Electric Charges, Fields, and Gauss's Law

AP Physics C: Electricity and Magnetism · Vocabulary in context

Word	Example
electric charge /ɪ'lektrɪk tʃɑ:dʒ/	A rubbed balloon has an **electric charge**.
quantized /'kwɒntaɪzd/	Charge is **quantized**: it comes in whole multiples of e.
	e
elementary charge /ˌelɪ'mentəri tʃɑ:dʒ/	The charge on one electron is the **elementary charge**.
conservation of charge /ˌkɒnsə'veɪʃn ɒv tʃɑ:dʒ/	**Conservation of charge** means charge is never lost.
point charge /pɔɪnt tʃɑ:dʒ/	Treat the small ball as a **point charge**.
Coulomb's law /'ku:lɒmz lɔ:/	**Coulomb's law** gives the force between two charges.
inverse-square /ɪn'vɜ:s skweə/	Gravity follows an **inverse-square** law: double the distance, a quarter of the force.
superposition /ˌsu:pəpə'zɪʃn/	When two waves meet, **superposition** adds them together.
fundamental property /ˌfʌndə'mentl 'prɒpəti/	Charge is a **fundamental property** of matter, like mass.
permittivity of free space /ˌpɜ:mɪ'tɪvəti ɒv fri: speɪs/	The **permittivity of free space** ε_0 sets the value of k.
	ε_0 k
conductor /kən'dʌktə/	Copper is a good **conductor** of electricity.
insulator /'ɪnsju:leɪtə/	Plastic is an **insulator**.

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charging by friction /'tʃɑ:dʒɪŋ baɪ 'frɪkʃn/	**Charging by friction** happens when you rub a balloon on your hair.
charging by conduction /'tʃɑ:dʒɪŋ baɪ kən'dʌkʃn/	**Charging by conduction** happens when a charged rod touches a metal sphere.
charging by induction /'tʃɑ:dʒɪŋ baɪ ɪn'dʌkʃn/	**Charging by induction** charges a sphere without touching it.
ground /graʊnd/	**Ground** the sphere by joining it to the Earth with a wire.
polarization /ˌpəʊlərəɪ'zeɪʃn/	**Polarization** moves the charges in a neutral object slightly apart.
electroscope /ɪˌlektrəʊ'skəʊp/	The leaves of an **electroscope** spread apart when it is charged.
electric field /ɪ'lektrɪk fi:ld/	A charged ball has an **electric field** around it.
test charge /test tʃɑ:dʒ/	A small positive **test charge** feels a force in the field.
field lines /fi:ld laɪnz/	**Field lines** point away from positive charge and never cross.
uniform /'ju:nɪfɔ:m/	The weight of a **uniform** rod acts at its middle.
continuous charge distribution /kən'tɪnju:əs tʃɑ:dʒ ˌdɪstrɪ'bju:ʃn/	A charged rod is a **continuous charge distribution**.
linear charge density /'lɪnɪə tʃɑ:dʒ 'densɪti/	A wire's **linear charge density** is its charge per metre.

Word	Example
surface charge density /ˈsɜːfɪs tʃɑːdʒ ˈdensɪti/	A plate's **surface charge density** is its charge per square metre.
volume charge density /ˈvɒljuːm tʃɑːdʒ ˈdensɪti/	A ball's **volume charge density** is its charge per cubic metre.
symmetry /ˈsɪmətri/	The rose curve has **symmetry**: each petal looks the same.
electric flux /ɪˈlektrɪk flʌks/	The **electric flux** through a closed surface equals the enclosed charge divided by ε_0.
area vector /ˈeərɪə ˈvektə/	The **area vector** points straight out of the surface.
Gauss's law /ˈgaʊsɪz lɔː/	**Gauss's law** links the electric field through a closed surface to the charge inside.
Gaussian surface /ˈgaʊʃn ˈsɜːfɪs/	Choose a **Gaussian surface** that matches the shape of the charge.
spherical symmetry /sˈferɪkl ˈsɪmətri/	A charged ball has **spherical symmetry**.
cylindrical symmetry /sɪˈlɪndrɪkl ˈsɪmətri/	A long charged wire has **cylindrical symmetry**.
planar symmetry /ˈpleɪnə ˈsɪmətri/	A large charged sheet has **planar symmetry**.

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