Biology IA Checklist

(can also be used for Chemistry and Physics IA)

	Personal Engagement	YES	NO
1	Experiment was repeated often		
2	Min 3 Pages of exploration		
3	Min 3-4 Pages of Analysis		
4	Min 3 Pages of Evaluation		
5	Mention in the introduction, what the personal significance		
6	RQ is original and not one suggested by the teacher		
7	A draft was given to the teacher before		

	Exploration – Topic and Research Question	YES	NO
8	The Topic is identified and explained		
9	The RQ is identified and clearly visible		
10	The RQ is focussed. This means that both dependent and independent variable are mentioned.		
11	A short overview of the method is given. For example: In order to answer the RQ I will grow cress seeds in different light intensities and…. Etc.		
12	Alternative methods are proposed and it is mentioned why they are not used.		
13	Both dependent and independent variable of the RQ are measurable (quantifiable)		
14	In the case of discontinuous independent variables, these are listed.		
15	The personal significance of the topic is clarified. Comment: “It is interesting” is not good enough.		

	Exploration – Background	YES	NO
16	Previous research that has been conducted in this area is mentioned and how this research is similar or different to the conducted experiment. Literature research has been done to place the RQ into a wider context.		
17	The research is directly relevant to the RQ Students very often include background info which is a general summary of Biology theory but not directly relevant to the RQ. They simply summarize theory.		
18	The background information is properly cited and referenced.		
19	The significance of the RQ in connection with previous research is mentioned.		

	Exploration – Safety, Ethical issues	YES	NO
20	**Safety issues are mentioned and explained.**		
21	**Ethical issues are mentioned and explained. This includes the disposal of materials.**		

	Exploration – Materials needed	YES	NO
22	**The list of materials is complete**		
23	**The list of materials mentions different sizes of beakers used etc.**		
24	**The list of materials mentions what the items are used for**		

	Exploration – Method	YES	NO
25	**A detailed method is presented in steps.**		
26	**The individual steps are justified**		
27	**Detailed quantities (ml, sec etc.) are indicated** Bad: I watered the plants Good: I watered the plants with 10ml of tap water every 24 hours.		

	Exploration – Variable control **This is part of the method.**	YES	NO
28	**The method mentions controlled variables**		
29	**Mention on how the controlled variables are controlled** Most students write that they are controlled but not how. “The temperature needs to be constant for all plants otherwise they grow differently” is not good.		
30	**Mention why the individual controlled variables needs to be controlled. How would this impact the dependent variable?**		
31	**How the dependent variable is measured.** This must be very detailed.		
32	**It is mentioned how often the experiment is repeated (how often dependent variable measured) and why it is repeated a particuar amount of times.** If not repeated, then major risk of loss of points.		
33	**How the independent variable is controlled.**		
34	**Why these particular values of the independent variable have been chosen.**		
35	**One independent variable is the control (no change)**		
36	**The range (min to max) of the independent variable is justified**		
37	**It is mentioned how the data is processed and why.**		

	Analysis - Raw data	YES	NO
38	**Enough raw data was collected to answer the RQ**		
39	**The raw data is presented in a table**		
40	**Headings are present with units**		
41	**The headings are meaningful.** Not: Beaker 1, Beaker 2…		
42	**Several trials were made**		
43	**The decimal places are consistent**		
44	**Inaccuracies, measurement errors, outliers etc are mentioned**		
45	**Trends in the raw data is described in the text**		
46	**The data tables are formatted properly.** The independent variable must be next to each other to allow for data comparison (not separate tables for different independent variables).		
47	**The impact of the measurment uncertainty on the significance of the data is mentioned.**		

	Analysis – Data processing	YES	NO
48	**Sufficient data processing took place**		
49	**The data is correctly processed**		
50	**The data processing is meaningful in the sense that it helps answer the RQ.** Some students process data just for the sake of processing it, even though it makes no sense for the RQ.		
51	**Data processing takes measurement error into consideration. Averages? Standard deviations? %Error?**		
52	**It is mentioned if/to what extent the measurement error makes the data significant.**		

	Analysis - Graphs	YES	NO
53	**The processed data was correctly presented.** **Some students just present the raw data.**		
54	**Lines of best fit, error bars etc are drawn.** Directly connecting dots is not a line of best fit.		
55	**The trend of the graph is described in the text**		
56	**Any deviations, uncertainties, unexpected trends are mentioned.**		
57	**The significance of the result is explained.**		
58	**Title, caption, legend is present**		
59	**Axes are labelled with units**		
60	**The graph is readable (colors printed in B/W?)**		
61	**Axes are scaled correctly.**		
62	**If multiple graphs are drawn, the scale is the same to allow for comparison.**		

	Analysis - Analysis – Qualitative data	YES	NO
63	Qualitative data is collected for the different independent variables.		
64	The qualitative data is compared to the quantitative data		
65	It is mentioned, how/to what extent the qualitative data answers the RQ.		

	Evaluation - Conclusion	YES	NO
66	The concusion clearly answers the RQ		
67	The conclusion clearly mentions where the experiment was not able to answer the RQ (eg. due to to lack of data significance)		
68	The conclusion makes reference to the quantitative data		
69	The conclusion makes reference to the qualitative data		
70	The conclusion makes reference to researched data		

	Evaluation of the Data There are only a few points here, but this part is important. Write a page.	YES	NO
71	Problems in the data are mentioned with reference to tables/graphs and how these limitations can be overcome.		
72	Strengths of the data is mentioned with reference to tables/graphs		
73	The strengths/weaknesses are relevant to the RQ		

	Evaluation – Strengths of the experiment	YES	NO
74	Explains what parts/aspects of the method were done well to asnwer the RQ. Several aspects necessary. "The experiment went well", "I controlled the variables" is not an evaluation. We need fundamental evaluation of the overall method, not individual steps.		
75	Explanation to what extent the aspects of the method were helpful in answering the RQ		

	Evaluation – Weaknesses of the experiment Write a page with 4-5 weaknesses. Note: You can join Weaknesses and Improvements into one larger secion.	YES	NO
76	**Several weaknesses are mentioned**		
77	**The weaknesses relate to the fundamental method of the experiment and not only to mistakes that were made**		
78	**It is explained why and how this was a weakness.**		
79	**It is explained to what extent is was a weakness, the degree.** Evaluation means that you attach a "value" to the weakness.		

	Improvements Write a page with 4 to 5 substantial improvements	YES	NO
80	**Several improvements to the method of the experiment are mentioned**		
81	**How/why these improvements would improve the answer to the RQ is mentioned**		
82	**The improvements are significant and are not only limited to the currently used method** Bad: The thermometer was not accurate enough. Then mention why/how a more accurate thermometer would have resulted in more significant data (even necessary?)		
83	**The improvements are evaluated. To what extent would they make the data more significant?**		

	Communication	YES	NO
84	**The report is not longer than 12 pages** Comment: Reports that are significantly shorter will not score high points, however.		
85	**Title page present**		
86	**NO NAME on title page and in the IA** The IA is anonymous. Student and teacher names should not be visible anywhere.		
87	**Proper headings of the different sections**		
88	**Consistent line spacing**		
89	**Proper paragraphing**		
90	**Readable font of size 12**		
91	**Correct citations and references** A link in the footnote is not proper referencing		
92	**Tables and diagrams have a title**		
93	**Diagrams have fully labelled axes with units**		
94	**Tables and diagrams have a caption**		
95	**Data presented in tables and diagrams are also verbally described in the text**		