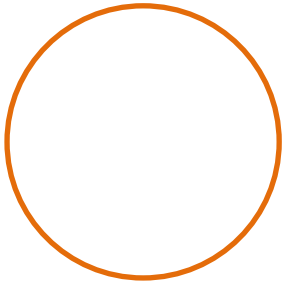
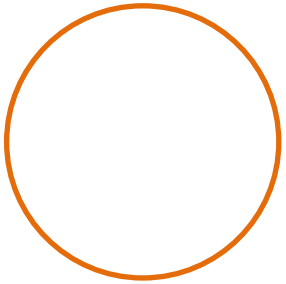
Up



Happy Families	Snap
Name: Up **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: very light	**Charge:** +2/3
one of the main components of protons and neutrons	together with the down they are the lightest of all quarks
amongst the first quarks to be discovered	physicists thought up and down were the only quarks

Dr Maria Pavlidou
Prof Cristina Lazzeroni

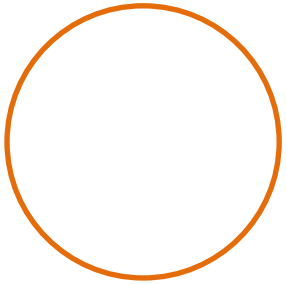
Down



Happy Families	Snap
Name: Down **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: very light	**Charge:** -1/3
one of the main components of protons and neutrons	together with the up they are the lightest of all quarks
amongst the first quarks to be discovered	physicists thought up and down were the only quarks

Dr Maria Pavlidou
Prof Cristina Lazzeroni

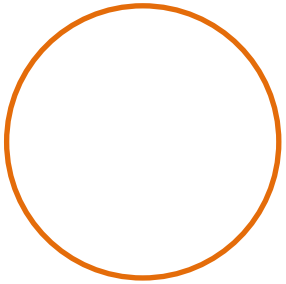
Anti-up



Happy Families	Snap
Name: Anti-up **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: very light	**Charge:** -2/3
one of the main components of anti-protons and anti-neutrons	together with the anti-down they are the lightest of all anti-quarks
when colliding with an up quark they annihilate	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

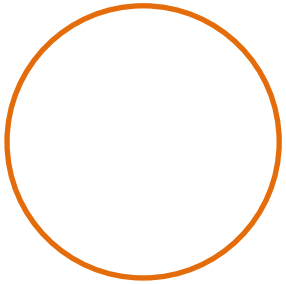
Anti-down



Happy Families	Snap
Name: Anti-down **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: very light	**Charge:** +1/3
one of the main components of anti-protons and anti-neutrons	together with the anti-up they are the lightest of all anti-quarks
when colliding with a down quark they annihilate	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

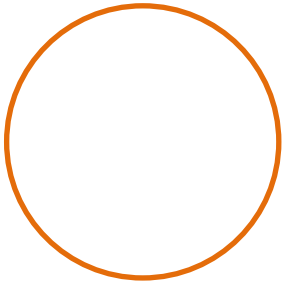
Charm



Happy Families	Snap
Name: Charm **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: heavy	**Charge:** +2/3
it is called charm because, when it was discovered, the mathematical calculations in the theory worked like a charm	it was discovered in 1974

Dr Maria Pavlidou
Prof Cristina Lazzeroni

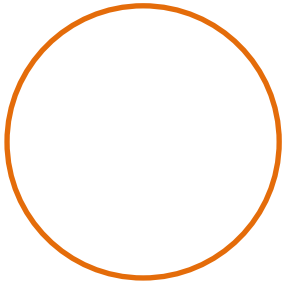
Strange



Happy Families	Snap
Name: Strange **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: light	**Charge:** -1/3
it is called strange because the first time it was seen physicists did not understand what it was	it was discovered in 1964

Dr Maria Pavlidou
Prof Cristina Lazzeroni

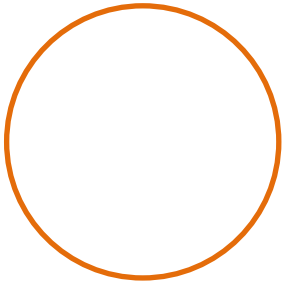
Anti-charm



Happy Families	Snap
Name: Anti-charm **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: heavy	**Charge:** -2/3
it is called anti-charm because, when it was discovered, the mathematical calculations in the theory worked like a charm	when colliding with a charm quark they annihilate

Dr Maria Pavlidou
Prof Cristina Lazzeroni

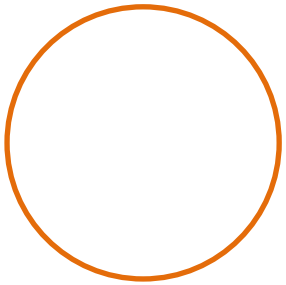
Anti-strange



Happy Families	Snap
Name: Anti-strange **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: light	**Charge:** +1/3
it is called anti-strange because the first time it was seen physicists did not understand what it was	when colliding with a strange quark they annihilate

Dr Maria Pavlidou
Prof Cristina Lazzeroni

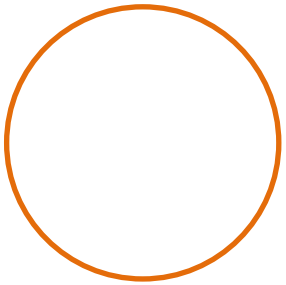
Top



Happy Families	Snap
Name: Top **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: very heavy	**Charge:** +2/3
it is called top because it is the heaviest quark	it has the shortest life of all quarks

Dr Maria Pavlidou
Prof Cristina Lazzeroni

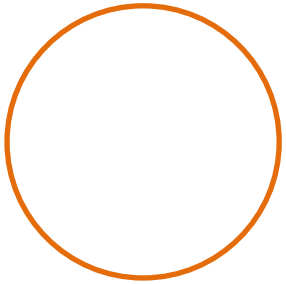
Beauty



Happy Families	Snap
Name: Beauty **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: heavy	**Charge:** -1/3
it is called beauty because when it was discovered physicists realised that there is a set of 6 quarks, which made the theory beautiful	some physicists call it bottom quark

Dr Maria Pavlidou
Prof Cristina Lazzeroni

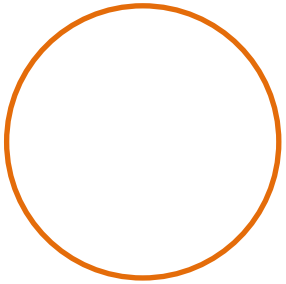
Anti-top



Happy Families	Snap
Name: Anti-top **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: very heavy	**Charge:** -2/3
when colliding with a top quark they annihilate	it is called anti-top because it is the heaviest anti-quark
it has the shortest life of all anti-quarks	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

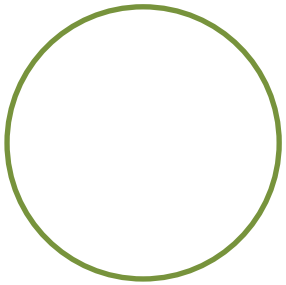
Anti-beauty



Happy Families	Snap
Name: Anti-beauty **Surname:** Quark	**Likes:** Z, W+, W-, gluon, photon
Mass: heavy	**Charge:** +1/3
when colliding with a beauty quark they annihilate some physicists call it anti-bottom quark	it is called anti-beauty because when it was discovered physicists realised that there is a set of 6 anti-quarks, which made the theory beautiful

Dr Maria Pavlidou
Prof Cristina Lazzeroni

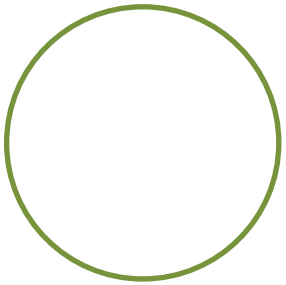
Electron



Happy Families	Snap
Name: Electron **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: very light	**Charge:** -1
it can be found inside atoms	it is the particle that runs along electric circuits and gives us electricity
it was discovered in Cambridge in 1897	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

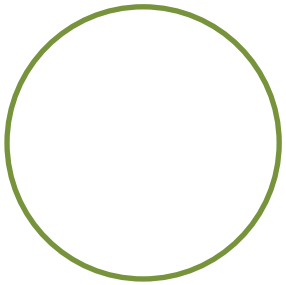
Electron neutrino



Happy Families	Snap
Name: Electron neutrino **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: very light	**Charge:** 0
elusive particle, like the "phantom" of the particle world; difficult to catch or to track down	it can pass through our body without us noticing
it travels almost at the speed of light	the Sun produces lots of them

Dr Maria Pavlidou
Prof Cristina Lazzeroni

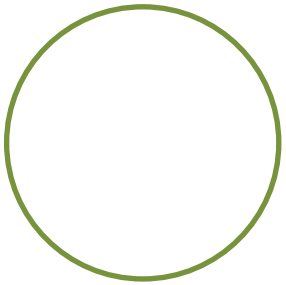
Anti-electron



Happy Families	Snap
Name: Anti-electron **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: very light	**Charge:** +1
it is also called positron	when colliding with an electron they annihilate

Dr Maria Pavlidou
Prof Cristina Lazzeroni

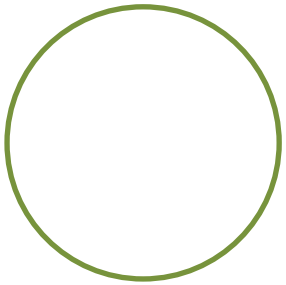
Anti-electron neutrino



Happy Families	Snap
Name: Anti-electron neutrino **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: very light	**Charge:** 0
it comes from space (cosmic anti-neutrinos)	it can pass through our body without us noticing
when colliding with an electron neutrino they annihilate	it travels almost at the speed of light

Dr Maria Pavlidou
Prof Cristina Lazzeroni

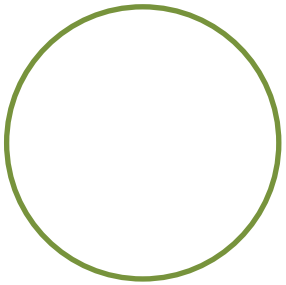
Muon



Happy Families	Snap
Name: Muon **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: light	**Charge:** -1
it is 200 times heavier than the electron	they come from space and arrive to the Earth all the time
it can pass through our body without us noticing	it was discovered in 1936

Dr Maria Pavlidou
Prof Cristina Lazzeroni

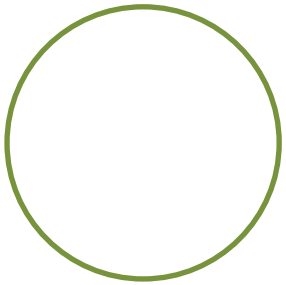
Muon neutrino



Happy Families	Snap
Name: Muon neutrino **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: very light	**Charge:** 0
elusive particle, like the "phantom" of the particle world; difficult to catch or to track down	it can pass through our body without us noticing
it travels almost at the speed of light	electron neutrinos oscillate into muon neutrinos before arriving on Earth

Dr Maria Pavlidou
Prof Cristina Lazzeroni

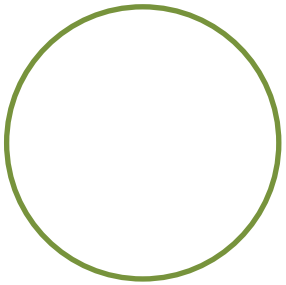
Anti-muon



Happy Families	Snap
Name: Anti-muon **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: light	**Charge:** +1
it is 200 times heavier than the anti-electron	they come from space and arrive to the Earth all the time
it can pass through our body without us noticing	when colliding with a muon they annihilate

Dr Maria Pavlidou
Prof Cristina Lazzeroni

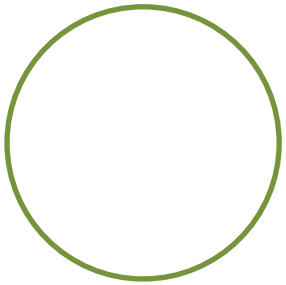
Anti-muon neutrino



Happy Families	Snap
Name: Anti-muon neutrino **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: very light	**Charge:** 0
elusive particle, like the "phantom" of the particle world; difficult to catch or to track down	when colliding with a muon neutrino they annihilate
it travels almost at the speed of light	it can pass through our body without us noticing

Dr Maria Pavlidou
Prof Cristina Lazzeroni

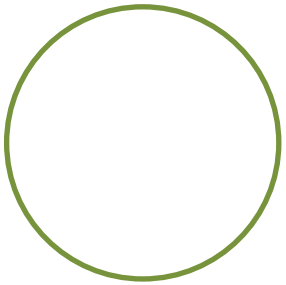
Tau



Happy Families	Snap
Name: Tau **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: heavy	**Charge:** -1
it is 20 times heavier than a muon	it is the heaviest of all leptons

Dr Maria Pavlidou
Prof Cristina Lazzeroni

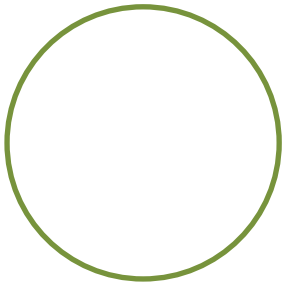
Tau neutrino



Happy Families	Snap
Name: Tau neutrino **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: very light	**Charge:** 0
elusive particle, like the “phantom” of the particle world; difficult to catch or to track down	it can pass through our body without us noticing
electron neutrinos oscillate into tau neutrinos before arriving on Earth	it travels almost at the speed of light

Dr Maria Pavlidou
Prof Cristina Lazzeroni

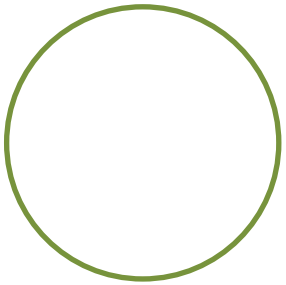
Anti-tau



Happy Families	Snap
Name: Anti-tau **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: heavy	**Charge:** +1
it is 20 times heavier than the anti-muon	it is the heaviest of all anti-leptons
when colliding with a tau they annihilate	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

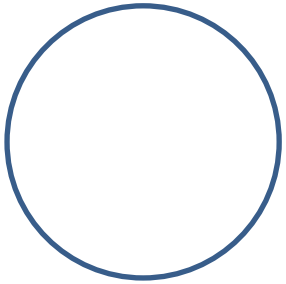
Anti-tau neutrino



Happy Families	Snap
Name: Anti-tau neutrino **Surname:** Lepton	**Likes:** Z, W+, W-, photon
Mass: very light	**Charge:** 0
elusive particle, like the "phantom" of the particle world; difficult to catch or to track down	it can pass through our body without us noticing
when colliding with a tau neutrino they annihilate	it travels almost at the speed of light

Dr Maria Pavlidou
Prof Cristina Lazzeroni

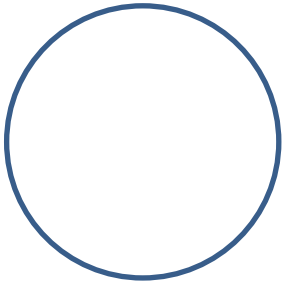
Gluon



Happy Families	Snap
Name: Gluon **Surname:** Boson	**Likes:** quarks, anti-quarks
Mass: very light	**Charge:** 0
it keeps the quarks inside protons and neutrons like a glue	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

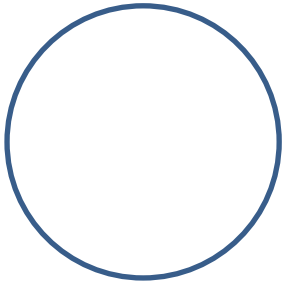
W+



Happy Families	Snap
Name: W+ **Surname:** Boson	**Likes:** quarks, anti-quarks, leptons, anti-leptons, Higgs
Mass: very heavy	**Charge:** +1
it is one of the particles responsible for radioactivity	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

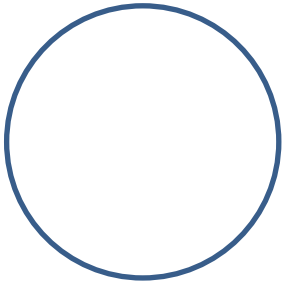
Photon



Happy Families	Snap
Name: Photon **Surname:** Boson	**Likes:** quarks, anti-quarks, leptons, anti-leptons, W+, W-
Mass: 0	**Charge:** 0
the gold medalist of all particles because it can run the fastest and no other particle can match this	it is the particle of light

Dr Maria Pavlidou
Prof Cristina Lazzeroni

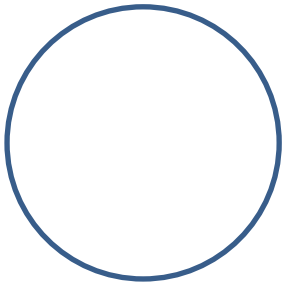
W-



Happy Families	Snap
Name: W- **Surname:** Boson	**Likes:** quarks, anti-quarks, leptons, anti-leptons, Higgs
Mass: very heavy	**Charge:** -1
it is one of the particles responsible for radioactivity	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

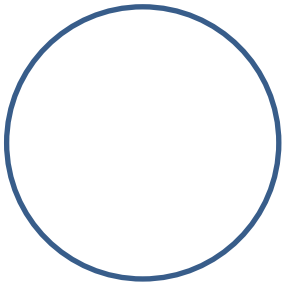
Z



Happy Families	Snap
Name: Z **Surname:** Boson	**Likes:** quarks, anti-quarks, leptons, anti-leptons, Higgs
Mass: very heavy	**Charge:** 0
physicists thought this was the last particle to be discovered, so they named it with the last letter of the alphabet	

Dr Maria Pavlidou
Prof Cristina Lazzeroni

Higgs



Happy Families	Snap
Name: Higgs **Surname:** Boson	**Likes:** quarks, anti-quarks, electron, muon, tau, W+, W-, Z
Mass: very heavy	**Charge:** 0
it got its name from Professor Higgs (University of Edinburgh) who first thought about it	It is responsible for giving mass to all other particles it was discovered in 2012

Dr Maria Pavlidou
Prof Cristina Lazzeroni