Cranedale Note Regarding Required Practical 12 & Competencies for AQA A-level Biology 2015

This Cranedale document makes additions to the AQA Practical Handbook for A-level Biology in red.

We offer an exciting and highly focussed field studies course for Topics 4, 5, & 7 of the new AQA Biology specification. In addition, students can:

- **Carry out Compulsory Practical 12**
- **Complete eight of the Apparatus & Techniques**
- **Develop, demonstrate, and record evidence of all five practical Competencies**
- **Design and implement their own ecological investigation**

Required practical	**12. Investigation into the effect of a named environmental factor on the distribution of a given species**
Apparatus and techniques covered during Cranedale Fieldtrip	a. Use appropriate apparatus to record a range of quantitative measurements b. Use appropriate instrumentation to record quantitative measurements *d. Use of light microscope at low power* *e. Produce scientific drawing from observation with annotations* h. safely and ethically use organisms to measure: plant or animal distribution j. safe use of instruments for dissection k. use sampling techniques in fieldwork l. Use ICT to collect data or use software to process data. *iPads also used for collation and processing*
Indicative apparatus. *An array of sampling apparatus and field instrumentation is offered, with training in appropriate recording of data and choice of analytical tool*	Tape measures, random number tables, *site-specific dichotomous* species identification chart, quadrats (could use point quadrat). *Illuminated hand lens, Longworth & Camera traps for mammals, Heath & Pitfall traps, Tullgren funnel, D-nets & Sweep nets for sampling invertebrates. Dissolved Oxygen meter, Digital pH meter, Conductivity meter for dissolved ions, Turbidity tube for suspended sediment, Nitrate photometer, Anemometer for wind speed, Lux meter for light, Hygrometer for air humidity, Atmospheric Carbon Dioxide meter, Refractometer for salinity, Soil moisture meter, Soil pH kit, Soil thermometer for temperatures 10cm below the soil surface, Infrared thermometer for solid surfaces.*

The Five Practical Competencies	Amount of choice Increasing independence →			
	Least choice	Some choice	Many choices 1	Full investigation 2
	Teacher chooses the species and the environmental factor to be investigated. Students use random sampling to investigate the distribution of the species. Experiments fully specified in terms of equipment and method.	Teacher allows a limited choice of environmental factors. Students use random sampling to investigate the distribution of the species. Experiment probably fully specified by teacher.	Teacher allows a choice of species and environmental factors. Students use random sampling to investigate the distribution of the species. Outline method provided by teacher.	Student decides on a question. Student researches methods for carrying out the experiment then chooses equipment, materials, justifying all choices.
	Opportunities for observation and assessment of competencies			
Follow written procedures	✓✓✓ Students follow written method.	✓✓✓ Students follow written method.	✓✓ Students follow an outline method.	✓✓✓ Students follow a method they have researched.
Applies investigative approaches and methods when using instruments and equipment	✓ Students measure the environmental variable then use random sampling to investigate the distribution of the species.	✓ Students measure the environmental variable then use random sampling to investigate the distribution of the species.	✓✓ Students measure the environmental variable then use random sampling to investigate the distribution of the species.	✓✓✓ Students must choose an appropriate approach, equipment and techniques to identify the species and measure the environmental variable and investigate distribution of chosen species.
Safely uses a range of practical equipment and materials	✓ Students must safely use the equipment and handle species ethically.	✓ Students must safely use the equipment and handle species ethically.	✓✓ Students minimise risks with minimal prompting and handle species ethically.	✓✓✓ Students must carry out a full risk assessment and minimise risks and handle species ethically
Makes and records observations	✓ Students record distribution of species in specified ways.	✓ Students record distribution of species in specified ways.	✓ Students record distribution of species in specified ways.	✓✓✓ Students must choose the most effective way of recording observations
Researches, references and reports	✓ Students compare results between students and identify reasons for differences.	✓✓ Students compare results between students and identify reasons for differences.	✓✓ Students compare results between students and identify reasons for differences.	✓✓✓ Students must research alternatives in order to plan their work. Reporting covers the planning, carrying out and an analysis of their results.

✓✓✓: Very good opportunity ✓✓: Good opportunity ✓: Slight opportunity ×: No opportunity

1. Many Choices

Students enjoy the ownership available in fieldwork with choices, and better understand the justification for the choice of species and environmental factors as a result.

This approach offers a good opportunity for students to demonstrate evidence of their mastery of some of the practical Competencies. Please let us know if you would like each student group to have a different title to their investigations in the field.

2. Full Investigation

An independent ecological investigation offers very good opportunities for students to demonstrate evidence of their mastery of all five practical Competencies. In addition, we hope that a taste of 'undergraduate-style' research will be richly rewarding for students and inspire them to pursue scientific study after the course.

A specially tailored Preliminary Research and Training day ensures that students have the time to thoughtfully develop their own choice and justification of aims, methods, and equipment, as well as draw up recording sheets and carry out a full risk assessment. Please ensure that you include a training day when deciding on the duration of your fieldtrip with us.