

# BIOLOGY IA

## 2020-2021

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**Biology IA Checklist**



# WHAT IS A BIOLOGY IA?

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- IA = Internal Assessment
  - Some is completed in class, marked by your teachers, marks sent to IB, random sample sent to IB to check accuracy of marking
  - 20% of your final HL Biology mark
  - An **original/new** experiment about a **living organism** that you design and conduct yourself, record and analyze observations and report results; you could also use a database with results from another researcher and analyze them in a new way or a simulation with data collection
  - Need to examine the effects of an independent variable on a measurable, quantifiable dependent variable
  - Like a mini-Biology EE

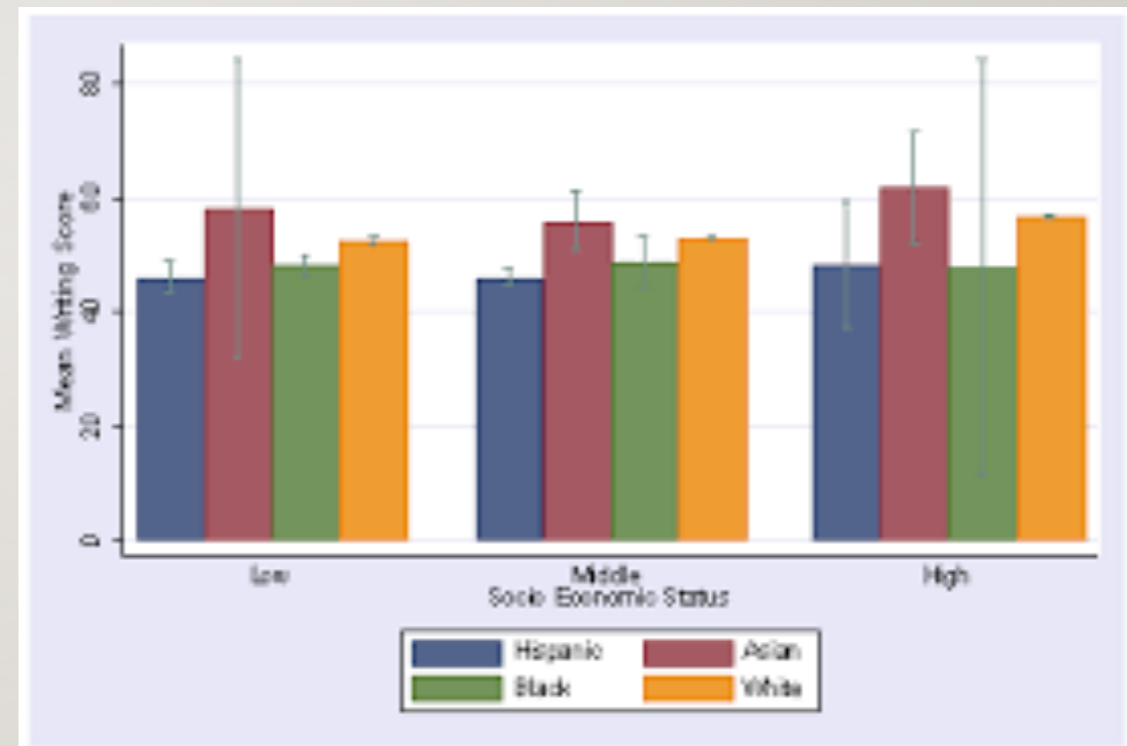




# COMPONENTS OF IA WRITE-UP: ANALYSIS

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- Data in tables, including consideration of uncertainties
- Graphs
- Statistical Analysis
- Sample calculations





# COMPONENTS OF IA WRITE-UP: EVALUATION

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- Conclusion – justified by data, with reference to scientific concepts
- Discussion of relevant limitations (What could you not control?)
- Suggestion of realistic improvements and/or possibilities for future research



# HOW DO I GET IDEAS FOR AN IA?



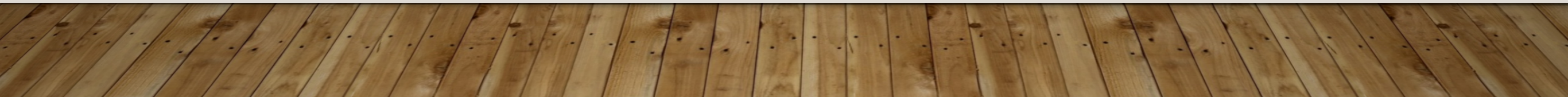
- Choose a topic that's meaningful/interesting to you (Personal Engagement is necessary)
- Science News
- Lifestyle “hacks”: cooking, gardening, health, cleaning, beauty
- YouTube



# IA INSPIRATION

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- <https://www.thinkib.net/biology/page/34574/ia-experiment-ideas-inspired-by-youtube>



# RSS EQUIPMENT AVAILABLE FOR DATA COLLECTION

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Glassware

Microscopes, slides

Bunsen burners

Hot plates

Electronic balances  
(mass)

Incubator



Vernier probes (data collection):

- Dynamometer (grip strength, pinch strength, muscle fatigue)
- Hand Grip Heart Rate monitor
- Exercise heart rate monitor
- O<sub>2</sub> gas sensor
- CO<sub>2</sub> gas sensor
- Dissolved oxygen
- Gas pressure sensor
- pH meter
- Spectrophotometer (pigmentation)
- Colorimeter
- Temperature probes





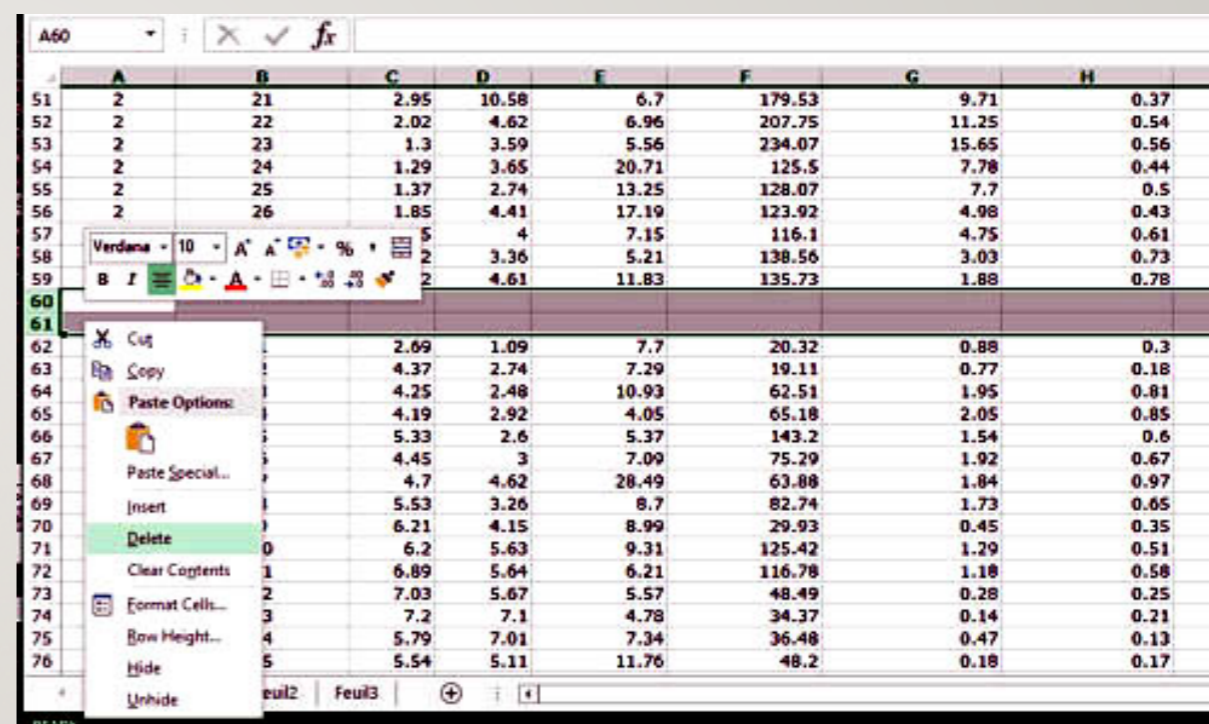
# ITEMS YOU WILL NEED TO OBTAIN

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- Seeds (investigate germination – subject half to one condition/variable vs other half = control)
- Plants (purchase plants grown in same conditions, subject half to one variable, other half = control)
- Kitchen supplies (salt, baking soda, coffee filters)

# EXAMPLES OF DATABASES

- [Global Invasive Species Database](#)
- [CITES endangered species database](#)
- [ReefBase](#) coral reef health survey data
- [Wallace Resource Library](#)
- [USDA nutrients database](#)
- [WHO Global Health Observatory](#)
- [NOAA Climate and weather databases](#)
- [Menstrual cycle hormones database](#) (and spreadsheet)
- [Entrez gene sequence database](#) ([here's our activity](#))
- <http://datanuggets.org/resources/data/>
- <https://www.ncbi.nlm.nih.gov/gene/>



	A	B	C	D	E	F	G	H	
51	2	21	2.95	10.58	6.7	179.53	9.71	0.37	
52	2	22	2.02	4.62	6.96	207.75	11.25	0.54	
53	2	23	1.3	3.59	5.56	234.07	15.65	0.56	
54	2	24	1.29	3.65	20.71	125.5	7.78	0.44	
55	2	25	1.37	2.74	13.25	128.07	7.7	0.5	
56	2	26	1.85	4.41	17.19	123.92	4.98	0.43	
57				4	7.15	116.1	4.75	0.61	
58				2	3.36	5.21	138.56	3.03	0.73
59				2	4.61	11.83	135.73	1.88	0.78
60									
61									
62				2.69	1.09	7.7	20.32	0.88	0.3
63				4.37	2.74	7.29	19.11	0.77	0.18
64				4.25	2.48	10.93	62.51	1.95	0.81
65				4.19	2.92	4.05	65.18	2.05	0.85
66				5.33	2.6	5.37	143.2	1.54	0.6
67				4.45	3	7.09	75.29	1.92	0.67
68				4.7	4.62	28.49	63.88	1.84	0.97
69				5.53	3.26	8.7	82.74	1.73	0.65
70				6.21	4.15	8.99	29.93	0.45	0.35
71				6.2	5.63	9.31	125.42	1.29	0.51
72				6.89	5.64	6.21	116.78	1.18	0.58
73				7.03	5.67	5.57	48.49	0.28	0.25
74				7.2	7.1	4.78	34.37	0.14	0.21
75				5.79	7.01	7.34	36.48	0.47	0.13
76				5.54	5.11	11.76	48.2	0.18	0.17



# HOW TO COVID-PROOF YOUR IA:



- Design an experiment that:
  - Does not require much time or equipment
  - Could be conducted in the Biology lab early in Quad 2
  - Could be conducted at home
  - Makes use of computer simulations (Gizmos)
  - Uses an existing database that you analyze in a new way



# WHAT NOT TO DO

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- Do not research something that has already been investigated (do background research)
- No animal subjects, observation studies in natural settings OK.
- No physical stress on human subjects
- No growing bacteria or molds
- Anything unsafe or unethical
- No prescribed labs (doing these in class)

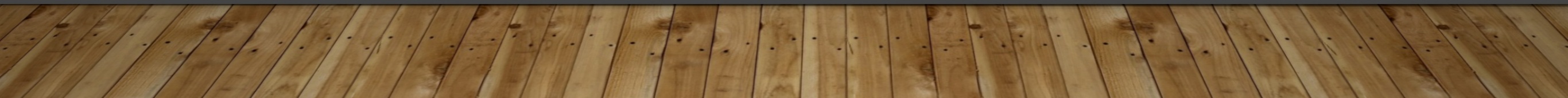




# EXPERIMENTS TO AVOID

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- Microscope-cell structure
  - Estimation of osmolarity in tissues
  - Investigating factor affecting enzyme activity that we've done.
  - Sealed Mesocosm
  - Monitoring ventilation in humans at rest and after exercise
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# DATES

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- INVESTIGATION PROPOSAL – due Friday May 21<sup>th</sup> – proposal outline (form you have)– to be attached to an Edsby message
- EXPLORATION – due Monday June 11 23<sup>rd</sup>
  - Research question, background, safety, ethical & environmental issues,
  - experimental design, procedure
- DATA COLLECTION & ANALYSIS – due Friday Sep 3<sup>rd</sup>
- FIRST DRAFT – TBA
- FINAL IA – TBA







- Take photos of the stages of your experiment Appendices
- Do your very best – if any IB exam components are cancelled (last year French exam cancelled), then IA is weighted heavily
- Pay attention to marking scheme
- Check out “How to write a Biology IA videos on YouTube
- Read sample Biology IAs that received high scores + feedback

# EXAMPLES OF IAs

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- **GOOD examples —>See the IA duo tang I gave you. Ideas about marking is there.**



# HELPFUL RESOURCES

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[Your textbook: Oxford Biology textbook p. 708-712](#)

[Original research papers: https://datasetsearch.research.google.com/](https://datasetsearch.research.google.com/)

[How to write a Biology IA that gets top marks:](#)

<https://www.youtube.com/watch?v=YrokMNND6Co>

[Excellent IB Biology websites by experienced IB teachers:](#)

- <https://www.mrgscience.com/ibdp-biology.html>
- <https://ib.bioninja.com.au/>
- <https://www.thinkib.net/biology/page/17622/the-investigation>