

PLASTIC: Good or bad?

A 10-11 grade science (chemistry) module on plastic products: structure, and environmental impact

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Abstract

This module is designed in order to expose the students to the convenient use of plastic products on the one hand, and to the environmental impact caused by over-using those products on the other hand. During the study of the module, students learn about polymers: Structure of the repeating unit, recycling, exhaustible polymers and their solubility in water. In the continuation of the module, students are expected to propose suggestions how we may reduce the negative influence resulted from the accumulation of plastic waste. Furthermore, they are requested to take a stand and choose the alternative way which they prefer. Obviously, they need to present their justified reasons.

Overall objectives/competencies

The students are expected to:

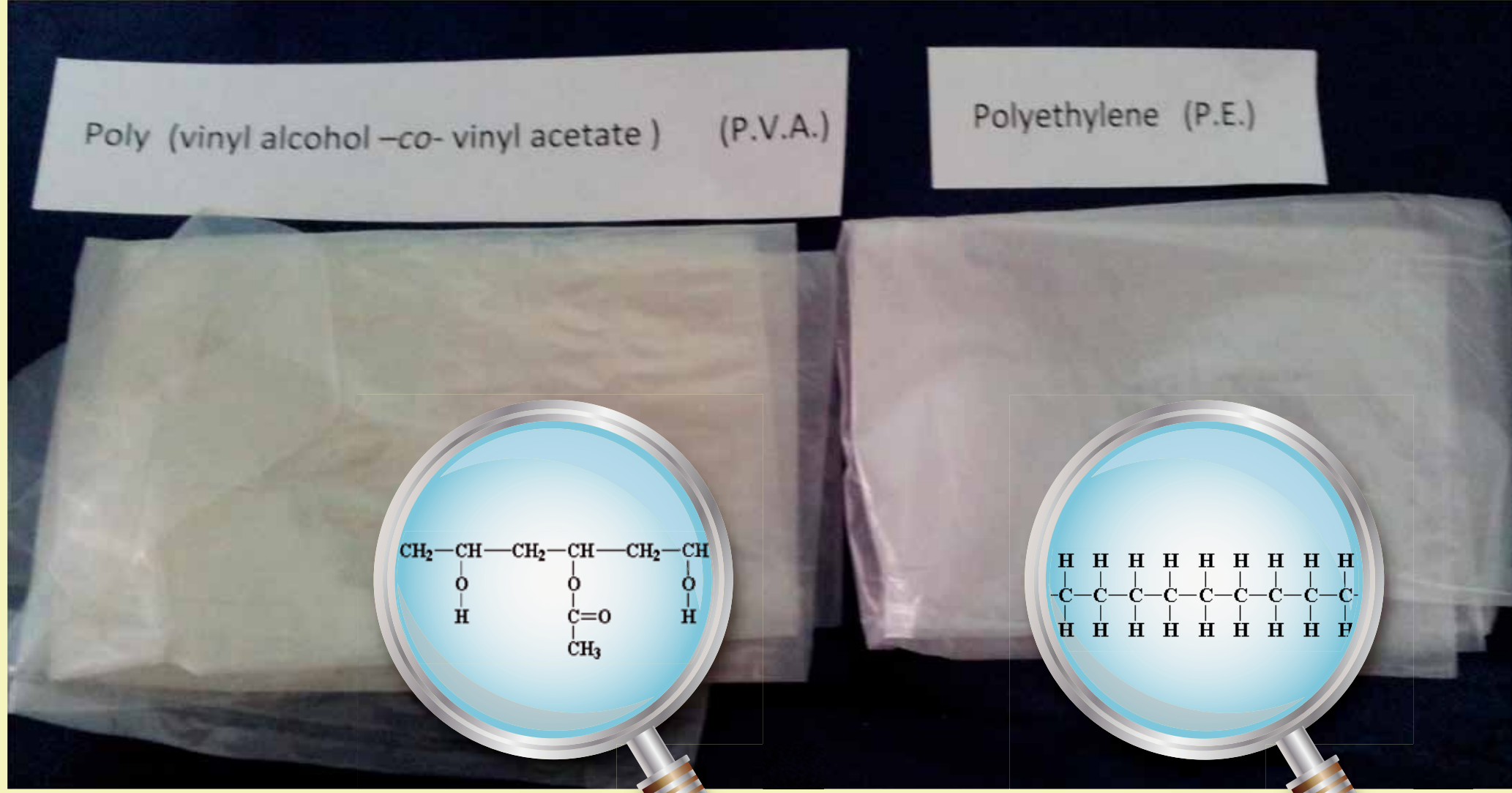
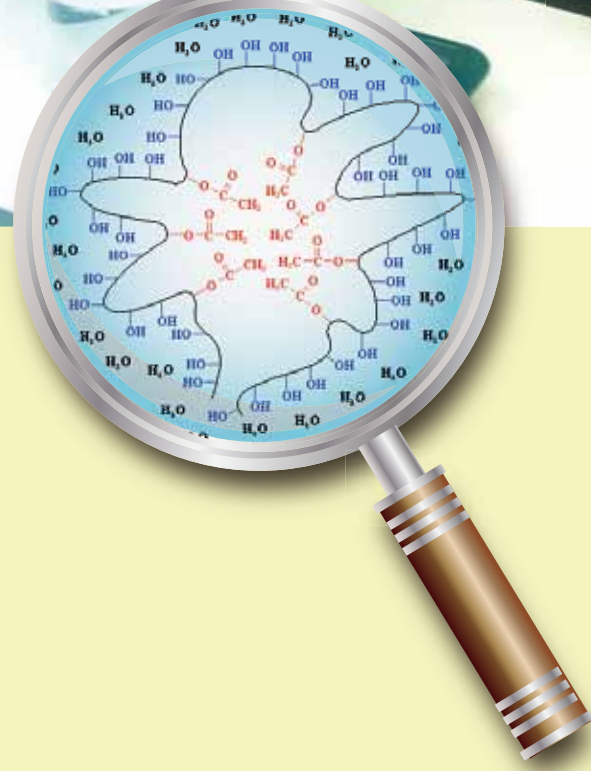
- Express orally their feelings and thoughts which crossed their minds after analyzing the pictures.
- Read texts and answer the questions which follow them.
- Co-operate as a member of the group in discussions.
- Carry out experiments.
- Explain the results of the experiment: The different solubility of Poly vinyl alcohol (P.V.A.) and Polyethylene (P.E.) in water (micro explanation).
- Ask a research question.
- Decide which alternative way would they prefer in order to minimize the influence of plastic waste.
- Communicate orally in an appropriate scientific manner in presenting their attitudes.

Anticipated time: 4 lessons

Prior knowledge expected:

- Intermolecular forces:
 - Van der waals interactions
 - Hydrogen bonding
- Intramolecular bonding: Covalent bonding
- Solubility in water

did you know ?
In 2010, only 14% of the nearly billion plastic bottles were recycled



did you know ?
Israel consumes 430,000,000 plastic bags in marketing network



did you know ?
Approximately 28% to 30% of the trash is plastic waste

Evaluation

The evaluation of the students will be based on the criteria described in the following table.
Comment: Regarding the Decision making - each students group will receive only one thinking tool.

Dimension	Criteria	Percent	scoring
Picture interpretation 10%	questions raised by students.	10%	
Text reading 20%	Answers to the questions.	20%	
Experimentation 30%	Performing an experiment according to the instructions in a clean and tidy way.	10%	
	Teamwork.	10%	
	Answers to the question/questions (Micro, Macro, Symbol).	10%	
Decisionmaking 20%	Number of alternatives offered to solve a problem.	10%	
	Number of dimensions and criteria taken into account.	10%	
	Range of effects taken into account.	10%	
Presentation 20%	Participation of all team members in the presentation.	10%	
	Articulating on the decision.	10%	



did you know ?
Approximately 100,000,000 kilograms of recyclable plastic each year is discarded and not used



It's time to determine :
which way do we want our surroundings
to look like on 2100 ??



did you know ?
Avi Gilad suggests wearing only recycled shirts

Curriculum content:

- Polymers, repeating unit, exhaustible polymers, solubility of polymers in water.

Sequence of the activities:

- Introductions: Pictures
- Watching a P.P.P. (Power point presentation)
- Reading texts and answering questions
- Carrying out experiments:
 - Production of nylon
 - Testing the solubility of P.V.A. and P.E. in water
- Thinking tools for making a decision
- Presentations: Each group should present its text, attitudes and explanations

