

Doos: Hi jen
Jen: hi doos
Jen: st helens blew yesterday
Doos: oh dear and you missed it
Jen: i did
Jen:
Doos: poor you
Jen: i was so sad
Doos: was it on tv?
Jen: poor me
Jen: no my tv is down
Jen: i am on hold to get it fixed
Jen: i read it on the web
Jen: i will see in 20 yrs if she goes again
Jen: or when she decides to go again
Jen: it wasn't big
Doos: maybe you'll be there
Jen: matbe
Jen: maybe*
Jen: maybe my hubby will watch with me
Jen: be soo romantic
Jen: lol
Doos: heh
Jen: you just get up
Jen: i did
Doos: it's almost dinner time here
Jen: annie is coming to check on you
Jen: oh really
Doos: lol
Doos: I better behave then
Jen: how come you are never on this time of day anymore
Jen: you better
Doos: doing stuff
Annie entered the room.
Doos: mostly after 10 am your time I'm on
Doos: hey annie
Annie: Hi Doos
Annie: Hi Jen
Jen: hi annie
Annie has left the room.
Doos: bye annie
Annie entered the room.
Doos: sit still annie
Annie: Hi again
Annie: i mustn't move
Jen: brb
Annie: How are you
Doos: I'm fine, how is it at your end?
Annie: oh, i had so much trouble
Annie: with computer and couldn't get java going since t
Annie: this morning
Doos: did you need to re-install?
Annie: i didn't have the software in my new system
Annie: but i am still craving for my old files
Doos: what happened to them?

Annie: all gone because of a stupid mistake
Doos: fdisk?
Annie: they didn't help to recover anything
Annie: and installed a new harddrive
Doos: I once had my computer stolen, 2-3 years of work down the drain
Annie: but apparently old harddrive is still in there
Jen: i am back
Annie: oh, my god, i;d be spuing even more for something like that
Jen: ok gemma said she would be late
Doos: turn around
Jen: ok doos can you remember what is was we said we would dicuss here
Jen: i am having a brain meltdown and can't remember
Annie: did you see my post on YG
Jen: probably sadness
Doos: funny thing was that the neighbour woman saw the whole thing happening and thought "not my business"
Annie: after Yean-Ives
Annie: oh that is cruel Doos
Doos: optical axes?
Jen: nooh
Jen: no i thought you said not to wrry about those
Jen: i am going to look
Doos: maybe Jean-Yves could get his butt over here and teach us some more
Annie: huh, i don't understand
Annie: oh yeah
Annie: oh you make me laugh again
Doos: not intended, honest
Doos: I'll behave
Annie: its under coloured stones Jen
Jen: i can't remember
Jen: blah maybe we dealt woth it doos
Jen: now there was another question i just thought of and lost
Jen: grrrr
Jen: oh yeah
Doos: we were talking about the tetrahedron and the lack of a center of symmetry
jen
Jen: ok crystallographic axes
Jen: monoclinic
Jen: 3 all unequal
Jen: 2 laterl inclined 1 C-axis @ 90 degree to thier plane
Jen: what does lateral incl;ined mean
Jen: that wasit
Jen: ok that next
Jen: any answers
Doos: well
Doos: remember that in a cube the a and the b axes are at 90 degrees to eachother?
Jen: yes
Doos: in a monoclinic crystal they are not
Annie: do you understand the definitions of those
Jen: ok i got that much
Jen: but what is inclined
Doos: (annie we cheated and talked about it earlier)
Doos: inclined = angled
Jen: oh ok cause some are lateral@60

Jen: and then inclined
Jen: what is lateral
Doos: uhm
Jen: my birds came out
Annie has left the room.
Jen: ok uhm is not a good answer
Jen: did you pass with that lol
Doos: look at lateral as in one plain
Jen: oh ok
Doos: so you look down the c-axis at the a and b axes
Jen: ok i have the model here
Jen: it is a slanted pinaciod
Jen: mono system
Jen: umm do these go straight down
Jen: or angle
Doos: yes, its like a matchbox (with the interior out) and the pushed over to one side
Jen: yes
Doos: if you then look from above, the a and b axes are not at 90 degrees
Jen: like the pin when i put it in i go straight down and it will be on a bit of an angle correct
Doos: (you need to hold the matchbox upright, not laying down)
Jen: oh to the planes no
Jen: to each other yes but not to the planes right
Doos: yes
Jen: i have it upright but on a desk so i can have it sit flat
Jen: yeah ok i got that
Annie entered the room.
Annie: Hi
Jen: ok so that is lateral inclined
Doos: should we need to glue you to your chair annie?
Jen: not being at 90 degree to the plane
Annie: something keeps me not being here
Doos: in the plane*
Annie: i lost connection
Doos: probably the evil internetninja
Annie: what are we talkikng about
Doos: lateral inclined and monoclinic
Jen: monoclinic
Annie: oh yes,
Jen: doos why do i understand better there
Jen: maybe because it is later in the day for me lol
Doos: dunno
Annie: where Jen
Doos: could be
Annie: all three axes are unequal in lengths
Jen: ok lets see if i am seeing one thing correct here
gemma entered the room.
Jen: from the centre point the angles for a and b are 90 degree to each other right
Doos: hi gemma
Doos: no jen
Jen: hi gem
Annie: lHi Gemma
gemma: hi. okay i know i'm lost. what is the ?

Annie: a is the not equal
Jen: none are equal
Annie: b is not equal
Annie: c is not equal
Jen: but from the dot in the middle where they all meet
Jen: a and b are 90 from that point agrn't they
Doos: no
Doos: c is at 90 to a and b
Jen: ok i am going to shut up now and try really hard tyo listen
gemma: ask the quesiton again plese
Doos: a and b are at a different angle (I don't know the angle from the top of my head)
Doos: we are talking about the monoclinic crystal axes
gemma: thank you
Jen: maybe gemma can get it
Jen: or has got it
gemma: oh yeah right
Jen: maybe i need to hear it and not read it
gemma: ok i have a diagram in front of me
Jen: lol
Doos: when you look down the c-axis, you see that the a and the b are not a 90 degrees to eachother
gemma: yes
Doos: (they are inclined at a different angle)
Annie: yes
gemma: yes
Doos: they "lean"
gemma: yes, looks about 20 degrees
Annie: they are all unequal t each other
Jen: in the diagram i have nothing is 90
Doos: jen: like the tower of pisa
gemma: y equals 90 in the diagram
Jen: oh i am looking at wrong one
Annie: its is somewhat mishapen in shape
Annie: like leaning as Doos said
Annie: its never going to be straight
Jen: i see a C and B 90 to each other
Jen: but a is 90 to no one
Annie: yes and a is not at 90 deg
Jen: ok i got it looking at the diagram
Doos: uhm, are you looking at the triclinic or am I going mad?
Jen: you can all shoot me now
Jen: or drop me in helens
gemma: how about we all look at this
<http://www.rockhounds.com/rockshop/xtal/part7.html>
Doos: jen: mono means "one", so it just leans to one side
Jen: ok
Annie: mono - one
Jen: well i see it now
Jen: i will learn to understand them all
Annie: clinic - inclination
gemma: "inclines one"
Jen: ok we can go on if you want going to look quick at gemmas website
Annie: there is only 1 of a 2 fold as you look on the crystal
gemma: it give several pix that we can all look at of diagrams,

Doos: ah the a inclines to c, not to be (guess I goofed)
Doos: b*
Jen: i can't go there
Jen: i will have to type in
Annie: ok, can i ask a question
Doos: no
gemma: lol
Annie: ok
Doos: lol
Jen: ok
Doos: ask already annie
Annie: i was gona ask Jen
Jen: why i am a dork
Annie: Jen do you understand all the other systems
Jen: not really i am passing on what they ask about
Jen: or i mean doind what they ask
Annie: ok, lets start from top and go down
Jen: the mono came up cause it was so different
Annie: if you want
Jen: they only ever ask about the cube
gemma: lets start from where you guys learned annie and doos
Annie: otherwise it gets a bit confusing if you don't understand the basics of other systems
Annie: because there is a system to it
gemma: you've been through it and know best the sequence to learn
Jen: well first doos how important is it to know NOW
gemma: and why
Annie: and mono and tri clinic are least important in your study
Annie: it won't even be examinable
Annie: they will give it to you but it is not necessary
gemma: ok. then why it is discussed at all?
Jen: where did doos go
Doos: I'm here
Jen: yeah they discuss something and only parts
Annie: you will need to know it but at this early stage it is rather confusing
Annie: lets make it easy
Jen: and then leave you wondering why they did not go into detail
gemma: should we be starting with cubic?
Doos: of course
Jen: doos is it that important for FGA to know all these systems and axis NOW and why
Annie: crystallographc axes, is dependent on the shape of unit cell
Annie: that is more of a definition
gemma: the basic first full crystal formed?
Annie: in order to measure an angle, the crystal faces and other planes
Annie: it will necessitate to refer of a measurement to lines, or axes
Annie: in a 3 d space
Doos: Jen: it's important because it may be an exam question (only in the prelimainary part) but overall it's not that important
Annie: you need to imagine this first
Jen: ok then i better learn each crystal
Annie: they are named basicly and an axes or unit intercepts
Jen: now i have had difficulty getting the axis of symetry on some crystals
Annie: hang on, we will get through them

gemma: im listeneing annie
Annie: normally they are "a" "b" "c"
Annie: the c is normally a principal and is always a vertical one going through from top to bottom
gemma: wait
Annie: the b is from right to left
Annie: a is front to back
gemma: how do we know which is left to right?
Annie: yes gemma, you have a question
gemma: no labels.
Doos: gemma: in a cube they are the same
gemma: on a real stone i mena
Annie: its the way you would opserve a crystal
gemma: but when you pick it up . . .
Annie: by turning and observing from top of crystal down the c axes
Jen: in most more sides are the same than others
gemma: how do you know which is the c axis
Annie: when you pick up, always between your
Annie: when you look from top
Jen: for instancetrigonal system
Annie: you eye meets the c
Jen: 4 sides are the same as each other
gemma: how do you know it is the top?
Annie: ok, we will get back to this one
Jen: 2 sides are different from those but those two are the same as one another
Annie: just imagine a cube
gemma: okay
Annie: its equal shape of 4 sides
Jen: oh maybe not
gemma: yes
Annie: cube is equal to all its shape
gemma: yes
Annie: some scientists have measured their angles and have found them to be all equal
gemma: well, assuming 90 degrees yeah
Annie: so therefore it does have a relationship to its shape and inner structure
gemma: yes
Annie: ok all three axes are equal in lengths
Annie: to each other
gemma: from flat side through to opposite, all 3 possibilities
Annie: like a1 and a2 and a3
Annie: and all are at 90 deg to each other
Annie: just go back to turning your imaginary cube from left to right,
Annie: from back to front
Annie: or front to back
Annie: or from any side
Annie: does that make sense
gemma: yes, if you are talking aboaut looking at it from the flat sides
gemma: this is 3 four fold?
Annie: yes we can only see the the flat sides
gemma: ok
Doos: you are confusing crystal axes with symmetry axes gemma
gemma: not really. just shouldn't have added that quesiton
gemma: sorry
Annie: yes, so therefore the minimum symmetry it is the 4 at 3 fold

Doos: ah okay
gemma: yes!
Annie: it means that given any crystal there must be at least this minimum essential to be called that particular system
gemma: we are talking about that minimum of crystal axes?
Annie: symmetry of elements are the faces arranged according to the laws of its symmetrical natural basis of the division into systems and its classes
gemma: ok
Annie: ok
gemma: faces as opposed to imaginary axes
Doos: if you cut off the corners of a cube, the rule still stands
gemma: yes
Doos: then we just call it a dodecahedron
Annie: cubic in its optical character is isometric
Annie: which means iso - one - metric - measure
Annie: it measures all the same within itself
gemma: this makes sense to me now about the dodecahedron being "cubic" or isometric
Annie: yes same applies for dodeca and cubocta and octahedra
Annie: and so on
gemma: yes.
Annie: there are many shapes that will fit into that cube
Annie: regardless
gemma: can i ask a clarification question at this point
Annie: dodeca have 12 faces that are all equal and only have one form present
Annie: sure
gemma: to make sure i have this: axes of symmetry is talking about faces, crystal symmetry internal axis
Doos: gemma: crystal axes deal with length and angles
Doos: symmetry axes deal with symmetry
Annie: yes
Jen: ok i got interrupted by the phone now i have to go back and read all that i missed
Doos: in the case of the cube, the crystal axes are also symmetry axes
gemma: makes sense. i can "see" symmetry, not the crystal axes. that is imaginary. ok
gemma: yes that makes sense
gemma: annie, you were starting to talk about the dodeca
gemma: 12 faces but the one form being cubic?
Annie: so, if rotated the same appearance twice or more during one complete rotation
Jen: ok i hate to ask this and interrupt you
Jen: but could we take a typing break for just a couple seconds so i can read
Annie: dodecahedron is one also in cubic form and fits in into a cube shape with its corners cut off to make 12
Annie: octahedron are same - will also fit into a cube having 8 faces - 4 on top and 4 on bottom
Annie: equilateral to each other
gemma: makes sense.
Jen: nevermind i will read it later
Annie: no read
Jen: and that leaves me lost for now
Annie: we will wait

gemma: so that is why they are cubic -- they have the same crystal axes
gemma: yes i will wait too
Doos: yes gemma, all axes are of equal length and at equal angles to each other
gemma:
Annie: and all its properties will fit with each other
Annie: like RI and pleochroism
Annie: and light transmission and so on
Annie: because of its system -
gemma: then on the forum when i said the crystal axes has to do with optical characteristics, i was correct?
Annie: singly refractive gems
gemma: signly because the axes are all at 90 degrees
Annie: yes thats what is meant by its optical and physical which can all be measured with our instruments when cut
gemma: ok then i understand more than i thought. thanks.
Annie: and therefore the polariscope will show darkness through a complete rotation at 90 deg at 360 full rotation
gemma: got it
gemma: you catching up reading here jen or do we need to wait again
Annie: because light travels through the gem in all direction are all the same
Annie: we will wait
gemma: holding a light beam in my hand
gemma: jen imd me. said continue
gemma: but wait!
gemma: jen, just go back to the part about hte cubic
gemma: it will make sense to you
gemma: trust me
Annie: and axes are a way of directions within the crystal
Annie: or the cut gem
gemma: because light meets all at one point because of the angle of the faces
gemma: that are cut correctly according to the crystal system?
Annie: yes
gemma: ok. i know its getting on in time but lets have jen read the cubic section. i know this will make sense to her.
Doos: I might have confused Jen with my bad info on the monoclinic
gemma: doos, you are so bad
Doos: yeah
gemma: jen says it will take her five mins to read the cubic thing
gemma: can we wait
Doos: of course
gemma: its her discussion too
gemma: read it jen! we will wait!
Annie: yes of course, we are with you, Jen
Doos: my ebay account has been suspended
Annie: were you naughty again
Doos: I'm a good girl Iyam!
Doos: just some crazy bastid wanting me to re-enter all my data, they even want my driverslicense number
gemma: considering i wouldn't be asking these questions if she wasn't talking me through my studies, we are studying as a team here. so i emailed her the section annied wrote
gemma: i am going to make her read it!
Doos: and have her eat the veggies
Annie: maybe we are going to fast

Jen: it isn't there
gemma: haha. she's getting the email now. she has too many email accounts, to
Jen: i will get it all later
Annie: what is not there Jen
gemma: ok. lets g with the next easisest, please
gemma: the email i sent her
Annie: oh, rightio
gemma: they get lost in the ether between her and me
Doos: tetragonal is the next one
gemma: ok tetra it is, mate
gemma: ready jen
Doos: a tetragonal crystal is just an elongated cube
Jen: yeah i guess so
Annie: are we going to fast
Jen: no i got interupted it is my sons bday today
gemma: not for me. give it a try while jen is actually reading along!
Jen: and i got a call about his party
Jen: and i had to figure stuff out
gemma: ready for the tetra . . .
Jen: i probly won't have time for this one again
Annie: ok so its a more stretched cube
Jen: i have to go to town shortly but need to shower first
Jen: i have to get things ready
Jen: grrrr
Doos: then we'll do it an other time jen
gemma: ok. elongated. but are some angles 90 degrees?
Annie: but has two equal axes (a1 & a2)
Annie: one unequal axis
Jen: see this session isn't long enough i am finding and i just never have the
time on the weekend cause everyone is
home
Jen: i have to go
Jen: i will read it logged
gemma: bye jen
Jen: maybe doos can help if i don't get something
Doos: till soon Jen, have a nice bday party
Jen: i will try
gemma: are you guys too tired to help me still?
Doos: no
gemma: i will work through it with jen
gemma: i got her through the planes of symmetry
Annie: no its fine
Jen has left the room.
gemma: great.
gemma: tetra . . .
Doos: so like in the cube, all angles are at 90 degrees
Annie: 3 crsytal axes at right angles
gemma: yes
Annie: which are 2 are horizontal and equal
gemma: a dn ab
Annie: the 3rd is vertial and of a different length
gemma: oops a and b are horiz, c is vert in this
Doos: that's basically it
Annie: yep
gemma: so we have a cube but stretched long for the c axes

Doos: yes
gemma: the rain in spain . . .
Doos)
gemma: more please, asked oliver
Doos: hexagonal
Annie: so its minimum symmetry essential is 1 at 4 fold
gemma: wait
gemma: wait
gemma: define tetragonal four . . .
Annie: tetra means 4
gemma: don't tell me gonol means gonad, doos
Annie: lol
gemma: tap tap tap tap
Annie: thats in the pearl
gemma: hahaha
Annie: you know where the baby pearls grow
Doos: lol, I'm Dutch remember (I don't get all the inside jokes)
gemma: people do say gems are sexy!
gemma: anyway, gonol means . . .
Annie: yes
gemma lol:
Doos: sided I guess
Annie: with hexa gonol
Annie: hex meaning 6
Annie: so it has 6 sides
Annie: its axes are
Annie: can you work that one out
gemma: that makes sense
gemma: there has to be 4 axes
Annie: yep
gemma: but if the one the light is through is c, what is the fourth
gemma: is the optical one always c
Annie: a1, a2, a3,
Annie: all equal
gemma: oh hell
Annie: and c is unequal
gemma: a 1 2 3 becaus they are on the same plane
gemma: the unequal axes get the letter, those on the same plane with same angle
get the number
Doos: gemma: the name them a1 a2 a3 because they are all of equal length
Annie: yep'
gemma: okay. next if you have time
Doos: (but you may also call them a b and d if that's easier)
gemma: i know these are the easy ones
gemma: well, what are they universally referrd to. that is what i should learn,
not waht is easy
Annie: orthorhomic
gemma: wait
gemma: what letter designation is the most accepted one
gemma: a1 a2 a 3 c or a b c d
Annie: well, the d is not there
gemma: better talk to doos . . .
gemma: he may be hallucinating
Annie: a b c
Doos: I think annie has moved on to orthorhombic

gemma: he is from amsterdam . . .
gemma: ok. i am on orthorhombic.
gemma: will ask that again later
Doos: heh
Annie: which one
Annie: what would you ask again
gemma: ok
gemma: it was up a bit about the accepted letter designation
gemma: that doos brought up
Annie: oh ok
gemma: which is the correct way to refer to the axes
gemma: or most accepted, i should say
Annie: well, if two axes are of equal length, then they are called a1 and a2
Annie: instead of " a" b"
Annie: iss this what you mean
gemma: yes
gemma: ok. ortho
Annie: do you wana have a go at that one
Annie: if a b and c are equal
Doos: Me?
gemma: no doos you have the princess doll
gemma: yes i am ready
Doos: I agree, it just can make it easier to remember
Annie: i am asking gemma if she would like to have a go at that one
Doos: ah okay
gemma: yes, i see where i may help doos but i think it will screw me up later on
gemma: im very methodical . . .
Doos: then forget what I said
gemma: who could forget you, doos. ok annie, roll on . . .
Annie: no, i get the feeling i don't make it as easy to understand as Doos would
gemma: well, i am understanding just fine.
Annie: I wish Robert was also here
Doos: lol
Doos: you are doing fine annie
Annie: go Doos,
Doos: okay
gemma: talk about the ortho and i think you will see why i like the a1 a2 etc
for me
gemma: ready doos
Annie: no i get a bit sensitive
Doos: the orthorombic system is like a flattened and elongated cube
Annie: ready, go
Doos: like a matchbox
Doos: so all axes are of unequal length
gemma: much more flattened than the tetrag
Doos: yes
gemma: ok, understand the 3 unequal then
Doos: the angles are still at 90 degrees
gemma: yes
Doos: so in this case they are called a b and c
gemma: yes
Doos: (because they are all of unequal length)
gemma: yes
Doos: that's it
gemma: ok. so when we talk about a b c we are talking about different lengths

Doos: yes
Annie: keep in mind that your ending with gonals
gemma: at sides
Annie: are the uniaxial ones
gemma: uniaxials are *gonal crystals
Annie: so hexa, tetra, trig gonals are uniaxial with one optic axes
gemma: because a and b are on same plane?
Annie: and because the ortho , mono and tri (clinic) ones are biaxial because they have 2 optic axis
Annie: yep
gemma: ok. do you two feel like taking me through those?
Annie: you ask me or Doos
gemma: both or either.
Doos: lol
gemma: just not at the same time!
Doos: your turn annie
gemma: love this. thanks so much
Annie: tetragonal , trigonal, hexagonal are all ending with gonal - right
gemma: yes
gemma: uniaxial
gemma: one optic axis
Annie: these have the ability to split rays into two
gemma: biaxial splits the ray into two . . ?
Annie: having one direction of optic axis which is the c
Annie: biaxial split the rays in three directions because they have 2 optic axis and they have the 2 v angles in the middle
Annie: like your orthohomic, mono clinic, triclinics
Annie: all ending with clinic
gemma: yes
gemma: gonal uniaxial one clinic biaxial two
Annie: yep
gemma: explain this v angle thing
Annie: and their properties all link in with this
gemma: the properties link in with the uni or biaxial definition
Annie: having $R_i - 1$ ordinary ray, 1 extraordinary ray
Annie: the biaxial have 2 varying rays
gemma: wait.
gemma: explain the ordinary extraordinary rays. uniaxials have them?
Annie: uniaxial , have dichroism (2 colours of rays splitting) within the gemstone travelling in different directions
Annie: biaxial ones have tri (3 colours of rays splitting)
gemma: give me gem examples please
Annie: uniaxial ones,
Annie: lets do those,
gemma: ok
Annie: hexagonal - give me couple of stones
gemma: oh hell you give me
gemma: lol
Annie: lol
Annie: you are not paying attention ??
gemma: oh, u mean system
gemma: i thought you meant gem name
Annie: system and stones

gemma: uniaxial system:
Annie: so hexagonal system - emerald,
gemma: yes
Annie: so beryl family
Annie: can you give me another one
gemma: um.
gemma: lol
Annie: lol
gemma: im just starting
gemma: give me a break lol
gemma: can i have a minute to look at pictures
Annie: sure
gemma: thanks this is fun
Annie: it would be much more fun, if Jen would have stayed and we had more people
Annie: ok how about Apatite
gemma: i know i am lucky to call my time my own
Annie: you are very lucky, my gemma
gemma: ok im just seing apaite and beryl right now
gemma: but i understand
gemma: tetra is rutile and zircon
gemma: and i can understand that because of the rutile, i think
Annie: yep
Annie: and trigonal
gemma: calcite and tourmaline
Annie: corundum
gemma: oh yea
gemma: question
Annie: sure
gemma: trigonal is considered a form of hexagonal?
gemma: or tetra?
Doos: yes
Doos: hexa
gemma: ok. why the differentiation . . .
Annie: yep its a division of hexagonal
gemma: and why the US euro conflict in the separate system
Annie: in america i thing you don't use trigonal
gemma: yeah, the remeber six things concept [lauging]
Annie: you have it as hexagonal
Annie: english and aussies have 7 systems (lol)
gemma: yes. but doesn't it have more rounded edges or something
gemma: so really does give different optical properties
Annie: no, not really, they are uniaxial and have own properties and constance
gemma: so why the dif?
Annie: like quartz
Annie: what do you think quartz comes under
gemma: im reading trigonal
Doos: gemma: mainly because trigonal has lesser symmetry than hexagonal
gemma: just the clarification i was going to ask, doos
gemma: what does that mean?
Doos: it has 3 sides
gemma: hexa has a1 a2 a3 c
gemma: right
Doos: while hexagonal has 6 sides
gemma: oh yeah, a4 a5 a6

gemma: duh
gemma: now tell me trigo
Doos: the a1 a2 a3 c was correct
gemma: oh now
gemma: right
gemma: 1 2 3 correct
gemma: because they "pierce"
gemma: sorry
gemma: confused with faces for a moment
gemma: contiune please
gemma: (i think it would be easier if they talked about crystal axes first!)
gemma: doos, you saying trigonal has 3 sides?
Annie: hang on gotta go to the loo
gemma: ok
gemma: run me through this doos
gemma: why would trigo be a subsystem of a six sides system
gemma: thats like a slanted cube or something isnt it?
gemma: or a slanted tetrag?
Doos: uhm no
gemma: ok
Doos: its like a hexagonal prism but then with just 3 sides (ideally)
Doos: let me find a good example for you
gemma: ok
gemma: im looking at the bottom of this page
<http://www.rockhounds.com/rockshop/xtal/part6.html> if that helps
Annie: ok
Annie: where are we looking
gemma: hi again
gemma: doos is trying to make me understnad
gemma: why trig is a subsystem of hexag
gemma: when hexag is six sided
gemma: but trig is refered to as "three"
gemma: i'm, like, totally lost on that one
Doos: gemma, imagine a an elongated triangle
gemma: ok
gemma: two angles same one not?
Doos: if you look through the c-axis (from top till bottom)
gemma: ok
Doos: there you have one of the symmetry axes
Annie: trigonal is rotated at 1 at 3 fold
Annie: hexa is 6 x 2 fold
Annie: of minimums
Doos: while the hexagonal would have a 6 fold
gemma: got it. because the "center" is gotten by going through the corners
gemma: not the edges or faces
gemma ?
Doos: <http://www.ganoksin.com/borissat/nenam/mineral.htm>
Doos: this comes closest
gemma: ok let me look
gemma: yes, that makes sense. i am not saying i understand it without reference
but it makes sense. it does have
something to do with that 3fold axis then.
gemma: it that correct
Doos: it's not easy to explain just why it's like hexagonal

gemma: would you now please name the axes for me, so i know and better understand
Doos: or where it really differs
gemma: i'll worry about the hexag correlation later
Doos: same as hexagonal
Annie: lets revise this,
gemma: please do
Annie: trigonal - 4 crystal axes - 3 are equal and intersect at angles of 120 deg, the 4th one is vertical at 90 deg
Annie: has 4 planes which are 3 of 2 fold, 1 at 3 fold
Annie: hexagonal is the same ---- but has 7 planes which are 6 axes at 2 fold, 1 at 6 fold
gemma: got it
gemma: now i see where understanding the "fold" concept is critical
Doos: okay, I found a good image
Annie: the folds are important of the imaginary positions and
Doos:
http://webphysics.davidson.edu/alumni/MiLee/JLab/Crystallography_WWW/trigonal.jpg
Doos: in this hexagonal prism you can see a trigonal
gemma: so that's where you were getting the triangle idea doos. those are of three fold axes
Doos: oh sorry annie, I was interrupting you
gemma: i mean two fold
gemma: yes go ahead annie
Annie: no its fine
Annie: i just can't hit any of the sites you are referring to
Annie: i get a restriction ??
gemma: annie, the hexa six fold is the c axes?
gemma: c axis sorry
Annie: you see the 2 fold - 6 times when you rotated it
gemma: yes, i see that part
gemma: and they are a1 a2 a3
Annie: ok, because i am not able to see it
Doos: (the sixfold is at the c-axis yes)
Annie: yes
gemma: ok. i believe i have it
Annie: as you look down the c axis and rotate it
gemma: symmetrical from 6 different ways
gemma: from each of the six sides
Doos: it's better described as "you see the same side 6 times in a full rotation"
gemma: ok. yes that is better
gemma: but how is it decided which axis is the "c" ?
Doos: that is agreed on
gemma: i mean, when they started naming them, not from the diagram
gemma: know what i mean
Doos: they made it up and we accepted it
gemma: it is the one that light can go through or what
Annie: the centre of the crystal when looked from top is always the C or vertical axes
gemma: i think i figured it out.
gemma: its kind of a rational concept more than scientific?
Annie: that is the direction of light goes straight through
gemma: ok, then i do understand it

Annie: like your Ordinary ray -- all one way
gemma: ok
Annie: that would always be the constant ray
Annie: the others will be travelling differently
gemma: so all crystals have one ordinary ray
gemma: the c axis
Annie: only in hexa, trig, and tretragonals
gemma: ok
Annie: the others such as orthorhomic, monoclinic and triclinic have 2 of those
Doos: brb feeding the cats
gemma: ok lets start on the clinics
gemma: if you think im ready for it
Annie: the clinics are a bit complex to understand
gemma: shall i wait then
gemma: i dont mind
Annie: when you are just beginning
gemma: it doesnt make me feel stupid to wait
Annie: no of course not
gemma: i can read and then maybe have better grasp because i understand the
gonals better
Annie: oh yes
gemma: oh heck. just looked at the clock. i have a stupid family party to get
ready for anyway
gemma: ok. then i am happy with what ive learned
Annie: oh rightio
gemma: i can work with jen on it and she will ask you guys when we are both
confused.
Annie: ok
gemma: thank you so much
gemma: much
gemma: by doos. hug the kitties for me!
gemma: thanks annie.
Annie: ok,
gemma: bye
Annie: thats ok, you welcome
Annie: sorry it sounds so confusing in the beginning
Doos: bye gemma
Annie: but once you understand
Annie: its easy
gemma: i am learning so much .
gemma: this is really important what you two are doing
gemma: see you in the forum!
gemma: lol
Doos: till soon
Annie: ok, bye for now Gemma,
gemma: bye
gemma has left the room.
Doos: was a nice time again (although I goofed)
Annie: no you haven;t Doos
Annie: it is all good
Doos: let me log it before I forget
Annie: i don't think we have
Annie: and remember
Annie: ok

