BIOLOGY IA
2020-2021
WHAT IS A BIOLOGY IA?

• 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:
INTRODUCTION

• Background information, include personal engagement (why is it important to you?)
• Research question
• Scientific rationale (Why should this be investigated?)
• Experimental/data collection method
COMPONENTS OF IA WRITE-UP: ANALYSIS

- Data in tables, including consideration of uncertainties
- Graphs
- Statistical Analysis
- Sample calculations
COMPONENTS OF IA WRITE-UP: EVALUATION

- 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

- https://www.thinkib.net/biology/page/34574/ia-experiment-ideas-inspired-by-youtube
RSS EQUIPMENT AVAILABLE FOR DATA COLLECTION

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
- O2 gas sensor
- CO2 gas sensor
- Dissolved oxygen
- Gas pressure sensor
- pH meter
- Spectrophotometer (pigmentation)
- Colorimeter
- Temperature probes
ITEMS YOU WILL NEED TO OBTAIN

• 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/
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

• 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

• 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
DATES

• INVESTIGATION PROPOSAL – due Friday May 21\textsuperscript{th} – proposal outline (form you have)– to be attached to an Edsby message

• EXPLORATION – due Monday June 11 23\textsuperscript{rd}
  • Research question, background, safety, ethical & environmental issues,
  • experimental design, procedure

• DATA COLLECTION & ANALYSIS – due Friday Sep 3rd

• 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

• GOOD examples —>See the IA duo tang I gave you. Ideas about marking is there.
HELPFUL RESOURCES

Your textbook: Oxford Biology textbook p. 708-712

Original research papers: 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://www.thinkib.net/biology/page/17622/the-investigation