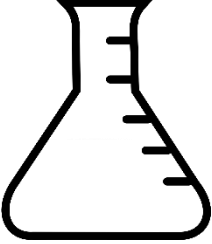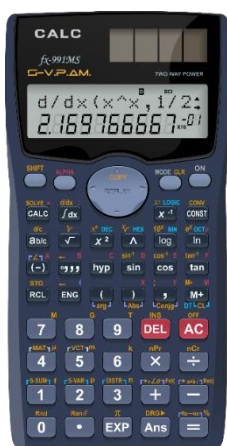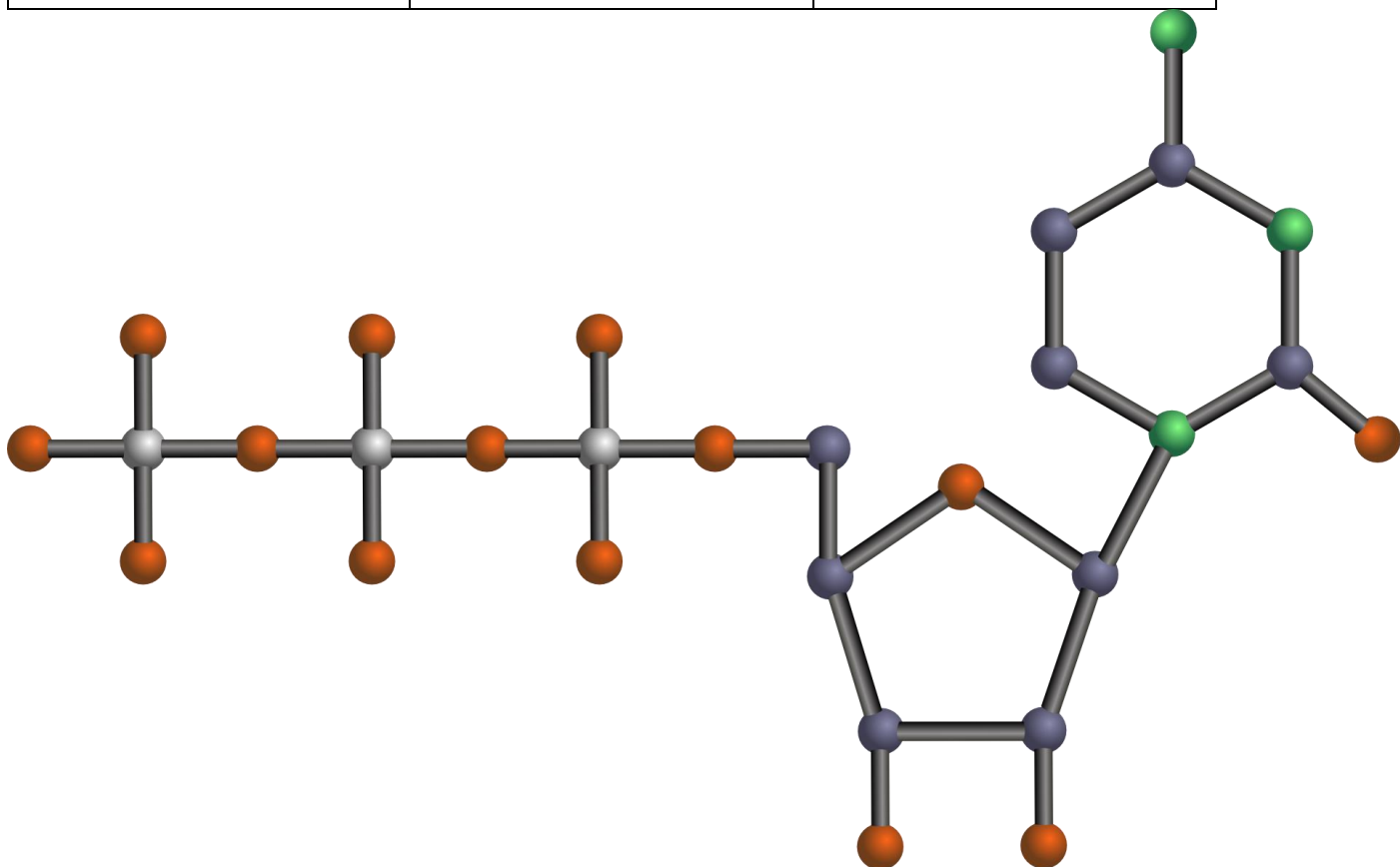# Mathematics

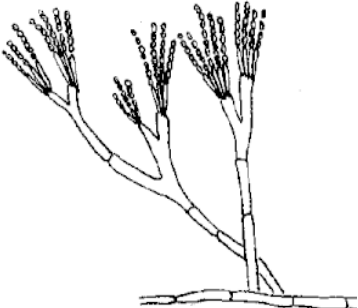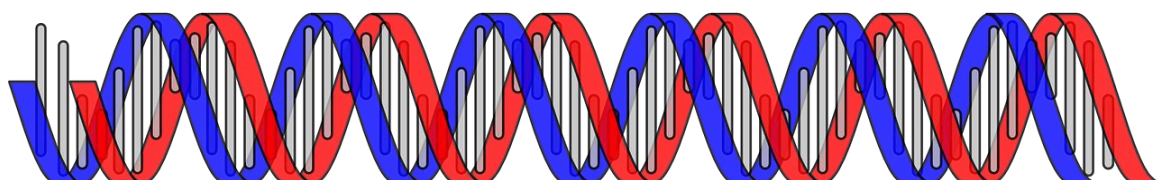|		
Write one millionth as a power of ten!	1) 10^{-2} **2) 10^{-6}** 3) 10^{-3} 4) 10^{-9}	A millionth is 10^6.
25 employees work in a laboratory. The ratio of men to women is 2:3. How many woman and men work in the laboratory?	1) 20 men und 5 women **2) 10 men und 15 women** 3) 15 men und 10 women 4) 5 men und 20 women	$\dfrac{m}{w} = \dfrac{2}{3}$ m + w = 25
The graph shows the burning process of a candle. Give the appropriate functional euqation for the graph. 	1) y = -0,5x + 8 **2) y = -0,4x + 8** 3) y = 2,5x + 8 4) y = -0,6x – 8	y = mx + t m: gradient t: intercept
In an experiment, a goalkeeper hits the ball from a height of 90 cm. After 25 m horizontal distance, the ball has a height of 10 m and hits the ground after 45 m. The trajectory of the ball can be described by a parabolic equation of the form $y = ax^2 + bx + c$. Where x m stands for the horizontal flight distance and y m for the height above the ground. Determine mathematically the equation of the parabola for the flight!	1) $y = 172x^2 + 0{,}655x + 77$ **2) $y = -0{,}0192x^2 + 0{,}844x + 0{,}9$** 3) $y = -0{,}01x^2 + 0{,}9x + 0{,}8$ 4) $y = -0{,}8943x^2 + 1{,}428x + 0{,}7$	P (25|10) Q (45|0) -> Plug into the parabola equation!

Chemistry

|		
Name this laboratory device!	**1) Erlenmeyer flask** 2) Round bottom flask 3) Graduated cylinder 4) Petri dish	Named after a german chemist.
$^{7}_{3}Li$ Name the technical term of the number 3 in the example above!	**1) Atomic number** 2) Nucleon number 3) Valence number 4) Neutron count	Another word for proton or electron count.
Calculate the absolute particle mass in u from HCl!	**1) 36 u** 2) 17 u 3) 9,5 u 4) 55 u	H: 1 u Cl: 35 u
Formulate the reaction equation for the redox atoms with oxygen molecules!	**1) 2 Cu + O₂ = 2 CuO** 2) Cu + O₂ = CuO₂ 3) 3 Cu + S = Cu₃S 4) 2 Cu +O₂ = Cu₂O₂	The same number of atoms must appear on both sides.

Biology

Cucumbers can be grown in the lab. We know them as a vegetable. Explain why the cucumber belongs to the berries!	**1) Because their seeds are covered in pulp.** 2) It is green. 3) The cucumber grows on a bush, like a berry. 4) The cucumber, like a berry, consists mostly of water.	If the seeds of a fruit are enclosed by the pulp, it is called a berry.
Formulate the word equation of photosynthesis!	**1) Glucose and oxygen are produced in the plant from light, water and carbon dioxide.** 2) Oxygen is produced in the plant from light and water. 3) Oxygen is produced in the plant from water and carbon dioxide. 4) Water and oxygen are produced in the plant from light, glucose and carbon dioxide.	$6\ H_2O + 6\ CO_2$ + Licht = $6\ O_2 + C_6H_{12}O_6$
Mold has grown on the bread in the lab. Name the group of molds shown below. 	**1) Brush mold** 2) Watering can mold 3) Brain mold 4) Dapple mold	The name is derived from the appearance.
Name the function of the adhesive enzymes in genetic engineering!	**1) They insert the foreign gene into the genetic material.** 2) They deliver the gene into the recipient cell. 3) They are able to stick the DNA together at certain points. 4) They connect genes.	

Physik

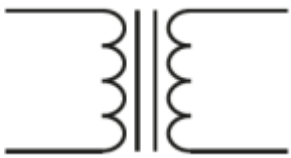| In the experiment, a goalkeeper kicks a soccer ball at a speed of 108 $\frac{km}{h}$. Calculate how long it takes the ball to travel 45 m!	1) 0,75 s 2) 1,35 s 3) 0,42 s **4) 1,5 s**	$v = \frac{s}{t}$ $-> t = \frac{s}{v}$
In an experiment, a 450 g soccer ball is kicked at a speed of 108 $\frac{km}{h}$. Calculate its kinetic energy!	1) 2845,5 J 2) 2624,4 J 3) 202500 J **4) 202,5 J**	$E_{kin} = 0{,}5 \cdot m \cdot v^2$ m in kg v in $\frac{m}{s}$
A physicist with a mass of 75 kg wears shoes with a sole area of 400 cm². Calculate the pressure on the laboratory floor!	1) 3,8 bar 2) 730 bar 3) 294 Pa **4) 1839 Pa**	$p = \frac{F_G}{A}$
Calculate the momentum of a soccer ball with a mass of 450 g and a speed of 108 $\frac{km}{h}$!	1) 4860 Ns 2) 1350 Ns 3) 48,6 Ns **4) 13,5 Ns**	$p = m \cdot v$
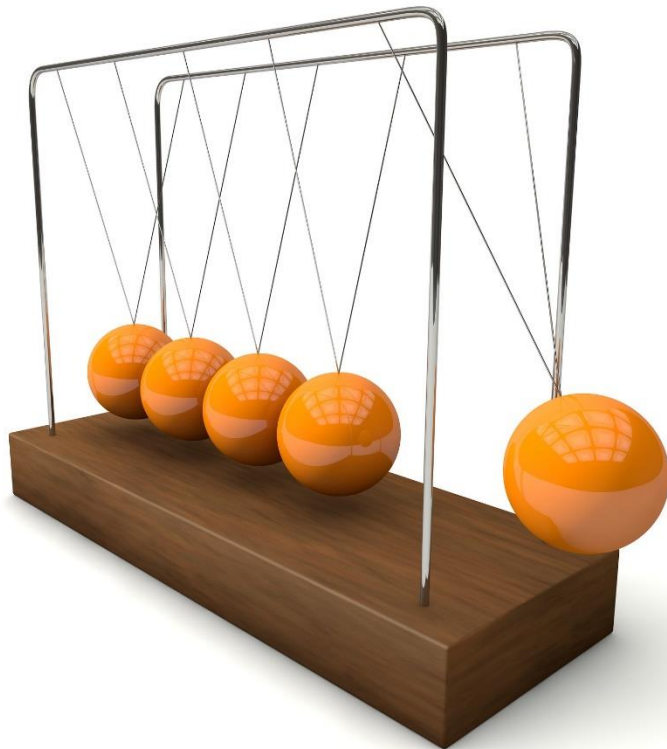
IT

Which keys are your fingers on in the basic position?	1) ADGJ HIOB 2) QWER ZUIO **3) ASDF JKLÖ** 4) SDFG HJKL	The left indexfinger stays on the F.
Which special character is needed to create an absolute reference in a spreadsheet program?	1) # 2) & **3) $** 4) *	
What file type is a „.png" ?	1) text file 2) video file **3) image file** 4) audio file	Png: portable network graphics
$Y = A \overline{\vee} B$ Which logical function is represented here?	1) OR 2) XOR **3) NOR** 4) NAND	V represents „or"

Engineering

Name the following circuit symbol!	1) power supply 2) gauge 3) resistance **4) lightbulb**	
A battery is labeled 2400 mAh. What physical quantity does the specification refer to?	1) power 2) voltage 3) amperage **4) capacity**	mAh indicates how long a battery or rechargeable battery supplies a certain current. So how much energy can be stored in it.
	1) amplifier 2) coil with iron core 3) photodiode **4) Iron core transformer**	
Describe Lenz's rule.	1) The induced voltage of a coil depends on the number of turns and the thickness of the wire. 2) The Lorentz force is always parallel to the direction of the current. 3) A magnetic field always generates an induction current. **4) The induction current is always directed in such a way that it counteracts the cause of its generation.**	A magnet falling through an aluminum tube is slowed down.