



UNIT 1. THE SCIENCE. MAGNITUDES & UNITS.

Key words & exercises.

1. VOCABULARY

Concepts		Laboratory equipment
Science	Surface (area)	Beaker
Hypothesis	Volume	Flask
Theory	Radius	Volumetric flask
Knowledge	Side	Graduated cylinder
Data	Rectangle	Pipette
Physics	Triangle	Ruler
Chemistry	Circle	Scale
Magnitude	Cube	Test tube
Unit	Prism	Stopper
Length	Cylinder	Actions
Height	Sphere	To test
Depth	Metre (<i>meter in US</i>)	To measure
Width	Square metre	To calculate
Weight	Cubic metre	To divide
	Litre (<i>liter in US</i>)	To multiply



Translate this text into Spanish

The Science studies how Nature works, from the smallest bacteria to the biggest galaxy in Universe.

But, how do scientists get this knowledge? They use the Scientific Method.

The Scientific Method includes observation, study of data, making hypothesis and experiments to test the hypothesis.

When a hypothesis is tested well enough is called 'theory'.



2. READING & WRITING NUMBERS

Hundred 359: three hundred and fifty nine

Thousand 15201: fifteen thousand two hundred and one

Million

Billion (thousand million)

Expressing decimals:

Unlike Spanish language, in English we use a dot (.) to separate decimal digits. We say "point"

3.5 : three point five

Fractions:

$\frac{1}{2}$: a half

$\frac{1}{4}$: a quarter

$\frac{3}{4}$: three quarters

$\frac{1}{5}$: a fifth

0.1: a tenth

0.01: a hundredth

2.4 : two and four tenths

2.04: two and four hundredths



3. MATHEMATICAL OPERATIONS

+	plus	x^2	squared (to the power of 2)
-	minus	x^3	cubed (to the power of 3)
=	equals (is)	$\sqrt{2}$	square root of two
·	times (multiplied by)	%	per cent (percent, US)
/	over (divided by)		



Write with words (not with numbers) these operations:

$$2 + 3 = 5 \quad \rightarrow$$

$$15 - 8 = 7 \quad \rightarrow$$

$$50 \cdot 100 = 5000 \quad \rightarrow$$

$$688 / 2 = 344 \quad \rightarrow$$

$$4^2 = 16 \quad \rightarrow$$

$$2^3 = 8 \quad \rightarrow$$

$$\sqrt{16} = 4 \quad \rightarrow$$

$$25\% \text{ of } 80 = 20 \quad \rightarrow$$

$$6 \cdot \sqrt{3} = 10.39 \quad \rightarrow$$



4. DESCRIBING DIMENSIONS

There are several ways of describing dimensions in English, like *length*, *height*, *width*, *depth*, *surface*, *volume*... Usually in scientific English, we use the verbs *to be* or *to have*.

For example: *The length of the car **is** 4.5 m.* or
 *The car **has** a length of 4.5 m.*



Exercise: Make sentences using both structures, with these words:

1) river width 300 m

2) tower 150 m

3) rectangle 20 cm²

4) bottle 2 l

5) well 67 m

We can also use adjectives to express some dimensions, but it's less formal:

Length → long

Height → high

Width → wide

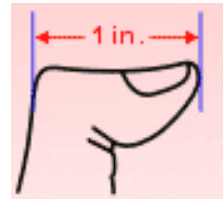
Depth → deep



5. BRITISH AND AMERICAN UNITS OF LENGTH:

British and American people (specially in USA) rarely use the International System of Units. For example, for measuring the length of a road, or the height of a person, they don't use metres, or kilometres... They use very ancient units, like miles, inches, feet... here they are some of them.

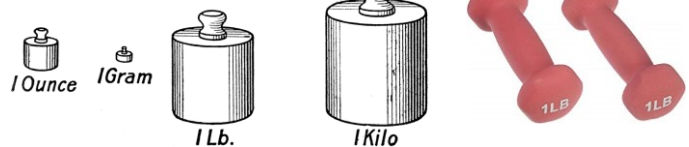
- inch (in): 1 in. = 2,54 cm
- foot (ft): 1 ft. = 12 in = 30,48 cm
- yard (yd): 1 yd = 3 ft = 0,9144 m
- mile: 1 mile = 1,609 km = 1609 m



BRITISH AND AMERICAN UNITS OF WEIGHT:

- Ounce (oz): 1 oz = 28.35 g
- Pound (lb): 1 lb = 16 oz = 453.6 g

Comparison of Units of Weight

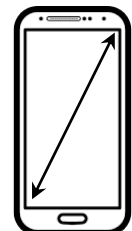


Pau Gasol is 7 ft. tall. Which is his height in S.I. units?

The penalty point on a football court is 12 yards far from the goal line. How many metres are 12 yards?

The screen of a mobile phone measures 5 in. Which is this length in S.I. units?

What's your weight in pounds? And your height in feet?



6. UNDERSTANDING A TEXT: The Royal Observatory of San Fernando (Cádiz)

What's the time? It's easy to answer this question if we have a clock, or a watch. But the question "What's the exact time?" is not so easy to answer. If we take two watches, they don't display the same time. Maybe the difference is only a few seconds, but in science this is very important. Normally we adjust our clocks and watches with the radio, television or internet. And these media get the exact time from Astronomical Observatories located in each country. In Spain, the Royal Observatory of San Fernando (Cádiz) keeps the right time, by using atomic clocks.

It was built in the latest years of the 18th century. Since then, scientists who work there provide the right time in our country. Nowadays, the Observatory gets the data from GPS satellites, and it is in permanent communication with other observatories around the world.



- a) Translate this text into Spanish
- b) Do you think it is important to know the exact time? Why?