2018 Exam Feedback:
ASTA meeting:
Wed, Nov 28th

Notes on 2018 NZQA NCEA externals:

L1sci: p 2-3

L3phy: p 4-5
L2phy: p 5-7
L1phy: p 7
PHY schol: p 7-8

L1che: p 8
L2che: p 9
L3che: p 9-10

L2bio: p 10-11
L3bio: p 11 - 13
Bio Schol: p 13

L2ess: p 14-15
L3ess: p 15
ESS Schol: p 16

L1 Science - approx 60 teachers in feedback group

Resource booklet for Chem – good…
But equations for PHY were on front cover – forcing kids to flip back and forth.
Can a combined resource sheet be made for CHE and PHY at L1?

In general – the lengths of the papers was OK/good.

L1 90940 (mechanics)

Q1 part c – huge amount a kid could compare… to answer question fully it was lengthy.

Q2 no comments / concerns

Q3

- It seems the examiners want to say “disregard friction”…
- Question: where the 3000J of grav-pot energy is calculated from – assuming 0J is ground level?
- Why can’t the exam just say “assume all grav-pot energy is converted into kinetic”? Basically, can the exam writers be more overt?

In general: very straightforward paper.

L1 90944 (acids & bases)

Q1

- Why not use Mg as 1 of the atoms questioned – for continuity?
- Chem vocab was quite generous.
- Part c seems a bit repetitive… why not examine another aspect instead of the same one?
- Ratio of ions – glitchy – assumes Mg lost e- and F gained e- without any other substance involved… most ionic compounds are not made by direct e- swap.

Q2

- Good – that they’ve asked what they want AND given reasonable space to give answer.
- Compound is a bit unfamiliar though.
- Good that the formula for sulfuric acid is provided – BUT this may hinder the A/M/E marking since that part of making a balanced equation is taken care of…

Q3

- Have not included formulae in Q3 but did so in Q2… no really consistent.
- 3b – technically – the same chemical reaction is happening in all 3 sections… if you want to ask about rate – then have overt terminology… or if you want more – then use specific terminology.
- Later – the overt use of "temperature" is included in question – so why not do the same in 3b?

L1 90948 (genetics)

Q1

- Good 1st question – exactly what kids / teachers expect.
- Would have put pics around other way (left/right).
- Note on question wording: "explain genotypes" vs "state the genotypes… and explain…"

Q2

Too open ended (Q2 and Q3)… needs scaffolding… no comparison to the scaffolding of L1mech and L1acid/base. Could have been "what is variation?... explain…. Discuss…." Use BULLET POINTS… when kids struggle – and see questions like they, many shut down and don't know how to start – thus miss out on marks – compared to scaffolded questions.

- Aren't herbicides used to kill plants (roses or any type of plant)… not just weeds…

2b – in comparison to what? Increases variation compared to what? They MIGHT mean in comparison to sexual/asexual reproduction… if so, question should be overt.

Q3

- would be difficult for kids at L1… in L2 this is done across entire organism… and bird that already has many colours. Simplified system down to asking about 1 gene when many many more are involved.
- Seemed a bit repetitious 2b… 3b… seems to cover the same ground.
- No pedigree chart? – could have allowed the "achieved student" to show some understanding without long paragraphs.

In general:
Level of language in genetics paper was quite good – more fair than in years past.

Physics - approx 15 teachers in feedback group

L3 91523 (waves)

Q1

- Not sure about “pink” colour for 410nm.
- Diagram p2 – may not be completely obvious which way light’s going;.. term “rotating telescope”.

Q2

- Good context.
- Graph on p6 is “going to be challenged”

Q3

- 1st bit – good – straightforward.
- Page 8 – could have been overt with terminology that wave is longitudinal in rod.
- Complicated situation…many aspects…
- Fundamental in rod.. but not in air column.
- 3d – good stretch / push for good kids.

FB comments 91523 (some of them…):

- a super complicated paper applications wise. Spectra, circular sound sources and multi component standing waves? Is there a precedence in previous papers to expect this?
- My students weren’t happy with this paper
- agree totally. My students would have had a panic attack I think
- a bit of a train wreck. How do we get official feedback to the writers of these exams?
- I wonder the justification for only 4 credits when the examination is the same length and number of questions as mechanics and emag?
- The standard states “standing waves in strings and pipes” so how does a question about a longitudinal standing wave in a solid steel rod assess the standard?
- Scared some of my students into not even attempting it so they could have enough time for the other two papers but I actually really like this paper. I don’t mind the steel rod or qualitative question
- 3b: the power ridge locations could be misinterpreted to each represent an antinode, too close together? Thus causing confusion.

L3 91524 (mechanics)

Q1

- 1b: capital M vs lower case m.
- 1c: ESOL kids will have hard time with “altitude”… forcing a 2D question into an actual 3D situation.
- Could replace “debris” with “junk” to be more obvious.

Q2

- 2b – good question – BUT would be even better with diagram.
- Would be better if 2c and 2d were on the same page. INSERT blank page on page 5.

Q3

- would benefit from a diagram
- 3d – nice question

FB comments 91524:

- really straight forward - my kids will be loving it. very similar to previous years
- The “m” vs “M” in the expression for satellite speed in the gravitation question caused some consternation among our students.
- I really don’t like the entire paper focussing on a single context that much
- Good paper overall.

L3 91526 (e&m)

Took into account examiners report from last year. GOOD.

Q1 – this year the charging cap curve graph has the correct gradient (almost) – MUCH BETER than in past yrs where gradient was not correct.
Q2 Seems unnecessary that text in diagram is vertical instead of horizontal.
Q3

FB comments 91526:

- a bit boring but well thought out
- pretty straightforward
- Q1 b) why is the “show” answer given to 1 sig fig? … but good response was: Question asks to show that it is "Approximately" 0.9. In fact, the correct answer is 0.0899- that would be much easier to mark as a SHOW question.

L2 91170 (waves)

Q1
Q2

- Page 5 – printing is a bit off… reflected angle not equal to incident.
- But nice context.
- Page 8 – 2d – COLOUR BLIND ISSUE… use solid/dotted lines maybe

Q3

- GOOD to have spare diagrams…

FB comments 91170:

- Waves Q1 (a) Clearly indicate its size... What is "it"? The question implies "its" refers to the eye rather than the image
- Anybody had students struggle with red-green colour blindness in questions 2 and 3d in Waves? Also, the velocity vectors in Electricity 2d? Does anyone check these issues?
- A good paper, although good point about colour blindness.

L2 91171 (mechanics)

- Again: thanks for reading and taking into account 2017 examiners report.
- For this paper AND the E&M paper – both Q1s are tricky contexts… not "easy" or "traditional" contexts to get going before tricky contexts…

Q1:

- complex situation… 2 bits of elastic on each side… simpler context would be better.
- Good to see use of graphs (again) p3
- P4… for a 2-D situation… but a 3-D diagram… could confuse some.

Q2

Q3

FB comments 91171:

- Looks good. I liked the one theme
- Scale diagram! 1980's throwback! …. My students may have melted when looking at that …. Good to see that back
- My students thought it was fair
- Very good paper

L2 91173 (e&m)

Q1: ends with a very tricky "what to do with that magnet"?... a bit vague… why? And if you include the magnet in diagram at top page 4 – then say "disregard that"… is odd.

Q2

- Total force is ZERO – but total torque is not.
- "coiled wire" implies more than one loop… but here there's only 1 loop. Nothing about number of turns included… ODD to bold the term "coiled".
- Bottom of page 6 – interesting concept.
- But last question seems a bit open-ended.

Q3

- P8 = OK
- P9 = why not just use a wire instead of the ammeter… just short circuit the thing with a wire

FB comments 91173:

- Electricity Q2 The Ammeter: the needle wasn't attached to the coil.....The magnets only had one pole. The way the picture is drawn, if the other end was the opposite pole, the motor meter wouldn't work
- In part b, it says the total force is 6N, but the total force is ZERO
- In part d, the ammeter shows a current in all three.
- Electricity 2di - should it say ROD AB instead of wire AB??
- like some questions, don't like others...very wordy
- Convoluted and too many curveballs.

- The ammeter in the circuit...yeah, I think only my excellence-level students will realise what's happening there. I bet lots of mine will have become overly preoccupied by the why an ammeter would ever be connected like that...
- Was not happy to see the ammeter. It did say it had virtually no resistance but I have little faith even our good kids will know what to make of it
- About the last question: It was tough, but being the last question of the paper, its allowed to be. It gives us teachers something to aspire to: produce students that have a good enough general physics knowledge that they can apply it to a novel situation like this.

L1 90937 (e&m)

Q1

- a bit wordy
- 1a – would have been EASIER if it was a negatively charged instead of positive… as positive charges are “not supposed to move in solids”…

Q2: P6 – energy efficient bulbs break all those rules of bulb’s power = brightness…

Q3

L1 90938 (waves)

Q1

- LIGO… in Level 1!?!? Evil complex situation for Level 1.
- Transmitted vs Refracted… because “transmitted” is the beam “transmitted by the laser”
- MASSIVE numbers for L1

Q2

Q3:

- Over Complicated situation: Kaleidoscope…
- AND then p8 and p9 with yet MORE complex situations.

FB comments 90938:

- Asking for sig-figs (2cii)? At L1? Not mentioned on cover page (like L3) and not mentioned in standard?

L1 90939 (heat)

No one at the meeting had students who did this paper.

Physics Scholarship

- Final bit of each question: “explain in detail” does not have enough SPACE for detailed answers.
- Diagram on Q2… wasn’t obvious which way the waves were coming in from: velocity vector vs wave fronts?
- Q3: AC – challenging…

FB comments:

- Not sure about the AC resonance question. The standard only talks about series circuits for AC
- Can anyone suggest a series parallel circuit that would give the graph they provide?
- Thin film interference seems outside the standard.

Chemistry- approx 20 teachers in feedback group

L1 90932 Carbon Chemistry

Q1

- Could use coloured lines on chart to make lines easily visible.
- aii In your answer, you should refer to the graph above, and your knowledge of the structure of alkanes and alkenes.
- This wording may lead students to discuss single/double bonds which we assume is not the intent.
- iii. Ethene can by produced by cracking long-chain (proof reading error)
- Good question asking how they differ rather than use Compare/contrast.

Q2

- Ii how many equations are expected?
- c. feasibility is a complex word to use at L1

Q3 a why use elaborate?

L1 90933 Selected elements

Q1 OK

2aii

- Elaborate on possible reasons that silver, copper, or other suitable metals are added to gold. In your answer, you should refer to their physical and chemical properties where appropriate.
- What chemical properties of the silver, copper are we looking for

3. OK

L1 90934 Chemical reactions

Q1 spacing for balancing eqn left no room before Mg2+

Q3

- Reaction 1 Some manganese dioxide is added to hydrogen peroxide in a test-tube.
- Reaction 2 A sample of barium hydroxide is heated in a boiling tube.
- Reaction 3 A sample of sodium hydrogen carbonate is heated in a boiling tube.
- Why test-tube with hyphen? Why mix of test tubes and boiling-tubes?

L2 91164 Bonding

Q1

- a. Why write eqn written below for i. and not for others
- c. Activation energy label to right of curve usually. Why double headed arrow?
- d. good

Q2

- Why capitalise Shape and Structure
- c. Lewis structures should have lone pairs.
- d. step for vol to mass extra and difficult.

Q3

- Nice to see table change.
- Not enough for Achieved students in question format
- b. OK
- c.OK
- Why put B.pt in table?
- d. why not say label rather than annotate?
- ii. Could be describe attractions not explain.

L2 Organic

Q1

- a ok
- B ok
- C. Do we have to put trademark name symbol?
- Cii language choice poor
- is a geometric (cis/trans) isomer

Q2

- A ii What is the name of this salt? Is this within standard?
- Is it necessary to give L2 students formula for water?
- c. Elaborate used again

Q3

- a. random question
- b. explain why potassium permanganate solution, KMnO4(aq), cannot be used to distinguish between these organic products.
- This bullet point is outside the L2 Standard

L3 Properties

Q1

- a. ok
- b. ok
- c. relate the trend in first ionisation energy to the trend in atomic radius.
- Why do we need to relate two trends?

Q2

- a. Why use Lewis structure at L2 and Lewis diagram at L3
- B ok
- c. subscripts r and f $\Delta r H^\circ$ $\Delta f H^\circ$ not easy to distinguish with type/font used.
- Why different fonts used across pages 6 and 7

Q3 Use term chemical equation rather that equation if that is what is required.

L3 Organic

Q1 C can use colour change given in c for mark in b
Q2c Difficult for A students to access

L3 Aqueous

The most difficult paper is made even more difficult by mixing solubility and pH in the same question

Q1

- Ca F_2 space between elements in compounds looks unusual. Font issue
- Ii Difficult for students to remember complex ion equations from L2
- Change in pH written the wrong way in terms of the change shown in the data 11.6-9.6

Q3

- Aii would not happen in practice as dilution factor would be more significant than common ion effect
- B again solubility and pH in same question.

BIOLOGY - approx 20 teachers in feedback group

- all L3 papers were too long
- **DO NOT have L3 physics and Scholarship bio on the same day.**

L2 Cells 91156

Q1. Movement of Materials

- what are brush boarder cells (kids wouldn't know what they are)
- why is the mitochondria drawn that way?
- make it easier in terms of language
- part b was straightforward
- part c was similar to what was in last year exams which helped to draw out E students

Q2. Photosynthesis and Enzymes

- straightforward
- chloroplasts look strange (better than last year)
- not expected as a named example of inhibitors

Q3. DNA replication and mitosis

- part a says describe when DNA replication happens, may have been interpreted as growth/repair or cell cycle by students... what are they expecting
- liked part b

L2 Genetics

Q1. Meiosis

- part a-c are straightforward
- part d are you telling me there are no chromosomes in the daughter cells ... badly written
- diagram needed to be read really well to identify where the alleles
- sight impaired students would have struggled with the picture, even with an enlarged... add another band

Q2. Population Genetics

- very guided
- shift the third bullet point up more in the list
- you would struggle to understand why they don't interbreed already (state where they are located so students could visualise why they aren't already)
- a lot to each bullet point
- have a progression of the bullet points from A-E
- would bullet point only get them an A?
- if you go to the link for the image it takes you to a Maui dolphin (for the Hector's dolphin)
- **it is hard to know what is expected in this question
- not a lot of space is provided for what they are expected to write

Q3. Natural Selection

- structure is good (short!)
- question was frustrating... to use co-dominance and then state dominate and recessive would be hard for lower students
- should have used different genotypes or simplify
- better was to say recessively lethal alleles
- part c was a big question (leave out or describe natural selection instead) ... too much time could have been spent on the first bullet point

L2 Gene expression 91159

Q1. Mutations and protein synthesis

- lots of "and" and "and"... too many points
- second and fourth bullet points... same question really

Q2. Phenotype

- pretty good
- a lot was repeating what was in the table
- wording on point a not scaffolded

Q3. Metabolic pathways

- did not like the question
- pathway was off ... should have shown Gene D differently ... cannot tell the difference between brown and black
- the simplification made it worse
- could have been better as a dihybrid question
- dilute yellow is tricky

L3 Plants and Animals

- the best of the three papers

Q1.

- straightforward
- didn't' like the picture on the ground (minor)
- tendrils growing wording wasn't good... in response to touching

Q2.

- look at the research material ... graph 2 has wrong axis label (only one egg per aphid and number of egg per female)
- diagram also doesn't have a good label ... one egg per aphid, not multiple
- bring roses into the equation was mean ... wasn't clear or useful
- trying to put too many things in one question
- the info given is scholarship about
- question was very confusing

Q3.

- seemed like a too easy of a question
- no free raining period
- was told by NZQA that students do not need to calculate free rain period
- picture could be clearer and bigger ... it is fuzzy

L3 Evolutionary processes 91605

Q1.

- first question was okay
- colour choice was not good
- didn't teach about shoulders (most of the teachers agreed)
- another scholarship question
- picture wasn't good to distinguish some of the features and angles
- overcomplicated phylogeny

Q2.

- blue land and white oceans?!
- heaps of info given and lactose and lactase but it would have put students off
- too much!
- could have been clearly linked between agriculture and lactase

Q3.

- why did you need to have five genes
- two pages of resources is a bit much
- liked the genetic diversity instead of mitochondrial was better for lower students
- too many examples
- was a very big question would have been better for scholarship

Speciation 91605

- all questions were scholarship level in this paper

Q1.

- always ask about mode of speciation...easier to work backwards for students for students to explain instead of what has caused speciation
- too much information provided and too varied and so you cannot integrate all of it
- lots of “and” and “and” again
- are they looking for the proximity to be discussed
- could have had simpler examples to discuss speciation

Q2.

- the question was straightforward but too much stuff was given
- can tolerate cold but not spread south ... goes against what they would think and contradicts the graph
- line would be hard to see on the graph for low visibility students
- last bullet point are you talking about it being direction or stabilising or disruptive
- didn’t need the distribution graph

Q3.

- too long (scholarship)
- bottom picture on page 11 is terrible... the arrows are misleading

Bio Scholarship

Q1. Forbes Kakariki

- very colourful
- student feedback: exam was nice // some dropped writing this paper after writing the L3 paper and it wasn’t great
- graph straightforward and easy and enough info was provided and clear
- if students had done past papers the layout was similar
- good reference material

Q2. Midas Cichlids

- linked in quite nicely with the L3 evolution standard
- a lot of info to draw from to answer their question

Q3. Jebel Irhoud Fossils

- the skulls got them ... having two Neanderthal skulls made them think that was more important instead of putting them in date order

Earth & Space Science

L2 91193 Physical Principles

Q1 Arctic Ice

- Slightly weird language. What's wrong with The North Pole is located in the arctic circle… "home" is silly & anthropomorphic.
- Good use of vocab in the bullet points.
- Pretty straightforward question.
- Clear diagram

Q2 Methane

- Lack of context for the question - where has the methane come from? Melting permafrost? Increasing agriculture? This is a less obvious greenhouse gas than CO_2 and while it is good to ring the changes, needs a bit of context
- "From the Earth through the atmosphere": where in/on the Earth? Centre of the earth as source or absorbed/emitted radiation. Should say Earth's surface if that was the intent.
- Transfer not the right word for Methane absorbing/re-emitting heat.
- Not dissimilar to question 1 in a way.

Q3 Hot Pools

- Liked how in the second bullet point they have to really unpack their understanding about the structure of the earth & the mechanisms of heat transfer. Question has a really good sequence of ideas that scaffold well.

L2 AS91192 Stars & Planets

- It would be really great if there was an approved version of the HR diagram that was used nationally.
- Have used stars and constellations that can be easily seen in NZ which is pleasing.

Q1 Canopus: Quite a nice question - no complaints.

Q2 Orion

- An assumption is made that they are going to compare the solar system that may form with ***our*** solar system. Lots of assumptions. What's to stop there being a large rocky planet?
- A lot of writing to answer this well. Seems disproportionate

Q3 Sirius

- What does smaller mean? Mass? Diameter? This is ambiguous!
- High initial mass burns fuel faster etc
- What is wanted is straightforward, but needed to say <u>lower mass vs higher mass</u>
- Compare and contrast the lifecycles may have been a better request than trying to refer to the life cycles of BOTH stars.

L2 AS91191 Extreme events

Q1 Havre Seamount

- Way too much reading!!! Too heavy in resource material. Too many bullet points
- Need the map showing the Zealandia continent - students need to infer that the overlying plate is continental. A student may well assume it is oceanic.
- First & 3rd bulletpoint effectively the same question. (we felt)

Q2 Fiordland

- Yellow blocky diagram is shocking. Impossible to tell what the diagram is showing. Expecting a lot with both transform and subduction

Q3 Doubtful sound again.

- Classic fiordland tsunami.
- A LOT of reading again. Disproportionate to the other papers. Faults in bedrock confusing - need to indicate sliding rather than toppling.

L3 Oceans

Q1. Salinity.

- Do need to understand a bit about atmosphere (high pressure, low pressure zones) to explain well. Still need to explain why there is more precipitation at equator vs 30 deg.

Q2. Upwelling / downwelling

- Diagram poorly proportioned!! Where is the Southern Hemisphere?
- The Explain statement after the diagram would benefit from restating what the processes are.
- Good question. Lots they can explain to achieve well.
- The 2 bullet points have no direct link to the Explain statement.

Q3 ENSO

- Good to have clear map and also space to draw own diagram.
- Great clear question.

L3 Atmosphere

Q1. Deserts & Rainforests.

- Nice diagram for annotation, clear bullet points. Really nice question.

Q2. Atmospheric Protection

- The different forms of solar radiation are not explicit in this standard.
- Many have felt this is reaching beyond the parameters of the standard. Way too specific.

Q3. Water cycle

- “Different weather events” is a bit vague - some examples would be useful such as extreme storms or extreme heat - it’s an endless task.
- Other than that, pretty good.

ESS Scholarship

Q1. Great question - excellent resources

Q2. Great that it pulled in dating techniques. Great links between the different spheres.

Q3. So very open-ended! There is SO much in the resources.