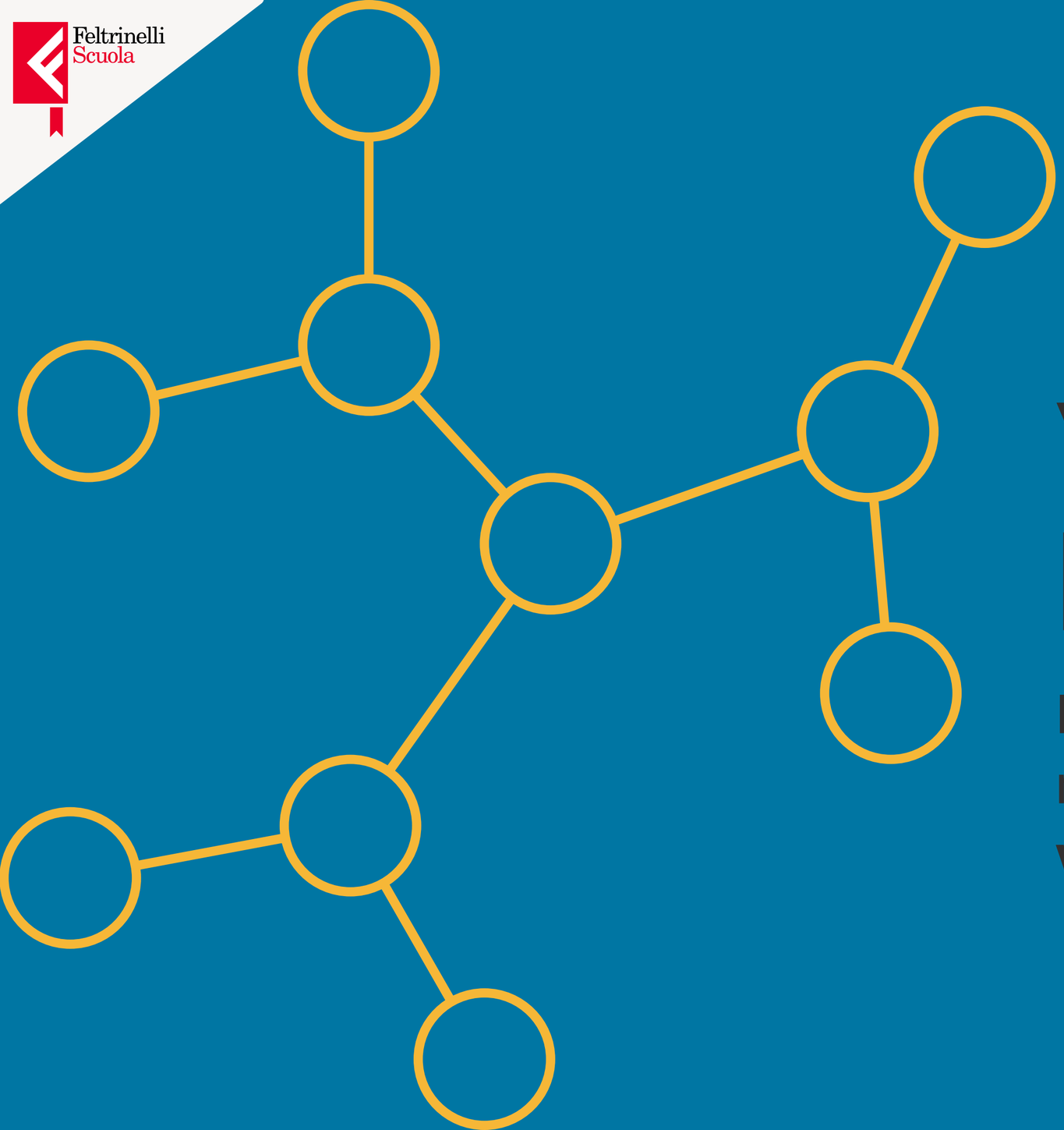
CLIL

STEAM

MATERIALS • UDA 6: Plastics

Feltrinelli Scuola

Feltrinelli Scuola



1. CREATE YOUR OWN MAP

Have a look at the mind map in the next slides, then **sketch your own version in your exercise book**.

PLASTIC

ORIGIN AND SUSTAINABILITY

Polymers:

- Organic
- Synthetic
- Derived from petroleum through polymerisation

CHARACTERISTICS AND COMPOSITION

- Low density
- High resistance to corrosion
- Poor electrical and thermal conductivity (good insulators)
- Chemically inert
- Water-resistant
- Easily processed
- Low cost

TYPES OF POLYMERS

Thermoplastics:

- Can be melted and reshaped multiple times
- Polyethylene (PE)
- Polypropylene (PP)

Thermosetting Polymers:

- Cannot be remelted once set
- Epoxy resin
- Polyurethane (PU)

Rubber:

- Natural: Extracted from the rubber tree
- Synthetic: Produced from petroleum-based compounds

PLASTIC

PROCESSING METHODS

- Injection moulding
- Blow moulding
- Extrusion
- Thermoforming

MAIN USES

- Everyday objects of all kinds
- Industrial applications

SUSTAINABILITY

- Environmental pollution (oceans)
- Microplastics
- Non-biodegradable
- Recycling

Feltrinelli Scuola

2. CREATE YOUR OWN TEST

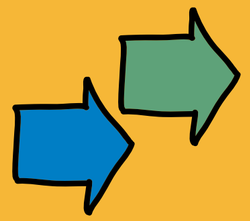
a. Indicate whether the following statements are true (T) or false (F).

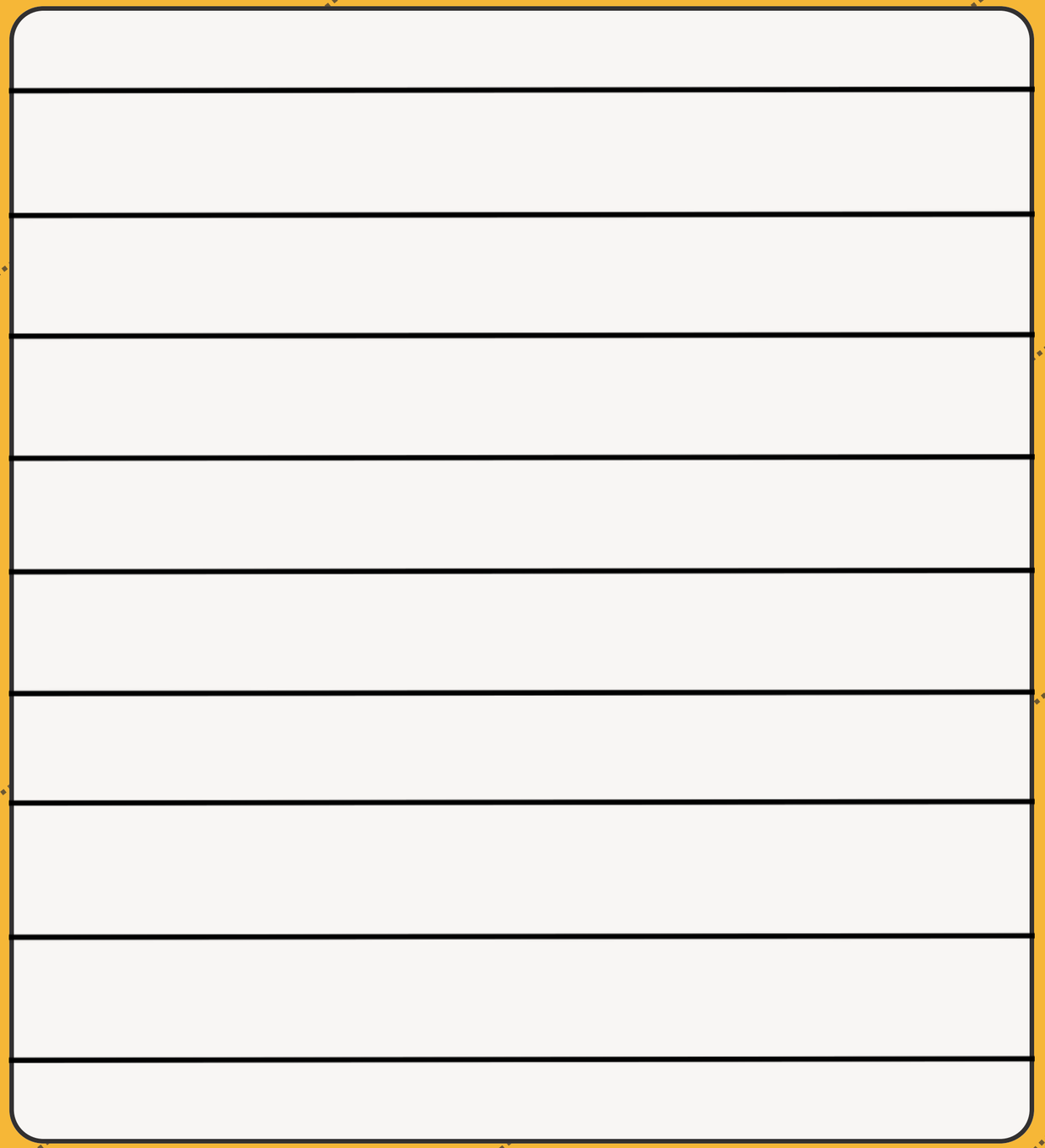
1. Plastics are polymers derived from petroleum.
   T F
2. Plastic is chemically inert and an effective insulator.
   T F
3. Thermosetting polymers can be remelted or reused.
   T F
4. Synthetic rubber does not withstand high temperatures.
   T F
5. In injection moulding, air is blown into the mould along with the polymer.
   T F
6. Microplastics are not dangerous.
   T F

Feltrinelli Scuola

2. CREATE YOUR OWN TEST

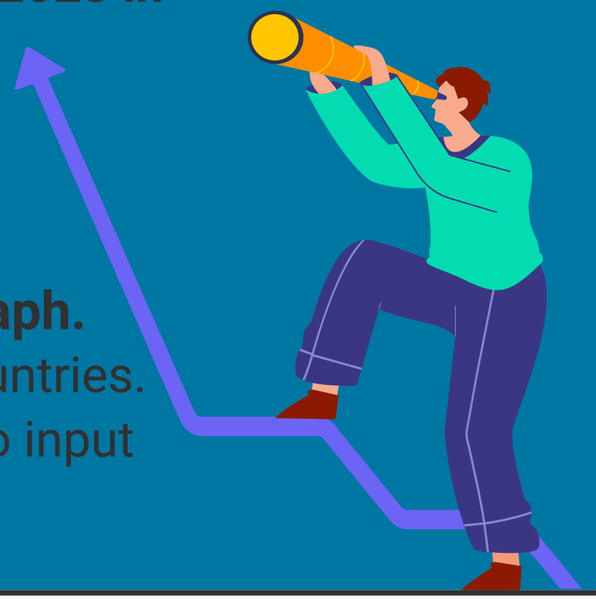
b. Create Five New True/False Questions to Share with the Class





3.ANALYSIS OF PLASTIC RECYCLING DATA

The table below shows the quantity of plastic recycled from 2020 to 2023 in key European countries, expressed in thousands of tonnes.



Which country recycles the most plastic? How has plastic recycling progressed in recent years? Has it increased or decreased?
Represent the data visually using the most appropriate chart/graph.
You may choose to focus on a single country or compare multiple countries.
You can either draw the graph on graph paper or use an Excel sheet to input the data.

Year	Italy	Germany	France	Spain
2020	430	550	300	400
2021	450	570	320	420
2022	480	600	350	450
2023	500	620	370	470

4. TETHERED CAPS ON PLASTIC BOTTLES

The European Union has introduced a directive on single-use plastics, **requiring manufacturers to ensure that bottle caps remain tethered to plastic bottles**.
This directive is part of a broader effort to **reduce plastic waste and promote a circular economy**. But how does it achieve this?
Conduct a brief online research and carry out a survey by interviewing at least five people. Collect their responses and compare the findings in class.

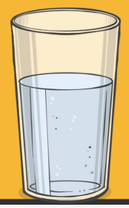
5.CORNSTARCH-BASED BIOPLASTIC

It is possible to create bioplastic using a microwave oven and a few simple ingredients, such as cornstarch (a highly purified flour), water, vegetable oil, and vinegar.
By mixing the ingredients and heating them in the microwave, a biodegradable plastic is formed, which can be shaped into various forms.

Feltrinelli Scuola

MATERIALS AND TOOLS

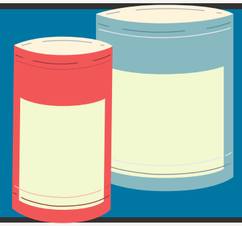
1 tablespoon of cornstarch



1 tablespoon of water

1 teaspoon of vegetable oil
(e.g. sunflower oil, corn oil)

1 teaspoon of vinegar

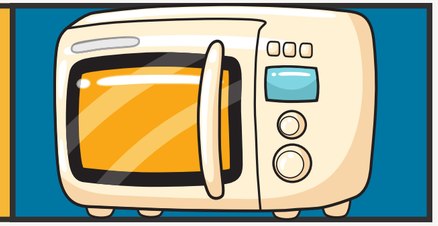


Food colouring (optional)

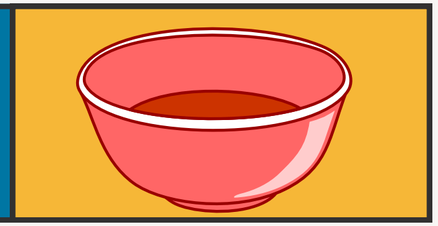
Feltrinelli Scuola

MATERIALS AND TOOLS

Microwave or stovetop

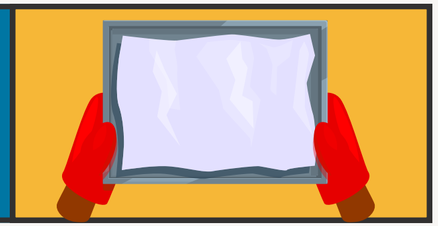


Heatproof bowl



Spoon for stirring

Baking paper or a baking tray



Feltrinelli Scuola

WORK PHASES

1

PREPARING THE INGREDIENTS

Place the cornstarch in a bowl. Add the water, vegetable oil, and vinegar. You can also add a few drops of food colouring if desired.

2

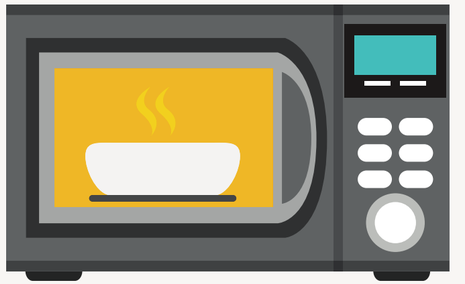
MIXING THE INGREDIENTS

Stir the ingredients thoroughly with a spoon until you achieve a smooth, uniform mixture. Ensure that the cornstarch is fully dissolved in the water and that the oil and vinegar are evenly distributed.

3

HEATING

Place the bowl in the microwave and heat the mixture in 20-second intervals, stirring between each interval. Continue until the mixture thickens and develops a gel-like consistency.

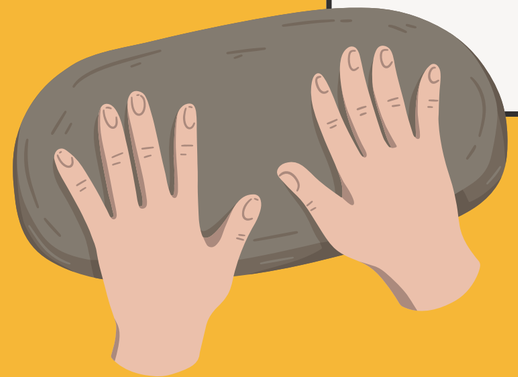


Feltrinelli Scuola

4

FORMING THE PLASTIC

Once the mixture has reached a gel-like consistency, remove it from the microwave. Allow it to cool slightly to prevent burns, then pour it onto baking paper or a baking tray and shape it as desired.
You can use kitchen utensils or your hands (wearing gloves if it is still warm).



5

DRYING

Let the plastic air dry for a few hours or until it is completely dry and solid. The drying time may vary depending on thickness and environmental conditions.
To speed up the drying process, place the plastic in a warm, dry area.