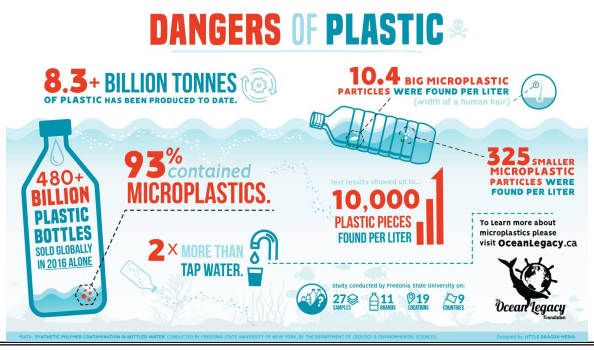
# ERASMUS+ KA219
# ENERGY FOR LIFE

# BIOPLASTIC

GRADE:4th YEAR

Ester De La Torre Martínez

| NAME | BIOPLASTIC | Grade: 4TH YEAR | Nº of lessons: 5 |
|---|---|---|---|
| Summary | Plastics are used throughout the world for a broad number of reasons. However we consider it is a must look for new alternatives which being less harmful to the environment.<br><br>Throughout the development of this lesson plant we sought wake up the critical thinking and the eco-awareness, where students being conscious of the benefits human beings can offer to nature. | | |
| Contents | - Unit of time (century, decade, five years)<br><br>- Resolution of time problems.<br><br>- Resolution of real problems where measures of capacity and mass appear.<br><br>- Submultiples of gram and liter<br><br>- Identification of the submultiples of the liter and kilo and use of their equivalences in and between them.<br><br>- Interest in solving problems with capacity and mass units.<br><br>- Approach to the method of scientific work by studying some of its characteristics and its practice in simple situations.<br><br>- Use of technological means in the learning process to obtain information, perform numerical calculations, solve problems and present results.<br><br>- Integration of information and communication technologies in the learning process.<br><br>- Understand different kinds of text | | |
| Aims | -Know and respect the rules of use and safety of instruments and work materials.<br><br>- Use problem solving strategies<br><br>-Present ypothesis in the resolution of a problem of daily life.<br><br>-Know the scientific method.<br><br>-Compare, order and transform units of length, mass and capacity.<br><br>-Know and use the measures of time and their relationships: quarter, semester, decade and century.<br><br>-Solve problems using the appropriate units of measurement. | | |

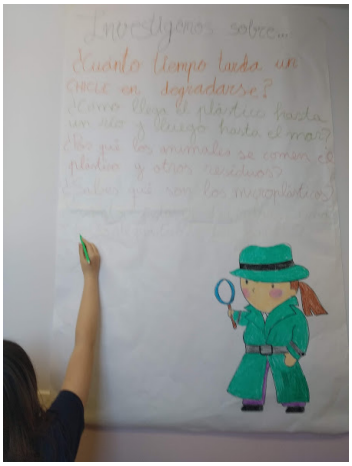
| | |
|---|---|
| | *-Explaining orally and in writing the processes followed in a recipe.* |
| **Resources** | - *Infographic: https://oceanlegacy.ca/the-ocean-plastic-problem/*<br><br>*- Vídeo recording by students of IES Ramón y Cajal de Albacete ( https://vimeo.com/335960999)*<br><br>*-Bio-plastic recipe: http://www.kidsagainstplastic.co.uk/casein-plastic/*<br><br>  |

| ***Subject skills (to explain what has been worked or relationship with Steam areas)*** | |
|---|---|
| **S**cience | Workshop: Prepare your own bioplastic |
| **T**echnology | *Create Weaf cutters using ICT* |
| **E**ngineering | Print Weaf cutters using 3D printer |
| **A**rt | Chromatic composition in the production of bioplastic |
| **M**aths | *Activities and problem solving using units of time and units of the Metric Decimal System.* |

| **Assessment:** | SUCCEEDED | ONGOING | DIDN´T SUCCEED |
|---|---|---|---|
| Students have reached most of the planned goals. | **X** | | |
| Lessons have been well planned according to the level of students and curriculum. | **X** | | |
| The difficulties encountered have been solved during the process | **X** | | |
| Stem activities have increased students knowledge and curiosity for the topic. | **X** | | |
| Outcomes of Stem lesson plans have been understood by most of the students. | **X** | | |

***(In this part, It will be add photos during the process, code QR or whatever visual resource about students and teacher work)***

## STARTING-POINT



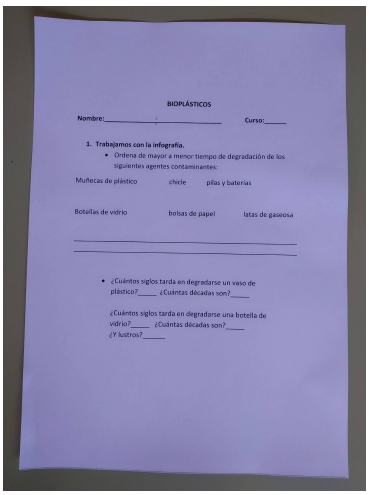

**Lesson #1:** *Using the technique of "brainstorming" and using the projector, we worked on the infographic, trying to get students to formulate their own hypotheses about the time it takes to degrade different types of contaminants. We also record in a panel all the questions and doubts that arise in the sharing by the students.*

**Lesson #2:c** *We watched a video which has been recording by three students of IES Ramón y Cajal, who have been the winners of a contest organized by the UCLM (college), for the development of a model to manufacture bioplastics. In the video, not only they show the model with which they won the contest, but they also teach us the process by which the bioplastic is made.*

*After the viewing of the video, our students shared their ideas and doubts.*

## MIDWAY PROCESS

**Lesson #3** *In this session a conference videoconference is held with the IES Ramón y Cajal of Albacete, where the students interact with the children who took part in the project of the model of the elaboration of bioplastic. With videoconferencing it is intended that students not only solve the doubts that arise from the development of bioplastics, if it is not an exchange of experiences between schools.*



BIOPLÁSTICOS

Nombre:_____ Curso:_____

1. **Trabajamos con la infografía.**
   - Ordena de mayor a menor tiempo de degradación de los siguientes agentes contaminantes:

Muñecas de plástico  chicle  pilas y baterías

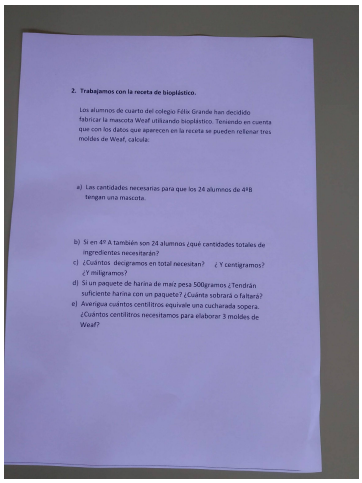
Botellas de vidrio  bolsas de papel  latas de gaseosa

_____

_____

- ¿Cuántos siglos tarda en degradarse un vaso de plástico?_____ ¿Cuántas décadas son?_____

  ¿Cuántos siglos tarda en degradarse una botella de vidrio?_____ ¿Cuántas décadas son?_____ ¿Y lustros?_____



2. **Trabajamos con la receta de bioplástico.**

Los alumnos de cuarto del colegio Félix Grande han decidido fabricar la mascota Wea! utilizando bioplástico. Teniendo en cuenta que con los datos que aparecen en la receta se pueden rellenar tres moldes de Wea!, calcula:

a) Las cantidades necesarias para que los 24 alumnos de 4ºB tengan una mascota.

b) Si en 4º A también son 24 alumnos ¿qué cantidades totales de ingredientes necesitarán?

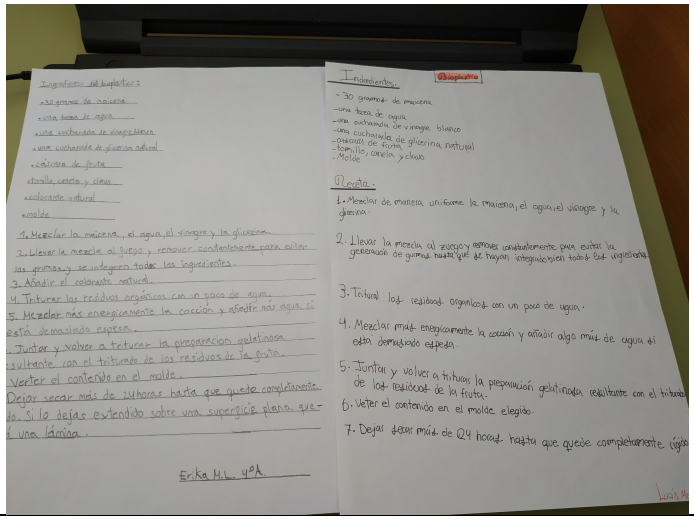
c) ¿Cuántos decigramos en total necesitan? ¿ Y centigramos? ¿Y miligramos?

d) Si un paquete de harina de maíz pesa 500gramos ¿Tendrán suficiente harina con un paquete? ¿Cuánto sobrará o faltará?

e) Averigua cuántos centilitros equivale una cucharada sopera. ¿Cuántos centilitros necesitamos para elaborar 3 moldes de Wea!?

**Lesson #4:** *Using the bioplastic recipe they have to resolve different uestions where we will work the measurement of time and resolution of problems of units of the Metric Decimal System.*

**Lesson #5:** *They investaged other bioplastic recipes and wrote their own recipe.*



Ingredientes del bioplástico:
- 30 gramos de maicena
- una taza de agua
- una cucharada de vinagre blanco
- una cucharada de glicerina natural
- cáscara de fruta
- canela, canela y clavo
- colorante natural
- molde

1. Mezclar la maicena, el agua, el vinagre y la glicerina.
2. Llevar la mezcla al fuego y remover constantemente para evitar los grumos y se integren todos los ingredientes.
3. Añadir el colorante natural.
4. Triturar los residuos orgánicos con un poco de agua.
5. Mezclar más enérgicamente la cocción y añadir más agua si está demasiado espesa.
Juntar y volver a triturar la preparación gelatinosa resultante con el triturado de los residuos de la fruta.
Verter el contenido en el molde.
Dejar secar más de 24 horas hasta que quede completamente seco. Si lo dejas extendido sobre una superficie plana queda una lámina.

Erika H.L. 4ºA

Bioplástico

Ingredientes:
- 30 gramos de maicena
- una taza de agua
- una cucharada de vinagre blanco
- una cucharada de glicerina natural
- cáscara de fruta
- tomillo, canela y clavo
- Molde

Receta:
1. Mezclar de manera uniforme la maicena, el agua, el vinagre y la glicerina.
2. Llevar la mezcla al fuego y remover constantemente para evitar la generación de grumos hasta que se hayan integrado todos los ingredientes.
3. Triturar los residuos orgánicos con un poco de agua.
4. Mezclar más energicamente la cocción y añadir algo más de agua si está demasiado espesa.
5. Juntar y volver a triturar la preparación gelatinosa resultante con el triturado de los residuos de la fruta.
6. Verter el contenido en el molde elegido.
7. Dejar secar más de 24 horas hasta que quede completamente seco.

## FINAL RESULT

**Lesson #5** *we prepared bioplastic following the recipe that we have worked previously.*

*In order to carry out the experiment it is necessary to divide the class into groups of 5 students and strictly follow a series of safety rules such as: the use of gloves and the non-manipulation of objects that can cause burns.*