

# Data-logging in primary schools – studying thermal equilibrium

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## 2. Objective

The aim of the study was the evaluation of the usefulness of experiments using data-logging and real time graphs to enhance learning about temperature, thermal isolation and thermal equilibrium in primary schools.

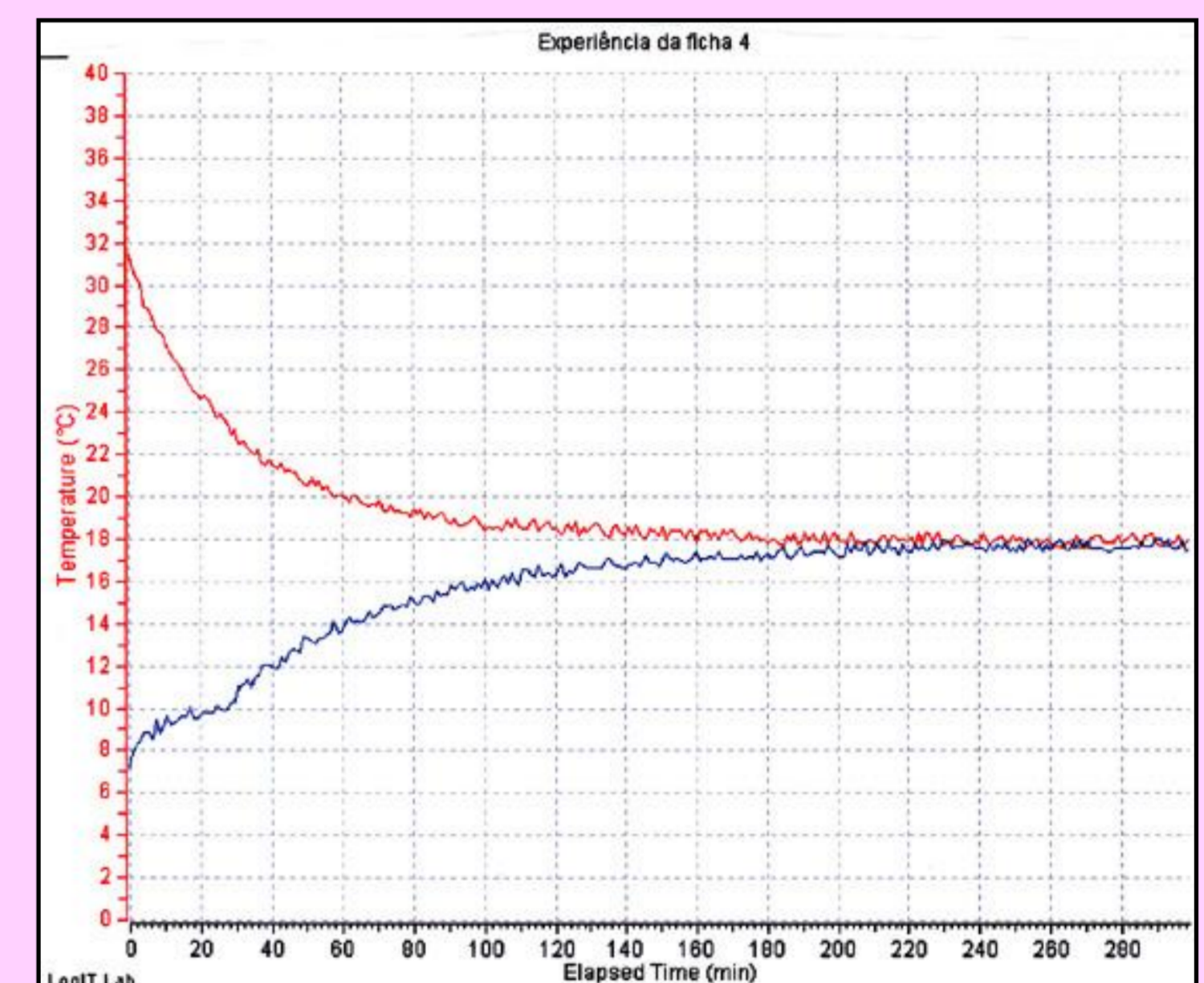
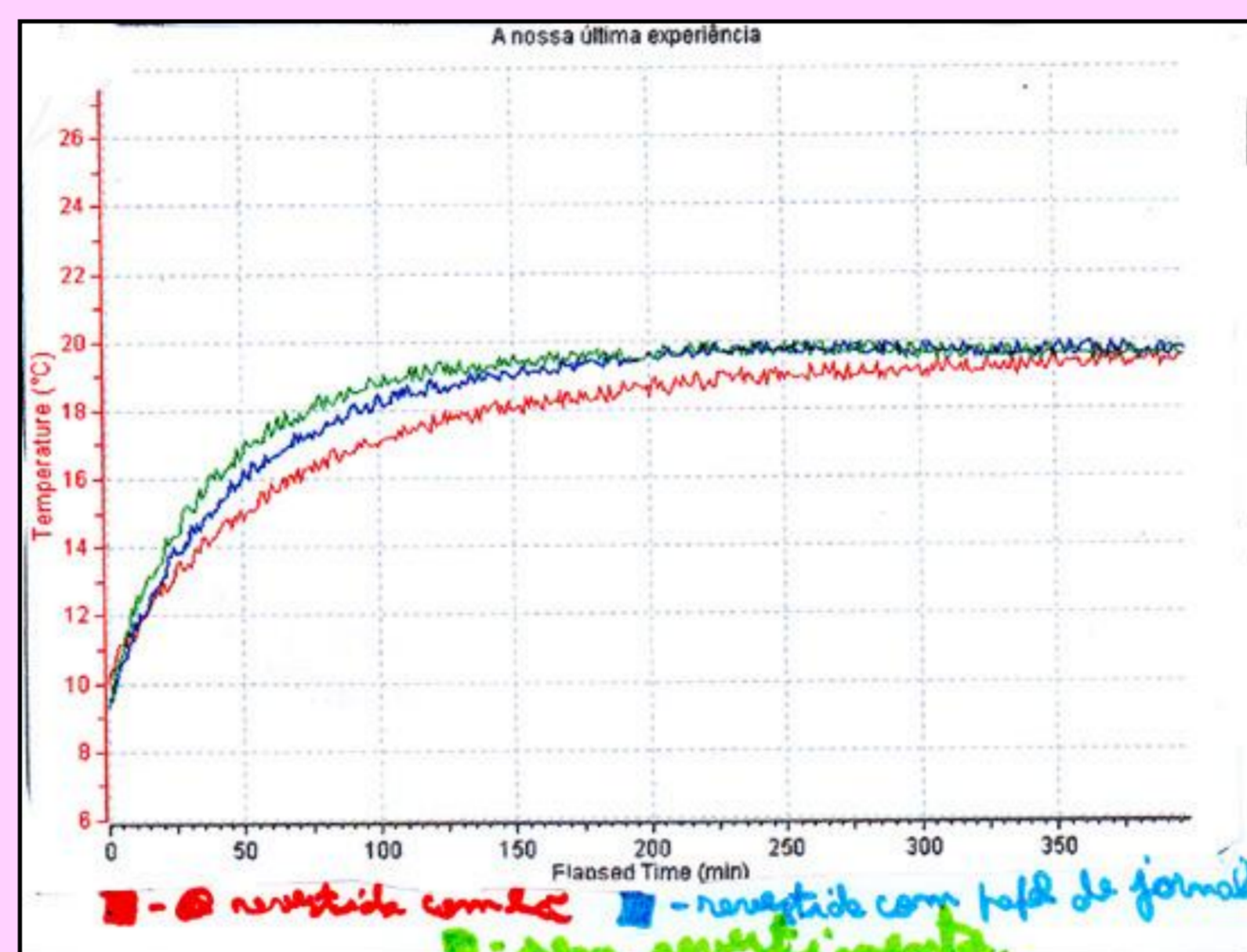
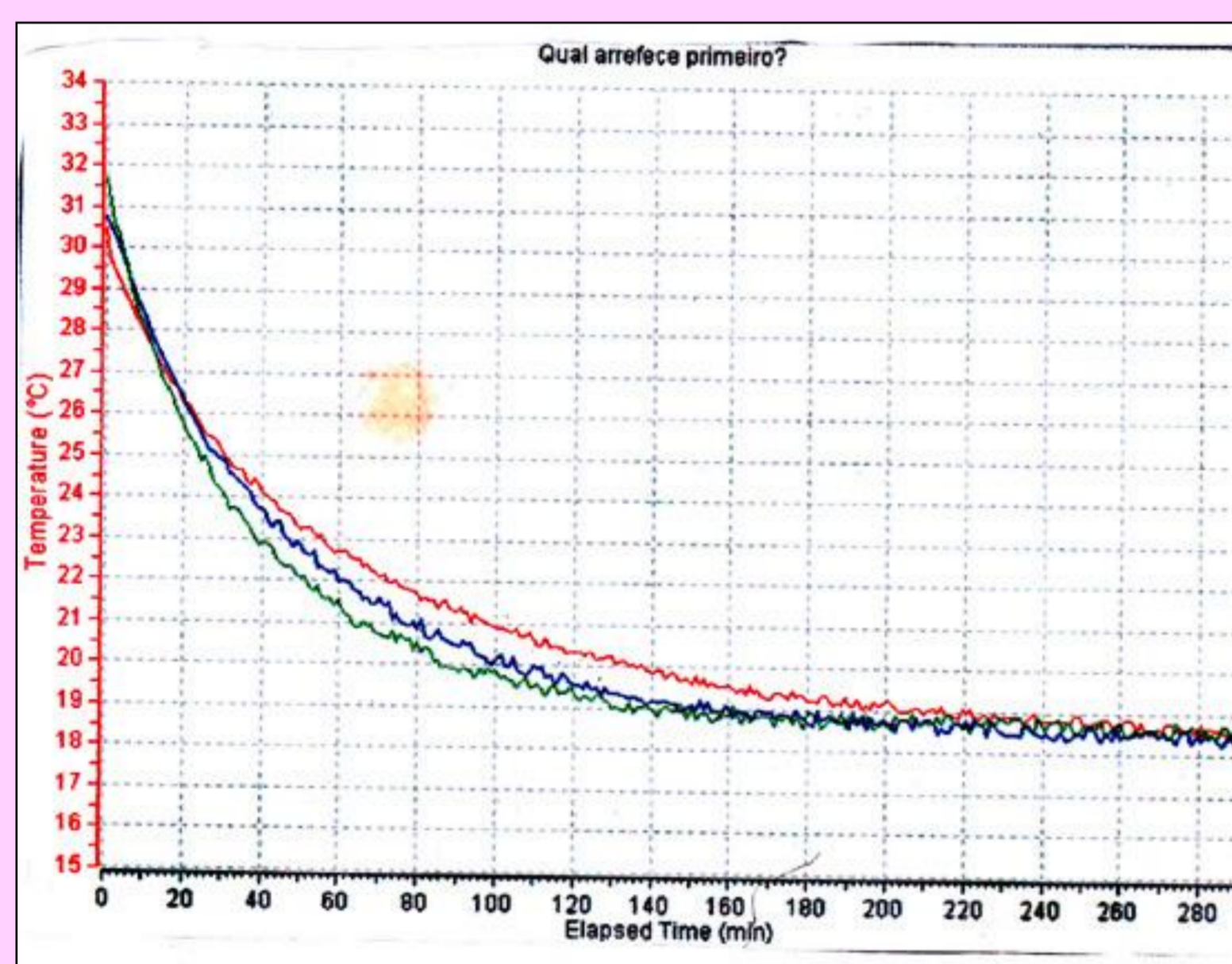
## 3. Sample

This study involved 14 pupils, aged 8 -11 years old.

## 4. Methodology

Eight experiments were done. Initially pupils used thermometers to study the establishment of thermal equilibrium. Then, after getting familiar with temperature sensors and data-logging, they used temperature sensors to study the establishment of thermal equilibrium in several situations, including the use of thermal isolators. They also compared results obtained with both maximum-minimum thermometers and temperature sensors to measure changes in temperature for several days.

Experimental activities were supported by work sheets. In some activities investigative work was developed where they had to make their own decisions in groups, using procedures such planning, measuring, observing and analyzing data. Several instruments were used to collect data to evaluate pupils' learning: questionnaires, observation and individual interviews. Action/research was the methodology used by the teacher to evaluate the process of teaching and learning all along, so that changes could be incorporated if needed.



## 5. Conclusions

The results suggested that these experiments enhanced pupils' learning. Pupils became familiar with the use of computers, thermometers, data-logging and sensors. They learned to interpret real time graphs, to identify thermal equilibrium situations and how thermal isolation occurs. They were able to transfer new ideas to new situations that were presented to them. Pupils showed great enthusiasm and motivation for the activities they were involved in and improved their global school performance.

