity and the temperature could be shown on the dot matrix.





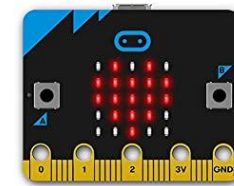
How to set up the experience: a proposal



How to set up the experience

The most difficult thing is to understand the right distance of micro:bit from the pot for gathering the temperature.

It is important to make some tests



Distance???





How to set up the experience

Obviously, different materials have a different level of thermal conduction (i.e. aluminium or steel).

So, it is important to make some test for a better understanding about which pot could be the best fitted for our experience.



Aluminium



Steel



How to set up the experience

It is a matter of fact the quantity of water should be always the same otherwise experiment data are failed.

Water has a thermal conduction itself!!!

How to set up the experience

Accordingly with Bressanini's lecture, the most important thing is to understand how long the pot could keep the right temperature (between 100° and 90°) for cooking pasta.

Micro:bit could easily monitor the temperature continuously

How to set up the experience

At the end of the experience, students should build:

1. A graph Time/Temperature for identifying properly the right area for cooking with fire off.
2. An estimation about the quantity of gas that could be saved by a family.



Conclusion



Conclusion

The amount of gas saved in a single cooking process could be poorly relevant, but if we think that this kind of approach could be made, potentially, by hundreds of thousands of families: the scenario changes in a meaningful way.



Thank you for your attention



Picture from the movie «Un americano a Roma», Starring Alberto Sordi

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