Part 1- Complete assigned Kognity assignments by June 15th, 2019

Part 2- See below

Hello! Your assignment for this summer is to complete work for your Internal Assessment. The work you complete during the summer will help you to complete the final product. It is extremely important that you follow the timeline provided so that you may receive feedback and make corrections in a timely manner.

What is the IA?
The Internal Assessment (IA) is an individual investigation on a scientific research question or topic that is related to your current IB Science Subject and is at the same level of this course.

• You choose a topic to investigate. The topic must be high in personal engagement, meaning you should have an invested interest in your topic.
• You create a research question.
• You design an experiment to test your hypothesis.
• You perform the experiment and collect data.

KEY FACTS ABOUT THE INTERNAL ASSESSMENT FOR THE SCIENCES

1. The Internal Assessment, is worth 20% of the final mark or IB final score.
2. Students complete a proposal and then write the report with a specific format. We assess the report using one or more of these five criteria: Personal Engagement (PE), Exploration (Ex), Analysis (An), Evaluation (Ev) and Communication (Com).
3. Ten (10) hours of in class lab time must be spent on the IA
4. Arial font size 12
5. Should be about 6-12 pages in length (no more no less)
6. Citations should be in MLA form
7. Double-line spacing
8. Numbered pages
9. Portrait orientation (rather than landscape) - except where it is necessary to accommodate a specific item such as a graph or illustration
10. All reports will be submitted to TURNITIN.COM to check for plagiarism. All work should be your own. Citations should be provided when it is not your
own words.
11. The final report is to be electronic, with word-processed text, mathematical equations and electronically drawn graphs. The entire report should be a single document, including references.

12. Students need ICT skills, including word processing, spread sheets, graphing software, and Internet searches. They must also know how to reference resources.

Some ideas to help you choose a research topic and question:

- Think about ANYTHING you like or are interested in! Can you investigate something about it?
- Look through the Topics in your book and the associated labs in those chapters.
- Search online for labs that have already been done that:
  1) Interest you!
  2) Relate to your IB science subject at the level of this course (whether an IB lab or not!). Can you do something different, such as change the procedures, use a different variable, collect different kind of data? Of course, you cannot just copy an existing experiment; therefore, you must see me and discuss how you will SIGNIFICANTLY modify the experiment so that it is YOUR original work.

<table>
<thead>
<tr>
<th>Date</th>
<th>IA Element Due</th>
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<tbody>
<tr>
<td>June 17, 2019</td>
<td>Submit two proposed topics/research questions of interest that you would like to research for the Internal Assessment. (email to me).</td>
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<td>By June 23, 2019</td>
<td>Expect feedback from your IB Science teacher on your topic choices by this date.</td>
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<tr>
<td>July 10, 2019</td>
<td>Pages 1 and 2 of Proposal form due (attached in packet)- email to me.</td>
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<tr>
<td>July 19, 2019</td>
<td>Submit completed entire Proposal form (attached in packet)- email to me.</td>
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****The proposal form will count as (2 portfolio grades). No late work will be accepted, you must adhere to all deadlines and dates in the table.

You will sign up for lab time to conduct your experiment during the first week of school.

I will be checking email periodically (not daily) throughout the summer if you have questions –

johnyk@fultonschools.org

Have a wonderful and safe summer!
## IA PROPOSAL FORM

**Outline of Problem or Research Question:**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Dependent Variable</th>
<th>Fixed Variables - top three</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1.</td>
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**General Method/Procedure:**

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Data to be collected (describe with units) What data do you intend to collect, and how will you evaluate it (what calculations, statistical analysis, etc. will you perform)? Assess whether it be sufficient evidence to support a claim/conclusion in response to your research question:

Safety

Materials

Materials WHS will provide:

Materials you will provide:
A minimum of THREE Sources with applicable content copy, pasted, highlighted, cited to this document below the instructions. Each piece/citation needs to be followed by a brief descriptive and evaluative paragraph that addresses the relevance, quality, and accuracy of the source. Address ethics, safety, animal experimentation policy (if needed).
**IB Chemistry - Internal Assessment Lab Format**

The following titles and subtitles should be used for your lab report and given in this order within your lab report.

Use the following sheet as a checklist when writing lab reports. Each lab report may focus on different sections so be sure that you are focusing on the section(s) that the lab is addressing.

**Introduction**
A short paragraph explaining to the reader what was performed during the experiment. Include diagrams, if appropriate.

**Design**

**Research Question**
Focused and not ambiguous in any way.
Should be written in the form “How is y dependant on x?”

**Variables**
- Independent
- Dependent
- Controlled

Variables are identified and listed correctly.

**Method**

**Measuring the Variables**
List the apparatus used.
Include a labeled diagram, if appropriate.
Tools with uncertainties and quantities are clearly stated.
Describe how you are going to change and measure the independent variable.
Describe how you are going to measure the dependent variable.
State the ranges of the independent variable you are going to use.
State how many times you are going to repeat the measurements of the dependent.
If a graph is going to be generated, you must collect at least 5 data points.
If an average value is to be calculated, the procedure should be repeated until consistent results are obtained.

**Controlling the Controlled Variables**
Describe how you controlled other variables.

**Results**

**Raw Data**
Both quantitative and qualitative data must be recorded. (Make sure this is raw data only.)
Data tables are easy to read and clearly labeled.
A title is provided.
Make sure that all columns, etc. are properly headed & units are given.
The decimal points should agree.
Uncertainties are mandatory and can be given within column headings for equipment precision and as footnotes beneath data tables for other types of uncertainties.
The number of significant figures in the measurement is consistent with the uncertainty.
**Processed Data**

Headings and the equation being used are provided to show the reader what you are doing. Headings are clear.

An example of one set of raw data’s calculation is shown through completion. The other sets do not need to be shown yet the answers to their calculations should be shown.

Uncertainties are propagated.

Significant figures are followed (round at the end).

Units are provided.

Graphs are properly labeled and clear.

Graphing raw data only counts as processing if the best-fit line, gradient, etc. are determined.

**Conclusion & Evaluation**

**Conclusion**

Start by addressing whether your data seems to support or refute a theory or known value. Specifically refer to your graph/data to give support to this discussion.

Avoid the use of the word “proof” or “proves” within your conclusion, as your data will not prove anything.

Compare the results with data values and calculate a percentage error between your results and a literature value.

Compare the % error to the uncertainty.

Discuss any outlier points could be discussed (if there were any outlier points) as well as possible reasons for those outlier points.

**Evaluation**

This paragraph section discusses how well the experimental design helped answer your experimental question.

Comment on…

- Controlled variables
- Equipment used and the method you used.
- Range of values and number of repetitions.
- Time management.

**Improvements**

In reference to the evaluation, what realistic and useful improvements could be made if you were to do this investigation again?

Discuss how random error can be reduced and how systematic errors can be removed. Be specific!!!

For an example and other notes on internal assessments, go to [http://www.rcnuwc.org/ibphysics/ia/IA1.html](http://www.rcnuwc.org/ibphysics/ia/IA1.html)
<table>
<thead>
<tr>
<th>New Assessment Criteria (24 points)</th>
<th>Requirements</th>
<th>Do they have it?</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
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<tr>
<td><strong>Personal Engagement</strong></td>
<td>Justification for the research question chosen (includes personal significance, interest, or curiosity)</td>
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<td></td>
<td>There is evidence of personal input and initiative in designing, implementation, or presentation of the investigation.</td>
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<td>Points earned</td>
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<tr>
<td><strong>Exploration</strong></td>
<td>Topic of the investigation is identified and a relevant fully focused research question is clearly described.</td>
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<td>The background information provided for the investigation is entirely appropriate and relevant and enhances the understanding of the context of the investigation.</td>
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<td>The methodology of the investigation is highly appropriate to address the research question because it takes into consideration all, or nearly all, the significant factors that may influence the relevance, reliability, and sufficiency of the collected data.</td>
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<td>The report shows evidence of full awareness of significant safety, ethical, or environmental issues that are relevant to the methodology of the investigation*.</td>
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<td>Points earned</td>
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<tr>
<td><strong>Analysis</strong></td>
<td>The report includes sufficient relevant quantitative and qualitative raw data that could support a detailed and valid conclusion to the research question.</td>
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<td>Appropriate and sufficient data processing is carried out with the accuracy required to enable a conclusion to the research question to be drawn that is fully consistent with the experimental data.</td>
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<td>The report shows evidence of full and appropriate consideration of the impact of measurement uncertainty on the analysis.</td>
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<td>The processed data is correctly interpreted so that a completely valid and detailed conclusion to the research question can be deduced.</td>
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<td>Points earned</td>
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<tr>
<td><strong>Evaluation</strong></td>
<td>A detailed conclusion is described and justified which is entirely relevant to the research question and fully supported by the data presented.</td>
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<td>A conclusion is correctly described and justified through relevant comparison to the accepted scientific content.</td>
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<td>Strengths and weaknesses of the investigation, such as limitations of the data and sources of error, are discussed and provide evidence of a clear understanding of the methodological issues* involved in establishing the conclusion.</td>
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<td>The student has discussed realistic and relevant suggestions for the improvement and extension of the investigation.</td>
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<td>Points earned</td>
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<tr>
<td><strong>Communication</strong></td>
<td>The report is well structured and clear; the necessary information on focus, process and outcomes is present and presented in a coherent way.</td>
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<td>The report is relevant and concise thereby facilitating a ready understanding of the focus, process and outcomes of the investigation.</td>
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<td>The use of subject-specific terminology and conventions is appropriate and correct. Any errors do not hamper understanding.</td>
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<td>Points earned</td>
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ASSESSMENT CRITERIA EXPLANATIONS

There are five assessment criteria. Each begins with a general statement. The marking grid then provides a number of descriptors or statements about the student’s achievement level for the criterion. These indicators explain how you are to assess the given criterion. You need to refer the Course Guide for the detailed statements and complete listings of achievement level descriptors.

Personal engagement

Students are expected to make their investigation their own unique investigation. This can be demonstrated in various ways, including the expression of personal interest with the topic or by showing initiative, insight or innovation in the implementation of their investigation. Although the teacher may guide the student into productive and safe areas of study, the student is expected to define their own research question. Repeating a standard experimental method for a standard experiment would not address the PE criterion. The personal engagement criterion can earn from zero to 2 marks and has 8% weight on the overall IA grade.

Exploration

Students are expected to state a scientifically relevant and focused research question. Students are to do research and set their research question in a scientific context. Students should use appropriate terminology and appropriate scientific techniques to answer their research question. Students must also be aware of factors that might influence the relevance, reliability and the quality of their data. If environmental and safety issues are relevant then students must demonstrate a full awareness of these issues. The exploration criterion can earn from zero to 6 marks and has 25% weight on the overall IA grade.

Analysis

Students are expected to make an appropriate and justified analysis of their data in away that addresses the research question and can be used to support a valid conclusion. This analysis includes the selection, processing and interpretation of data. Errors and uncertainties, where relevant, are to be dealt with in a reasonable and consistent way. The analysis criterion can earn from zero to 6 marks and has 25% weight on the overall IA grade.

Evaluation

Students are expected to express a relevant evaluation of the investigation process or methodology, and the data and analysis in terms of the research question. Student should also demonstrate an understanding of the wider context of real world scientific knowledge in their evaluation. If there is an accepted scientific answer to the research question then this must be compared to the student's results. Extensions of the study or improvements in the methodology
zero to 6 marks and has 25% weight on the overall IA grade.

Communication

Students are expected to produce a written report that is clear and easy to follow. The report is to demonstrate effective communications and be focused on the investigation's process and outcome. No superfluous material should be included. The report is to be 6 to 12 pages in length; excessive length will be penalized under the communication criterion. Appropriate scientific terminology and conventions must be followed, and graphs, tables, images, charts must all be presented in a clear way. The communication criterion can earn from zero to 4 marks and has 17% weight on the overall IA grade.

The five IA criteria add up to a maximum of 24 marks. Three written exam papers and the IA determine the student’s overall course grade. The IA is one-fifth of the overall grade.