Reuse of cooking oils

Summary

Age category
9 - 12 years
Topic
Data & Statistics
Measurement
Total duration
540 minutes

Students collect domestic trash. They measure and analyze the collected amounts of trash. They try to give some utility to used cooking oils by producing soap.

Problems to be tackled:

- What’s the amount of trash you produce every day in school? And at home? Can you say?
- Which wastes can you reuse?
- Do you recycle everything we can? Which wastes you don’t recycle?
- How can we recycle used cooking oil?

Real context

Real world motivation

Schools and media appeal for separate, recycling and reusing wastes. In real live a big part of our students’ families don’t recycle. Used cooking oils are thrown everywhere including in waste water systems with frightened consequences to environment and public health.

Goals

Skills

Domain-general:

Developing critical thinking skills:

- analysing arguments;
- judging the credibility of the sources;
- identifying the focus of a problem;
- answering, clarifying questions.

Mathematics:

Developing skills for problem solving, reasoning and mathematical communication:

- explaining and justifying mathematical processes, results and ideas;
- solving problems involving proportional thinking.

Science:

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Developing Citizenship (Environmental Education / Sustainable Development):

- promoting a process of environmental awareness and change of attitudes and behaviour towards the environment;
- using knowledge to interpret and evaluate the surrounding reality, to formulate and debate arguments, to support positions and options;
- stimulating active participation in decision-making based on the current world.

Knowledge

Mathematics:

- Numbers and operations.
- Statistics.
- Proportional thinking.

Science:

- Pollution. Measures to prevent pollution.
- Separation of waste. Reuse of waste.
- Environmental education and sustainable development.

Technology - Engineering:

- Measurement and measurement instruments.
- Transformation of materials.
- Recycling.

Methodology

Part	Description	Timing
1	**Week Challenge: Teacher's introduction** ***The teacher introduces the context of the activity: Reuse of cooking oils*** Students will have to collect school/domestic trash during one week.	45'
2	**Waste's recollection (small groups): group work and group discussion** ***Trash measurement and construction of tables and graphics*** Each group recollects and measures each kind of trash in each day and shares this with the class. The students put their measurements in tables and graphics in order to analyse (for example, in excel). Discussion in group class.	180'
3	**Text analysis (small groups and class): group work** In small groups students read, analyse and discuss the text on the worksheet (p.6) about used cooking oils and environmental consequences. Then they share conclusions in big group.	45'

4	**Soaps and cooking oils activity / Research** Here, you have the choice: **Version A** ***Soaps and cooking oils activity (small groups - group work)*** Small groups analyse the text *"How to make soap reusing cooking oil?"* on the worksheet and decide quantities of each material to use in proportion to the used cooking oil collected. ***Laboratorial activity (small groups - group work)*** *"How to make soap reusing cooking oil?"* **Version B** ***Research (small groups - group work)*** *Groups research on web, books, families "How to make soap reusing cooking oil?"* Discussion in class group to choose the best activity to produce soaps from cooking oils. ***Laboratorial activity (small groups)*** *"How to make soap reusing cooking oil?"*	225'
5	**Final assessment: group discussion** The final assessment is made in small groups about the way they worked together and individually about how each one enriched the team work.	45'

Organization

Materials

- Computer and internet
- Books
- Writing material, rulers
- Paper worksheets
- Material for the group laboratorial activity (used cooking oil, sodium hydroxide, water, alcohol,...)

Grouping

Groups should be organized considering students' abilities, math and manual skills. .

Printables

Worksheets for students

Coaching

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Useful questions

Engage, #1

- What kind of domestics waste do we produce?
- How much waste do you think we produce at home? And in our school?
- How can we know the real quantities of those wastes?

Engage, #2

- What's the best way to analyse the quantities of waste collected?
- What does the total mass of waste produced in your school this week means to you?
- How can we determinate the average amount of waste per person?
- If you wanted to know the amount of waste from your school community, in a year, how should you proceed? What can you conclude from the number you got?
- In one year what amount of used oil is produced on average at your school per person?

Investigate, #1

- What is the main subject in the text?
- What kind of consequences does oils not collected and recovered make to the environment and public health?
- How can we recover the used cooking oils?
- Is there any economical advantage?
- In you school's canteen what's the destiny of the rest of the used oils? And in your home?
- Is there any collecting system of used cooking oils in our country? In your town? In your school or restaurants?

Investigate #2

- How to make soap reusing cooking oil?
- How many cooking oil did we recollected?
- How many of other materials do we need? How can we know the right quantities?

The questions will depend on the laboratorial activity and the student's difficulties allowing them to do the laboratorial activity with security.

Report

- How did the group worked?
- How did you contributed to the group work?
- What were the biggest difficulties that your group faced?
- How did the group overcome the difficulties?

Assessment

Teacher's assessment:

- Schedule adequate
- Students motivation and participation
- Group collaboration
- All the groups have developed the laboratorial activity like planned
- Cooperation of all the class

Student's assessment:

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- Group work
- Individual contribution to the work
- All the task completed on time
- Biggest difficulties
- Ways to overcome the difficulties

Tips & tricks

- You can talk to school officials (specially cooks and cleaning) to explain the plan and to get their help with the collecting of materials.
- You can have an awareness raising meeting with the families about the problematic of wastes and the impact on the economy of the family and on the environment. Or you can write a letter explaining the idea.
- You can invite the chemistry teacher to explain security rules in the lab.
- You can invite older students to participate in the laboratory activity of making soaps.
- You can ask the local recycling centre to be your partner on this project by giving some materials for example oil.
- You can organize the students on shifts to collect waste in the beginning of the classes and measurement.
- If it’s hard to do the measurements every days you can do estimative with the students.
- You should prepare some materials: dynamometers, recycling bins, garbage bags, gloves,...
- You can prepare motivational badges to give as a reward to students that do the collecting of waste.