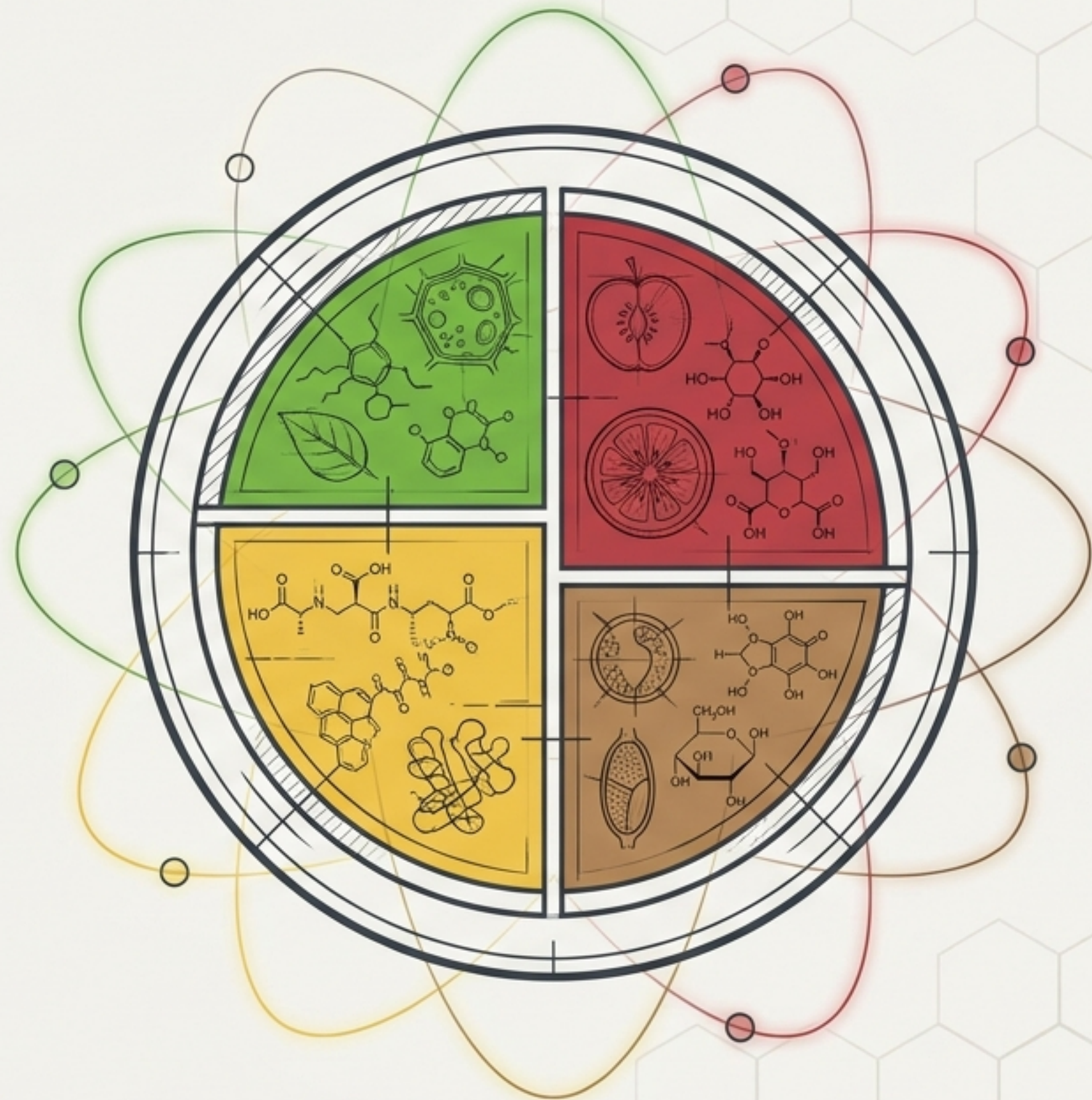


The Chemistry of the Harvard Plate

A Science Gallery Exhibition by
the 3^o ESO Students of IES Arjé



The Hypothesis: Food is Chemistry

Under the guidance of Chemistry teacher Irene, the 3º ESO students at IES Arjé tested a fundamental hypothesis: our everyday meals are built entirely from the elements on the periodic table.



The Mission

- Analyze the Harvard Plate through a chemical lens.
- Identify the atomic makeup of daily foods.
- Bridge the gap between theoretical chemistry and applied nutrition.

Exhibit A: Introduction to Dietary Elements

EL PLATO DE HARVARD

¿QUÉ ES?

El plato de Harvard es un plato que se basa en la pirámide alimentaria y se divide en cinco partes: verduras, frutas, granos, proteínas y lácteos. Se recomienda consumir una porción de cada uno de estos grupos de alimentos en cada comida.

DISTRIBUCIÓN

El plato de Harvard se divide en cinco partes: verduras, frutas, granos, proteínas y lácteos. Se recomienda consumir una porción de cada uno de estos grupos de alimentos en cada comida.



ALIMENTOS

Alimento	Porción	Grupos	Grupos
Verduras	1/2 taza	Verduras	Verduras
Frutas	1/2 taza	Frutas	Frutas
Granos	1/2 taza	Granos	Granos
Proteínas	1/2 taza	Proteínas	Proteínas
Lácteos	1/2 taza	Lácteos	Lácteos

PREGUNTAS FINALES

¿Qué es el plato de Harvard? ¿Por qué es importante? ¿Cómo se divide? ¿Qué alimentos se recomiendan? ¿Por qué es importante consumir una porción de cada grupo de alimentos en cada comida?

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Ca

Calcium | Atomic No. 20

Found in: Broccoli.

Function: Fortifies bones and aids nerve signaling.

B

Boron | Atomic No. 5

Found in: Apples.

Function: Aids in metabolizing calcium and magnesium in bones.

If we only eat one food, we get a large amount of one type of atom, and the lack of others will provoke disease.

PLATO DE HARVARD

Este plato de Harvard es una guía para una dieta saludable. Se recomienda consumir una variedad de alimentos en las proporciones indicadas.

Alimento	Granos	Vegetales	Frutas	Proteína	Lácteos	Grasas saludables	Agua
Alimento	Granos	Vegetales	Frutas	Proteína	Lácteos	Grasas saludables	Agua
Grupos	Granos	Vegetales	Frutas	Proteína	Lácteos	Grasas saludables	Agua
Porciones	20g	6g	19g	6g	28g	42g	?
Alimento	Granos	Vegetales	Frutas	Proteína	Lácteos	Grasas saludables	Agua
Alimento	Granos	Vegetales	Frutas	Proteína	Lácteos	Grasas saludables	Agua



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Exhibit B: Metals vs. Non-Metals in Nutrition

Transition Metal	Iron (Fe), Atomic No. 26	Spinach	Transports oxygen and produces energy.
Alkali Metal	Potassium (K), Atomic No. 19	Carrot	Muscle contraction and fluid balance.
Non-Metal	Carbon (C), Atomic No. 6	Tomato/ Orange	Creates complex chains for cellular structure.

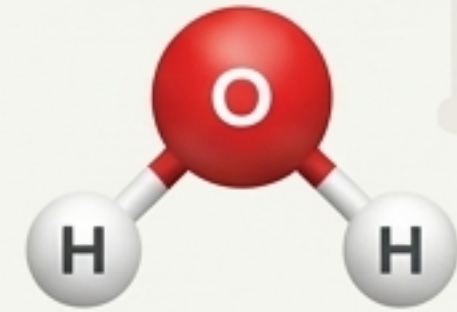
Exhibit C: Macrominerals and Hydration



Iodine | Atomic No. 53

Found in: Natural Yogurt.

Function: Essential for thyroid hormones.

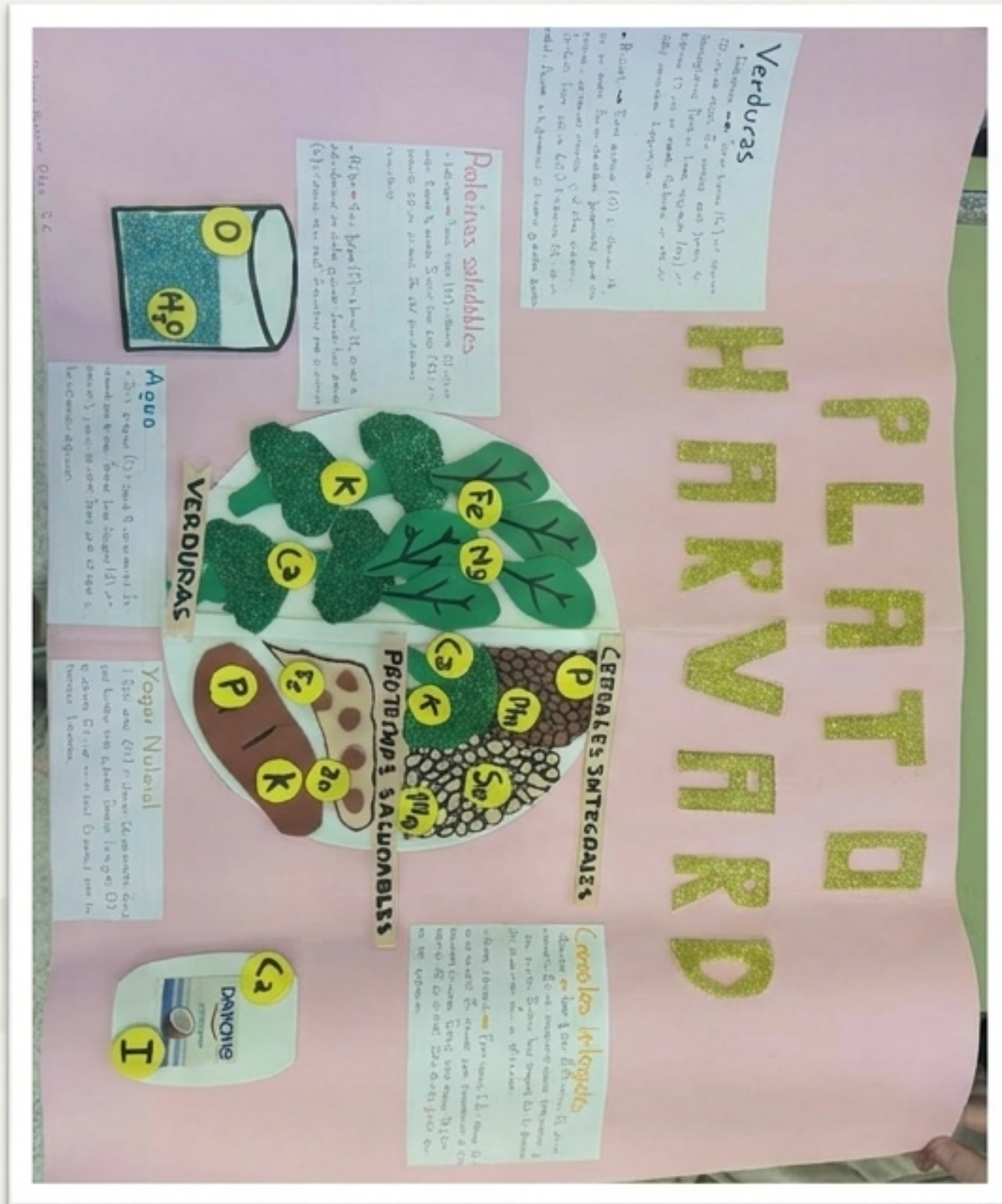


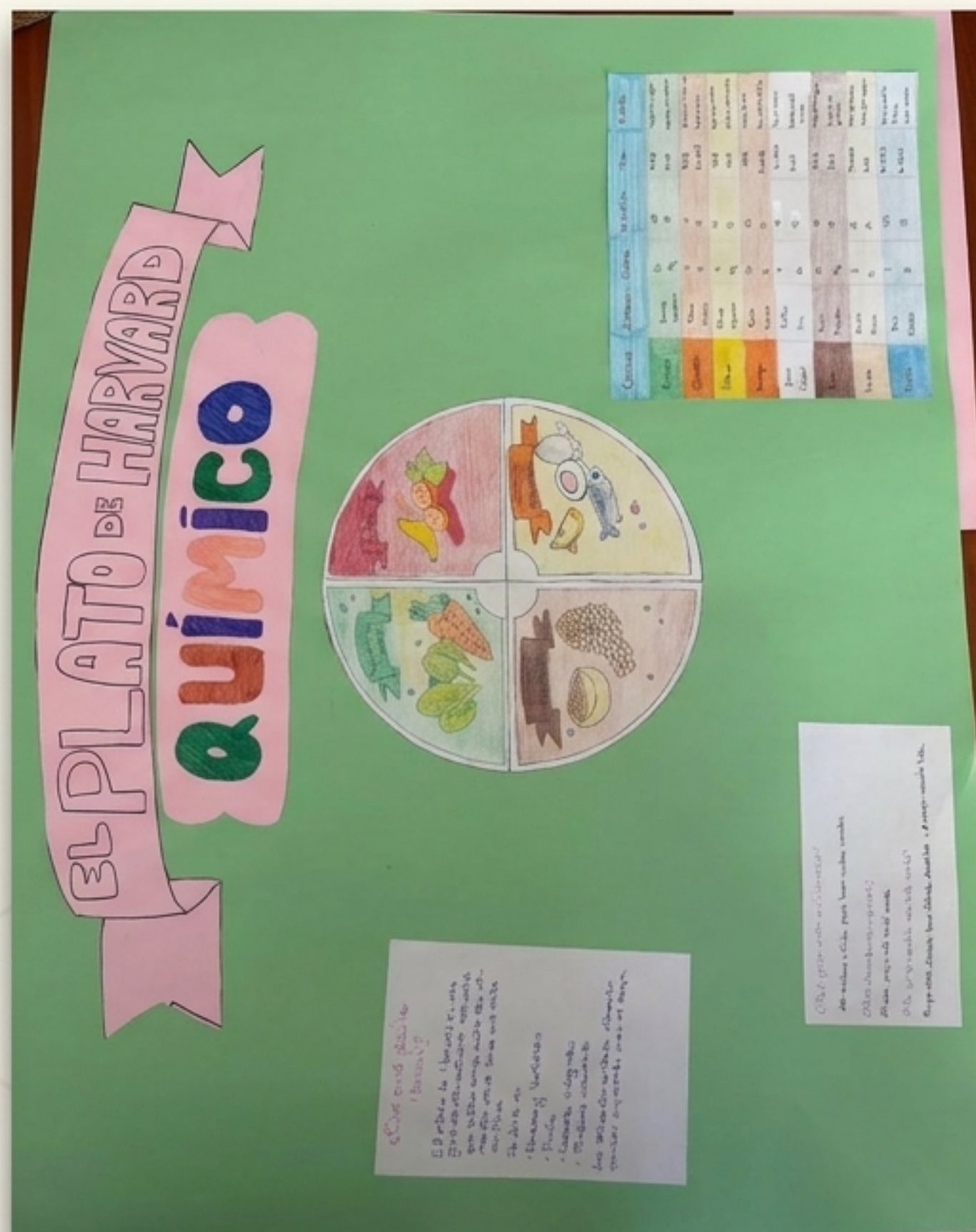
Water

Oxygen (Atomic No. 8) and Hydrogen (Atomic No. 1).

Function: Forms part of organic molecules; vital for life.

Did you know Rice has Phosphorus (P) and Magnesium (Mg)? Magnesium is a metal that participates in over 300 biochemical reactions.





Museum Placard

Exhibit D: Beyond the Basics

Card 1

S

Sulfur | Atomic No. 16

Type: Non-Metal.

Source: Egg.

Card 2

P

Phosphorus | Atomic No. 15

Type: Non-Metal.

Source: Fish.

"Why is a varied diet important? Because every food has different elements, and the body needs all of them."

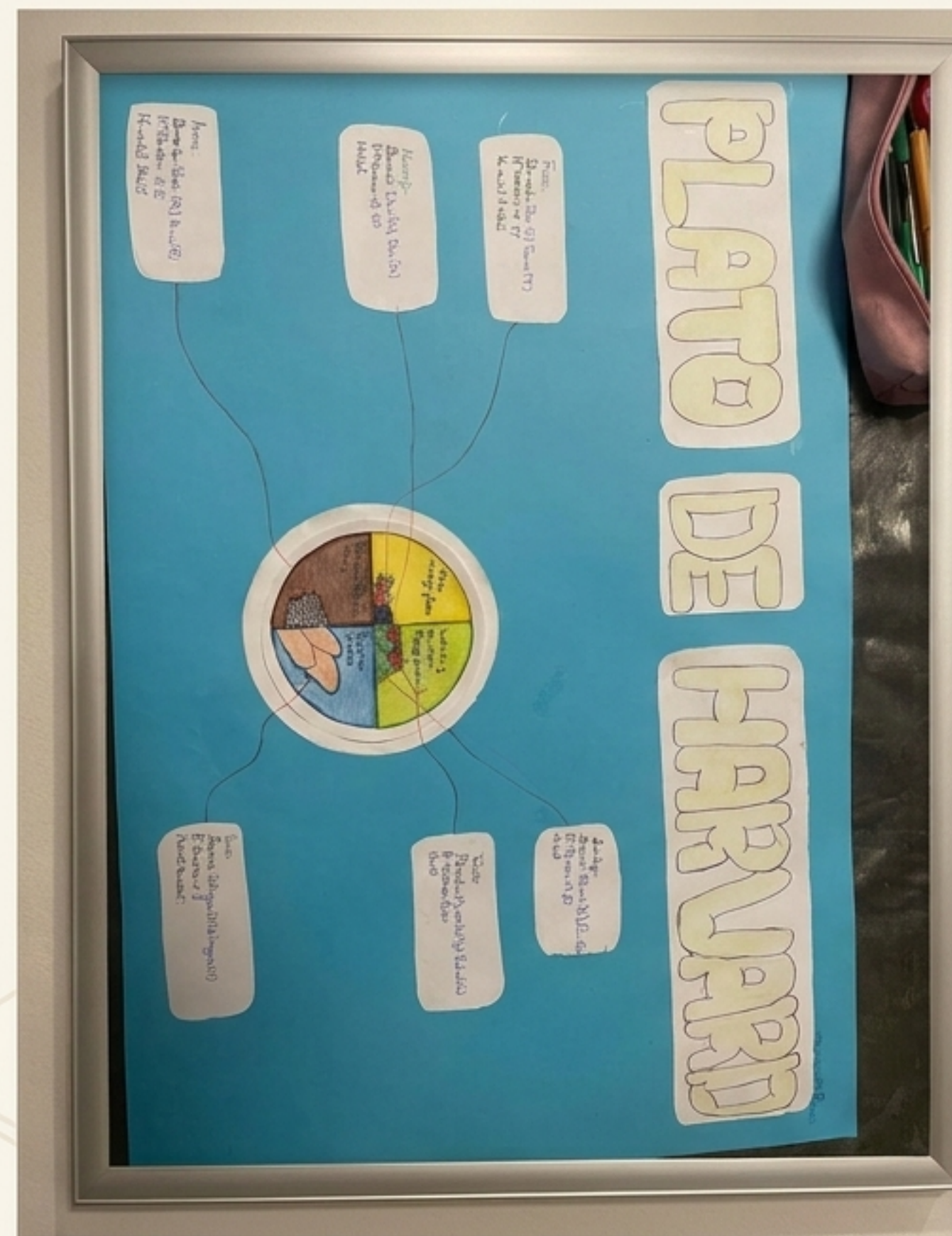
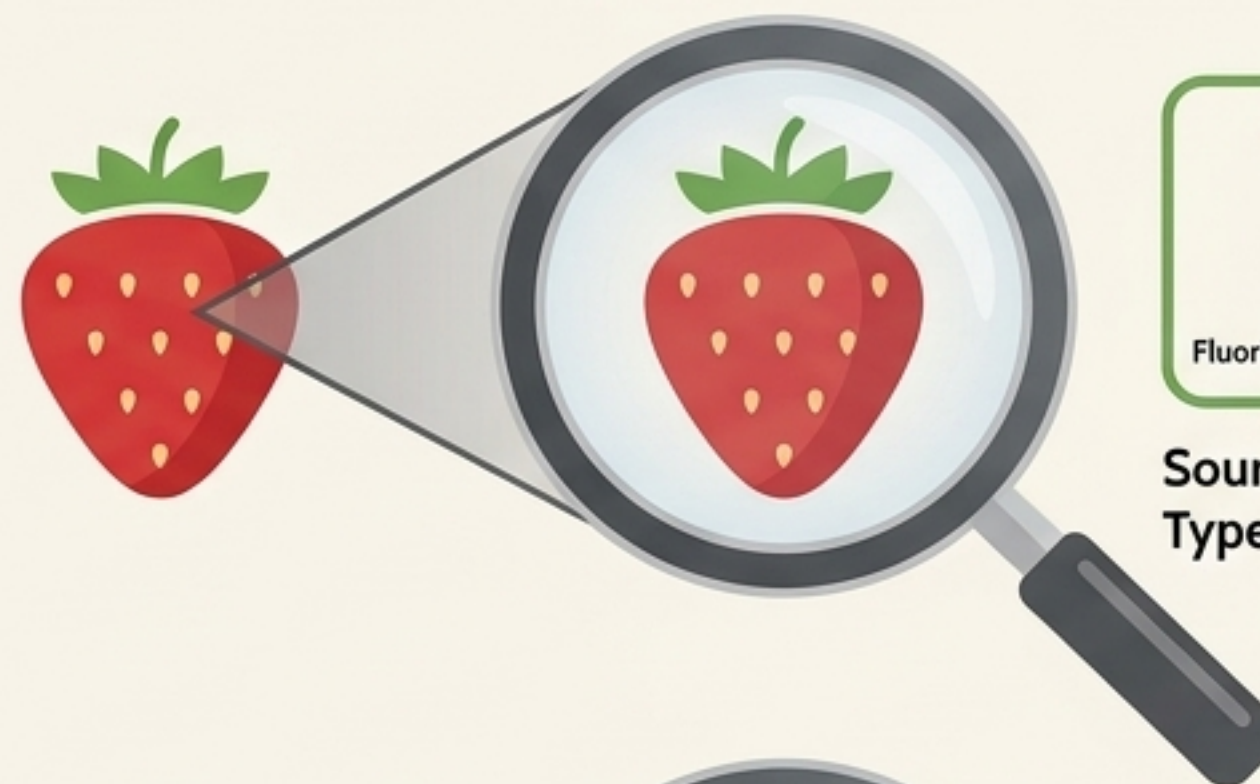
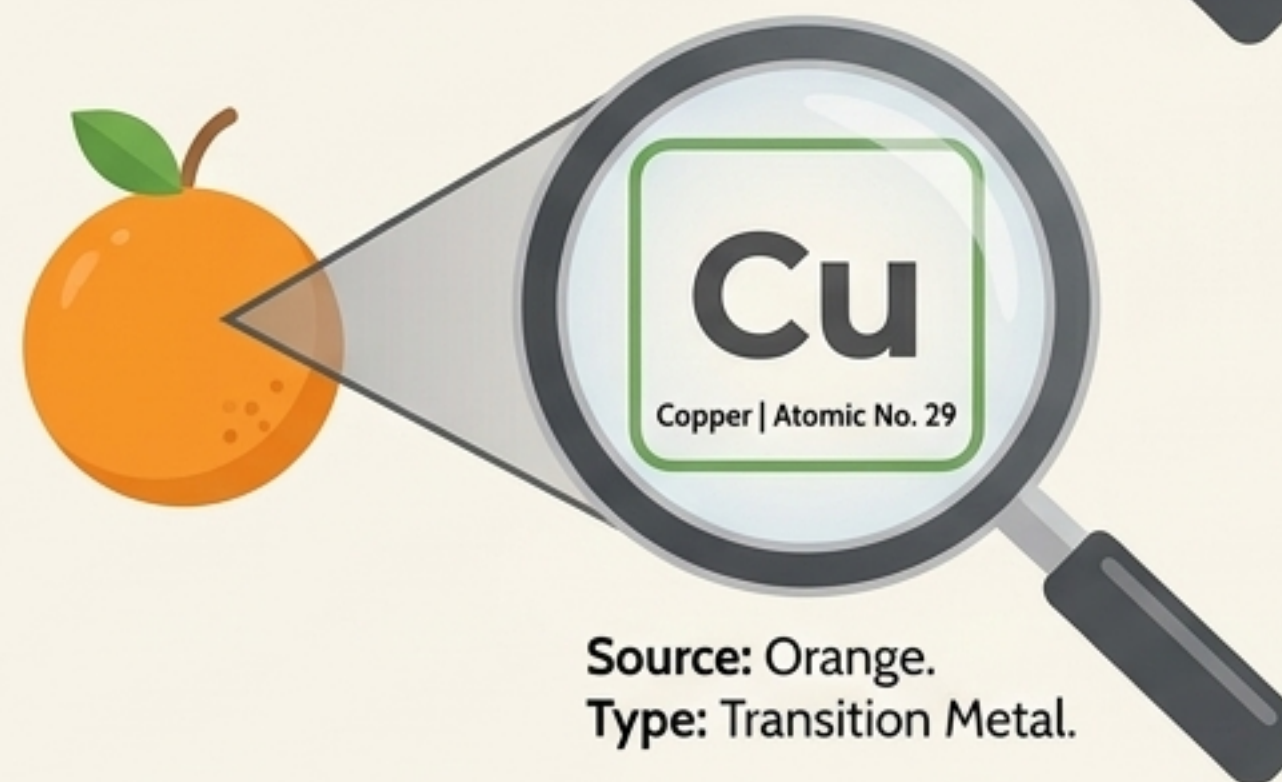


Exhibit E: Trace Elements in Fruit



Source: Strawberry.
Type: Non-metal.



Source: Orange.
Type: Transition Metal.



Source: Orange.
Type: Transition Metal.

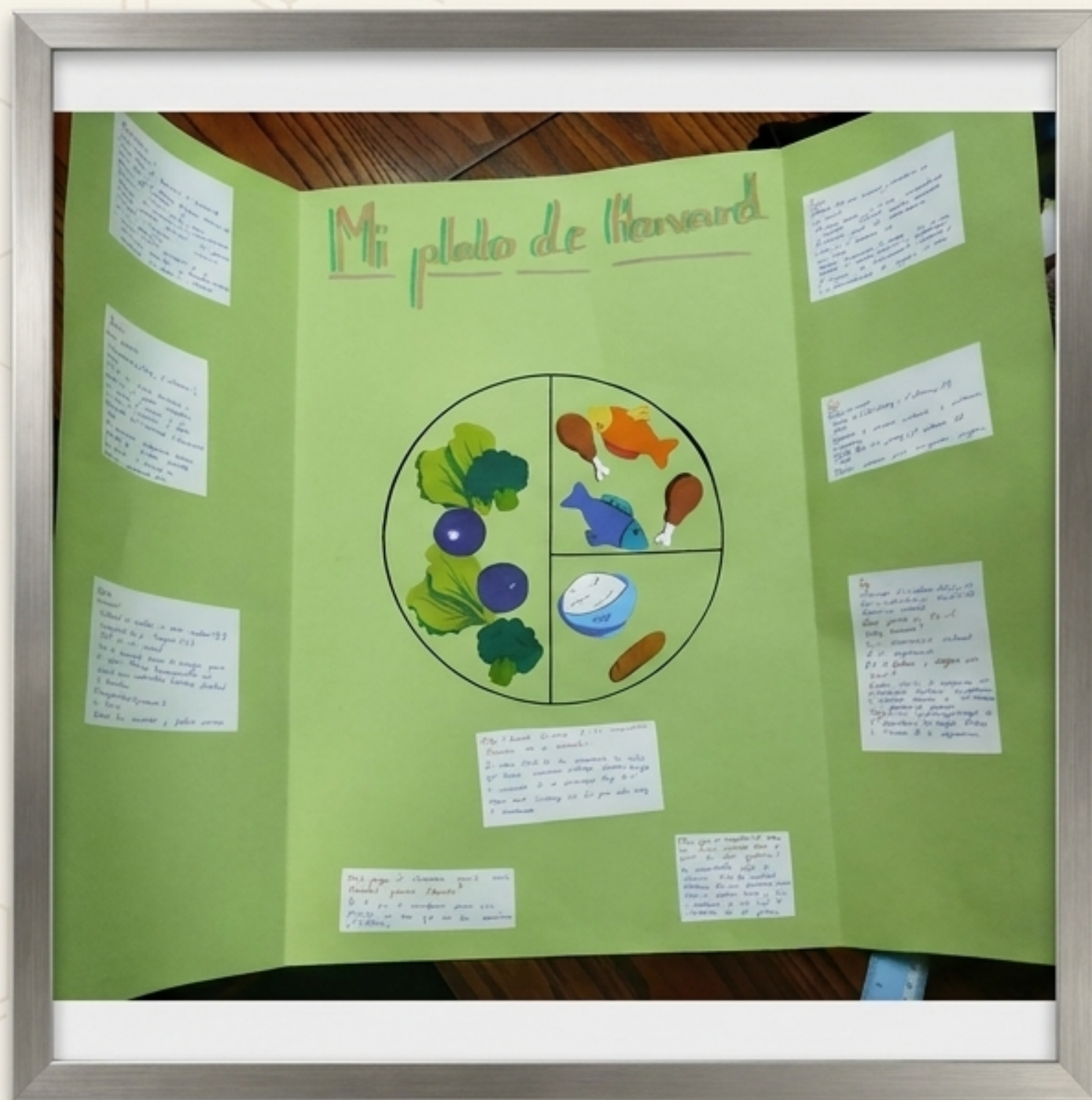
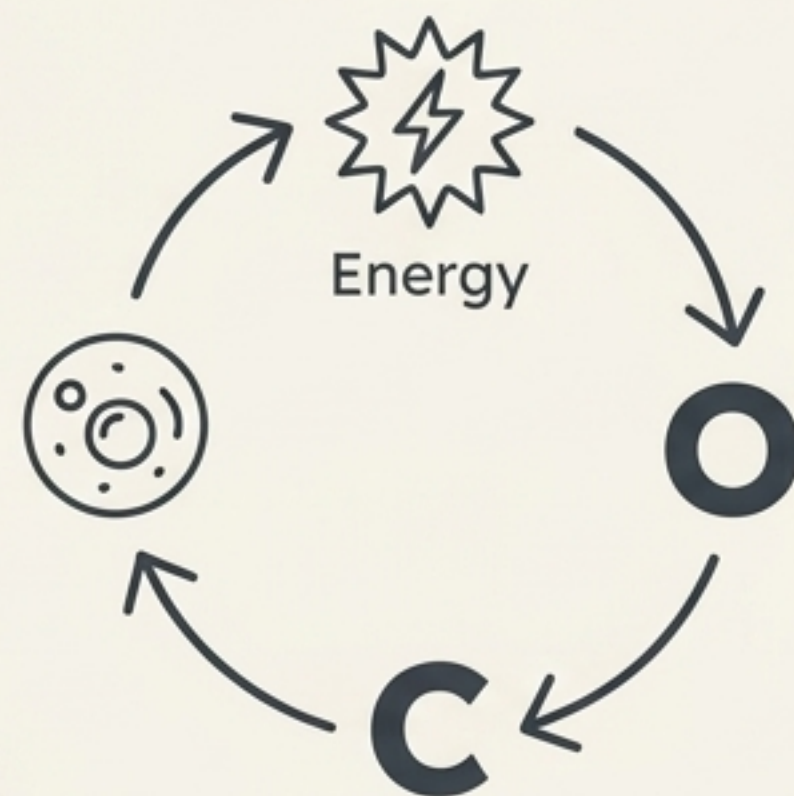


Exhibit F: The Organic Foundation



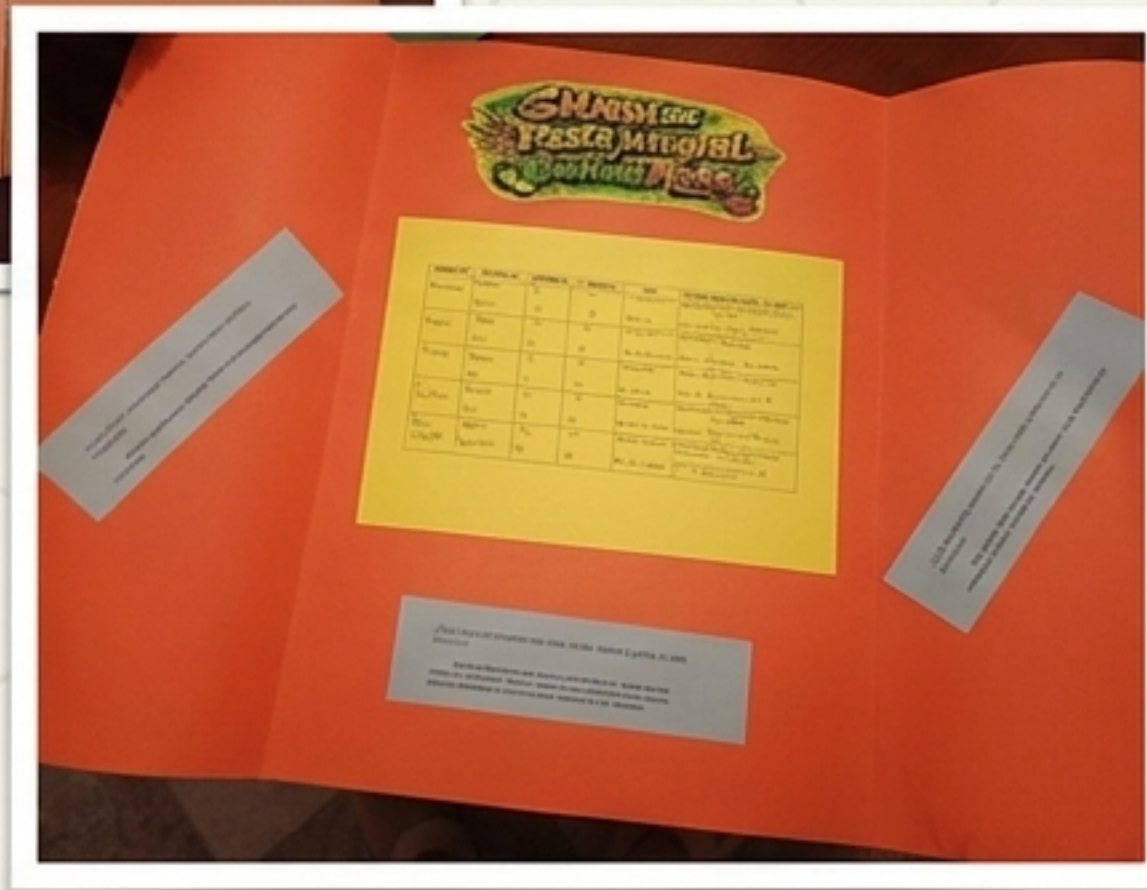
C (Carbon) & O (Oxygen):
Rice is built on these non-metals.

Biological Function:
Oxygen is the natural comburent for respiration. Carbon facilitates cellular combustion, providing energy to cells, transferring and storing energy.

Carbon and Oxygen are the primary source of energy for the human body, vital for cellular, brain, and muscular functions.

Exhibit G: Applied Chemistry in a Plated Meal

Focus: Salmón con Pasta Integral y Ensalada Mixta



Se

Selenium | Atomic No. 34.
Non-metal.

Function: Antioxidant, supports the immune system.

Zn

Zinc | Atomic No. 30.
Transition metal.

Function: Cellular metabolism and immune support.

The salmon provides almost all the mentioned chemical elements on its own!

Exhibit H: Essential Minerals in Grains and Greens



Mg (Magnesium) | Atomic No. 12



Alkaline earth metal.
Source: Whole Wheat Rice.

Zn (Zinc) | Atomic No. 30



Transition metal.
Function: Immune system
support and cell division.

Fe (Iron) | Atomic No. 26



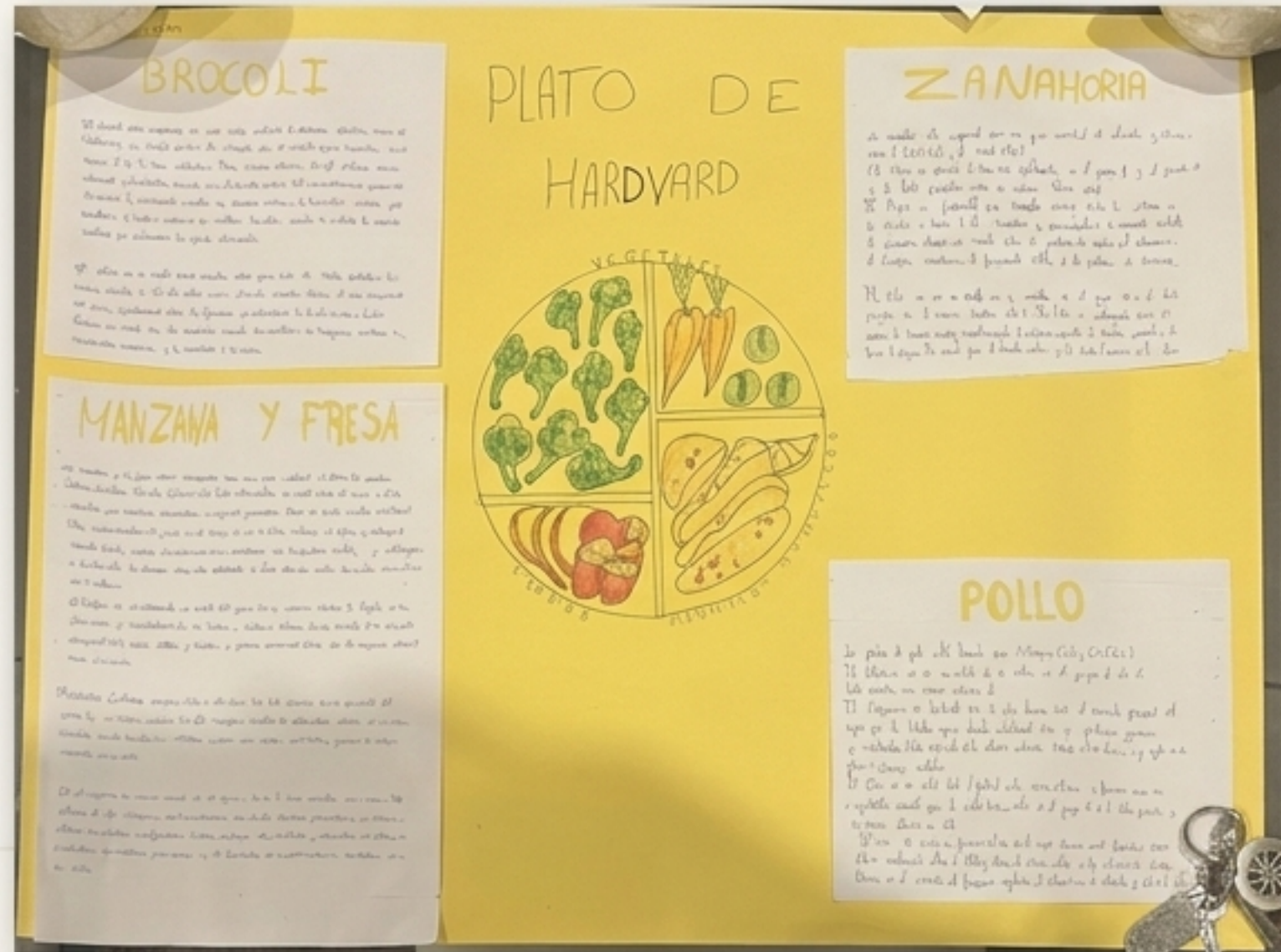
Transition metal.
Source: Vegetables.
Function: Forms part of
Hemoglobin.



Physical Energy
& Health

Exhibit I: The Detailed Biological Mechanisms

Extracted Focus: The intricate connection between specific atoms and cellular health.



The students discovered that eating is fundamentally the act of replenishing our atomic reserves. A carrot isn't just a vegetable; it is a delivery mechanism for Potassium (K), a critical metal required to maintain electrical gradients in human muscle tissue.

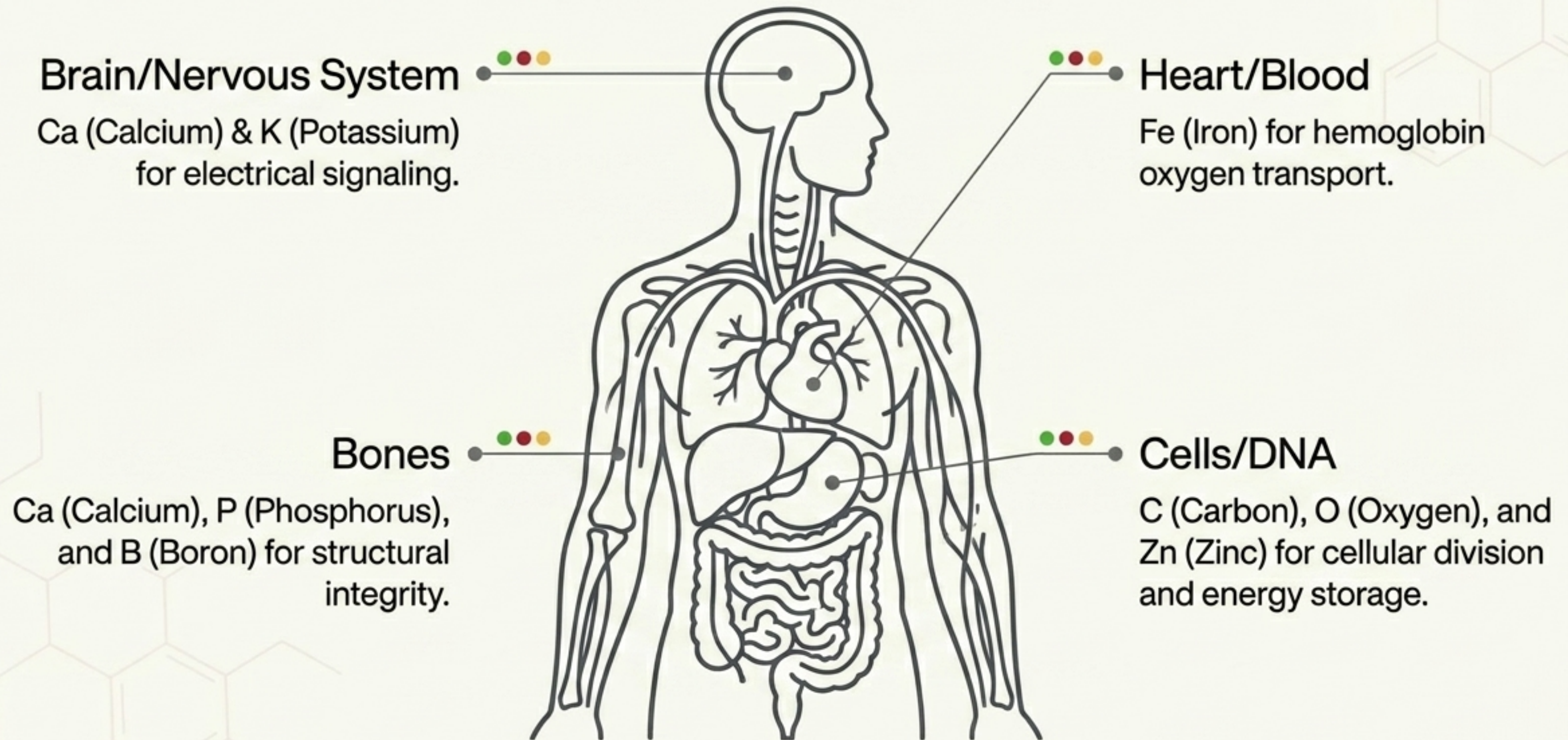


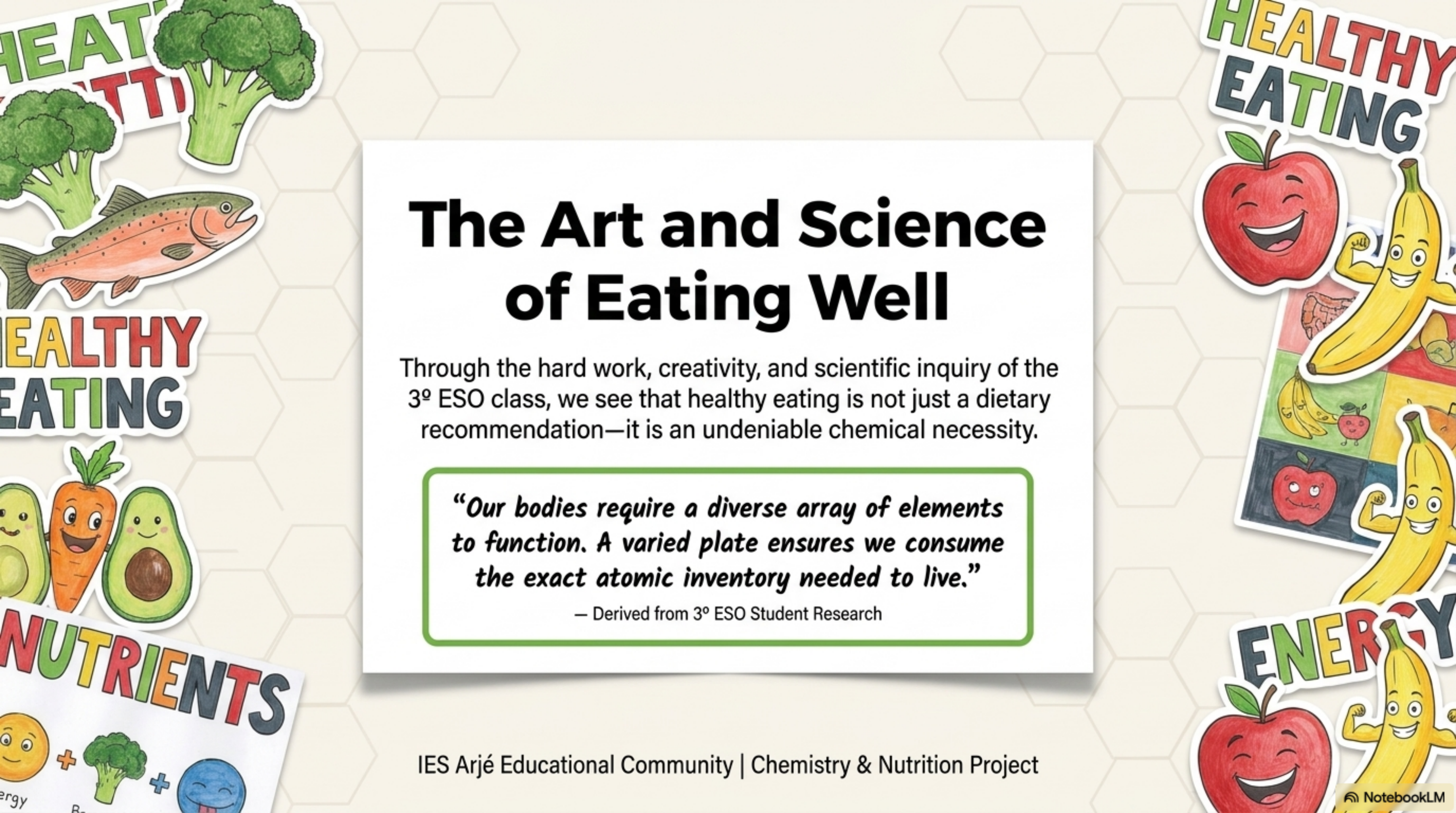
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The Master Catalog: Dietary Elements Matrix

Vegetables	Fe (26, Transport)	Ca (20, Bone Density)	K (19, Muscle function)
Proteins	Se (34, Immunity)	Zn (30, Metabolism)	S (16, Amino Acids)
Fruits	F (9, Enamel)	Cu (29, Iron absorption)	B (5, Bone health)
Grains	Mg (12, Biochemical reactions)	P (15, DNA formation)	–

The Biological Engine



The background of the slide is decorated with various food-related stickers. On the left, there are stickers for 'HEALTHY EATING' (partially visible), a broccoli, a fish, and 'HEALTHY EATING' (partially visible). At the bottom left, there are stickers for 'NUTRIENTS' (partially visible), a carrot, an avocado, and a smiley face. On the right, there are stickers for 'HEALTHY EATING', a smiling apple, a banana, and 'ENERGY' (partially visible).

The Art and Science of Eating Well

Through the hard work, creativity, and scientific inquiry of the 3º ESO class, we see that healthy eating is not just a dietary recommendation—it is an undeniable chemical necessity.

“Our bodies require a diverse array of elements to function. A varied plate ensures we consume the exact atomic inventory needed to live.”

— Derived from 3º ESO Student Research