Flexible Pre-Major in Biology - Analysis Project
Final Report

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On behalf of the
Biology Articulation Committee

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Introduction

Biology represents a very large discipline within the BC Transfer System. It includes a number of courses which serve many different ends, depending on which path a student wants to take. Biology as a discipline has subfields that were developed over the years, and many institutions began the development of paths to lead to study of subfields at the larger institutions. It is interesting to note that some large institutions are now eliminating the subfields. Smaller rural institutions have tried to offer a limited selection of courses to match the requirements of degree (Bachelor of Science) programs at the universities.

The number of receiving institutions has increased dramatically during the last ten years. The number of specialty courses in biology has also increased. Those institutions that are primarily sending ones are now challenged more than ever to offer students a core of courses that will improve students' ability to seamlessly transfer into third-year studies elsewhere. Students that begin their education at the colleges and later transfer to the universities perform very well, as BCCAT's own studies have shown

Some specific challenges for transfer students have been the fact that some of the small colleges are only able to offer a small selection of second-year courses, due to smaller class sizes and staffing limitations caused by funding constraints. The variety of courses required at larger institutions makes it difficult for smaller colleges to offer transferable equivalents to all of these courses. As a result, students at smaller institutions sometimes receive unassigned second-year transfer credit at larger institutions for some of their transferred courses, which can hamper them from directly entering third-year studies.

Much online research, reviews of articulation reports, and contacts with Biology Articulation Committee members produced the information for the Flexible Pre-Major analysis project. During this process, information was uncovered that, prior to starting the project, most were unaware of. It highlighted some unique offerings at the individual receiving institutions. As well, in the middle of this gathering process, the annual budget announcements at institutions were made. These budget cuts represent further limitations to the ability of some of the smaller institutions to offer courses which will transfer for first- and second-year credit at universities.

Core Courses Required For Transfer into the Third Year of University B.Sc. Programs

The biology courses typically offered in second year are: Cell Biology, Ecology, Genetics, Biochemistry, Microbiology, Vertebrate Biology, Invertebrate Biology, Vascular Plants and

Nonvascular Plants. Some recent additions at the university level are Physiology, Data Analysis and Developmental Biology. Table 1 shows the second year courses that are needed to move into the third year of a B.Sc. in biology at the universities. Three second-year courses are needed at almost all institutions within the province. These are highlighted in green and represent cell biology, ecology and genetics. In a few cases these courses are offered at the third year level instead of second year. This set of courses could be viewed as a common core that could be used for a flexible pre-major.

Table 1. Second year courses offered at institutions that award full 4 yr biology degrees

Institutions	Cell Bio	Ecology	Genetics	Physio	Biochem	Micro	Vert Bio	Botany	Data Anal	Devel	specialty	
Athabasca	3rd	Y	Y			Y	Y				Hum sex / wildflowers	
Kwantlen	Y	Y	Y		Y	REC						
SFU	Y	Y	Y		Y							
TRU	Y	Y	Y			Y					evol body plans /landplants	Still has streams
TRU OL	Y	3rd	Y		3rd			3rd				
Trinity West	Y	3rd	3rd					Y			marine/ plant envir	
UBCO	Y	Y	3rd			y	Y	Y	Y	Y		one of each - Still has streams
UBCV	Y	Y	Y	Y		Y	Y	Y				either one of each or two of one
UFV	Y	Y	Y	Y	Y	Y	3rd (2)	3rd				
UNBC		Y	Y			Y		Y				
UVIC	Y	Y	Y				3rd				topic/organ	
VIU	Y	Y	Y		Y	Y		Y				

Codes

Y= yes they offer this course

= they do not offer this course

REC= Recommended

3rd= offered at 3rd year

(2) = offered over 2 semesters

Shading code

Green = Common courses at most institutions

Red = Unique courses

White = Traditional courses

Speciality course codes

evol body plans= evolution of body plans

landplants= evolution and ecology of land plants

topic/organ= topics in organismal biology

Unique Courses Which Cause Difficulty for Transfer Into the Third Year of B.Sc. Programs At Some Universities

Those cells that are shaded red in Table 1 currently provide impediments to transfer. These represent a specific course(s) that only the receiving institution offers.

These specific courses are:

- UBC-V's new Physiology course
- UBC-O's Data Analysis course and Development course
- TRU's Evolution of Animal Body Plans course and Evolution and Ecology of Land Plants course
- UVIC's Topics in Organismal Biology

The development course at UBC-O is an offering that is traditional at the upper levels. Each of the remaining courses represents unique offerings at that institution that would prevent seamless transfer from other institutions. Small institutions that are only able to offer a few courses are in an impossible situation when different receiving institutions require different unique courses. Small institutions have three options:

1) Try to design their curriculum to match the curriculum at the greatest number of universities
2) Align their curriculum with the curriculum of just one single institution (which in itself limits transfer possibilities)
3) To design curriculum to give students the ability to transfer with a flexible pre-major

Other Traditional Courses That Are Needed For Transfer into Some Institutions

The courses whose cells are not shaded in Table 1 fall into this category. They represent a mix of courses that have been an important component in the study of biology over the decades. Some are more important for students exploring professional programs or degrees with a cellular/molecular focus. The other ones are more important for degree programs with an ecological or an organismal concentration.

Courses That Two-Year Institutions Offer

Table 2 highlights the courses that have been offered by the smaller rural institutions and by larger colleges that offer only two years of university studies. Once again, the green highlighting represents the common core courses identified in Table 1. Most institutions offer these courses. Both CNC and COTR did not offer one of these core courses this past year, and Northern Lights was only able to offer one.

Table 2. Second year offerings at institutions that offer two years of biology for the transfer to other institutions.
This table represents the situation from academic year 2011-2012.

Institutions	Cell Bio	Ecology	Genetics	Physio	Biochem	Microbio	Vertebrat	Botany	Data Anal	Devel	specialty
Camosun	Y	Y	Y			Y					
Capilano	Y	Y	Y		Y	Y	Y	Y			
College New Caladonia	Y		Y		Y	Y					
COTR	Y	Y			Y		Y				
Douglas	Y	3rd	3rd		Y	Y	3rd				
Langara	Y	Y	Y		Y	Y	Y	Y			Pop ecology
North Island College	Y	Y	Y		Y	Y					
Northern Lights		Y									
NorthWest	Y	Y	Y		Y		Y				
Okanagan	Y	Y	Y		Y	Y	Y	Y	Y	Y	water related
Selkirk	Y	Y	Y		Y	Y	Y	Y			

Codes
Y= yes they offer this course
= they do not offer this course
3rd= offered at 3rd year

Shading code
Green= core courses

Table 3 provides a look at the projected offerings at the smaller two year colleges based on budgets for the upcoming year (2012-13). It is becoming more difficult to serve many masters. The blue shading highlights the courses that are planned for the next academic year.

Table 3. Second year offerings at institutions that offer two years of biology for transfer to other institutions.
This table represents the situation after March 2012 budget cuts.

Institutions	Cell Bio	Ecology	Genetics	Physio	Biochem	Microbio	Vertebrat	Botany	Data Anal	Devel	specialty
Camosun	Y	Y	Y			Y					
Capilano	Y	Y	Y		Y	Y	Y	Y			
College New Caladonia	0		0		0	0					
COTR	Y	Y	Y				Y				
Douglas	Y	3rd	3rd		Y	Y	3rd				marine
Langara	Y	Y	Y		Y	Y	Y	Y			many
North Island College	Y	Y	Y		Y	Y					
Northern Lights		0									
NorthWest	0	0	0		0		0				
Okanagan	Y	Y	Y		Y	Y	Y	Y	Y	Y	water
Selkirk	0	0	0		0		0				

Codes
Y= yes they offer this course
0= course not scheduled to be offered in the next academic year
3rd= offered at 3rd year

Shading Code
Blue= courses still offered in the next academic year

Could a Flexible Pre-Major Overcome These Difficulties?

This analysis project has clearly highlighted three core courses which must be in the second year of any transfer program in Biology. Courses from the other traditional course groups might be a logical mix to round out or meet the needs for transfer students moving into 3rd year. It could be possible in a flexible pre-major to include one course from each group, or two from the same group. That would put the possible pre-major at five courses. Does it need to be five, or could it be four? Offering five courses could represent a challenge for some small institutions. The unique courses at some of the universities are the real limiters to transfer. What could the flexible pre-major look like: three core courses plus two others (flexible pre-major of five second-year courses), or three core courses plus one (flexible pre-major of four second-year course)? A flexible pre-major consisting of four courses taken at the sending institution, plus a fifth to be taken at the receiving institution once transfer is complete, would build in flexibility.

Discussion of the Flexible Pre-Major Analysis at the 2012 Biology Articulation meeting

The discussions that we had at our meeting were very productive. The information in this report was presented to the entire group and discussed quite thoroughly. The consensus around the table was that the three core courses were clear. Many were surprised, but the data highlighted this fact. The group was able to discuss what the flexible pre-major would mean, including that it would only specify the biology course requirements. We discussed the importance of Organic Chemistry courses in biology programs, but the pre-major would only specify the biology courses. Students would need to be informed that the Organic Chemistry course is important.

The committee ended its discussions by moving the following.

Motion: To submit the interim report subject to Betty's adjustment to the TAC committee this Friday.
-Blythe Nilson -Seconded-Larry Anthony Carried

Final Summary of the Analysis Project

After our articulation committee meetings in May 2012, we left with a better understanding of what a flexible pre-major in biology could look like. The group came to agreement about the fact that Cell Biology, Genetics and Ecology would represent the universal core courses that could be used for a major in biology. Biochemistry, microbiology and vertebrate biology were identified as courses that were needed for program credit at many institutions, and tend to be popular course offerings. The will around the table was to proceed with the implementation of

a Flexible Pre-Major, and the various representatives left in a positive framework that we were progressing further in our pursuit of a Flexible Pre-Major in Biology. The understanding was that institutions would still be able to agree and participate, or not agree and therefore not participate.

To complete our final report for the Analysis Phase of the project, I felt it would be useful to put together tables of the courses (by title) that are similar to the potential Flexible Pre-Major courses that are offered by most institutions. At this time, the courses in the following tables are not necessarily officially articulated to each other. As well, these tables are not an exhaustive list of all courses offered by each institution, and these tables are not the same as the existing Biology transfer grids. The intent of these tables was to look at the courses offered by each institution, and also to determine whether courses offered by each institution include lab and/or tutorial time in addition to lectures. The amount of lab or tutorial time would be important information that some institutions would want to have before any arrangement was agreed to.

Table 4 shows the information on the first-year courses. The first-year courses are all standard and consistent between institutions. As you can see from Tables 5 and 6, there is some variation in second-year courses. Many have full labs weekly, while others have reduced lab work or no labs. Some have tutorials instead of labs, but the length of the tutorials can vary. Some have a combination of labs and tutorials. Deciding how to accommodate these variations within a Flexible Pre-Major structure will be part of the decision process if the Flexible Pre-Major moves into the implementation phase.

Table 4. First-Year Courses in Biology Offered by BC Transfer System Member Institutions

Institution	Courses	Lab	Tutorial	Topic sequence
Alexander College	BIOL 101 BIOL 102	Yes both	1 hr	Cell-Ecol
Camosun College	Biol 124 Biol 126	Yes both		Ecol- Cell
Capilano University	BIOL 110/111 and BIOL 106/107	Yes both Yes both	 1 hr	Cell – Ecol Cell - Ecol
College of New Caledonia	Bio 107 Bio 120	Yes both		Cell - Ecol
College of the Rockies	Biol 101 Biol 102	Yes both		Cell - Ecol
Columbia College	Bio 110 Bio 120	Yes both		Diversity- Genetics - Cell
Coquitlam College	Bio 10 1 Bio 102	Yes both		
Douglas College	BIOL 1100 BIOL 1210	Yes both		Ecol- Physio –Cell
Kwantlen Polytechnic University	BIOL 1110 BIOL1210	Yes both		Diversity/Ecology - Cell
Langara College	BIOL 1115 BIOL 1215	Yes both		
North Island College	Bio 102 Bio 103	Yes both		Cell - Ecol
Northern Lights College	BIOL101 BIOL 102	Yes both		Cell - Ecol
Northwest Community College	Biol 101 Biol 102	Yes both		Cell – Ecol
Okanagan College	BIOL 111 BIOL 121	Yes both		
Quest University				
Selkirk College	BIOL 104 BIOL 106	Yes both		
Simon Fraser University	BISC 101 BISC 102	Yes both	1 hr	Cell – Ecol Either order
Trinity Western University	Biol 113 Biol 114	Yes both		Ecol - Cell
Thompson Rivers University	BIOL1110 BIOL1210	Yes both		Cell-Ecol
Thompson Rivers University - Open Learning	BIOL 1113 BIOL 1213	Yes both		
University of BC - Vancouver	Bio 112 Bio 121	One semester		Cell-Ecol
University of BC - Okanagan	BIOL 116 BIOL 125	Yes both		Cell - Ecol
University of the Fraser Valley	Bio 111 Bio 112	Yes both		Cell - Ecol
University of Northern BC	Biol 101 Biol 102	Yes both		Cell- Ecol
University of Victoria	BIO 190A BIO 190B	Yes both		Cell- Plant/Animal – No Genetics or

Institution	Courses	Lab	Tutorial	Topic sequence
				Ecology
Vancouver Community College	BIOL 1100 BIOL 1200	Yes both		Ecol - Cell
Vancouver Island University	Biol 121 Biol 123	Yes both		Zool/Ecol - Cellular
Yukon College	BIOL101 BIOL 102	Yes both		Ecol- Cell - Systems

Table 5. Second-Year Core Courses in Biology Offered by BC Transfer System Member Institutions

Institution	Course Cell	Lab	Tut	Course Genetics	Lab	Tut	Course Ecology	Lab	Tut
Alexander College									
Athabasca University	BIOL 401	No		BIOL 341	No		BIOL 345	4 day	
Camosun College	Biol 230	Yes		Biol 232	Yes		Biol 228	Yes	
Capilano University	BIOL 214	Yes		BIOL 200	No		Biol 208	Yes	
College of New Caledonia	BIO 201	Yes		BIO 220	Yes				
College of the Rockies	Biol 201	Yes		Biol 203	Yes		Biol 204	Yes	
Columbia College									
Coquitlam College									
Douglas College	BIOL 2321	Yes		BIOL 3205	Yes		BIOL 3305	Yes	
Kwantlen Polytechnic University	BIOL 2321	Yes		BIOL 2320	Yes		BIOL 2322	Yes	
Langara College	BIOL 2415	2 hr		BIOL 2330	2 hr		BIOL 2380	2 hr	
North Island College	Bio 200	Yes		Bio 202		1.5 hr	Bio 230	Yes	
Northern Lights College							BIOL 204		1 hr
Northwest Community College	Biol 205	Yes		Biol 209	No		Bio 211	No	
Okanagan College	BIOL 211	No		BIOL 224	1.5 hr		BIOL 203		1 hr
Quest University									

Institution	Course Cell	Lab	Tut	Course Genetics	Lab	Tut	Course Ecology	Lab	Tut
Selkirk College									
Simon Fraser University	MBB 221/231	No	1 hr	BISC 202	No	1 hr	BISC 204	No	1 hr
Trinity Western University	BIOL 223	Yes		BIOL 371	Yes		BIOL 381	Yes	
Thompson Rivers University	Biol 2130	1.5 hr	.5 hr	Biol 2340	1.5 hr	.5 hr	Biol 2170	1.5 hr	.5 hr
Thompson Rivers University – Open Learning	BIOL 2131	?		BIOL 2341	?		BIOL 3021	?	
University of British Columbia - Vancouver	BIOL 200		1 hr	BIOL 234		2 hr	BIOL 230	9 hrs?	
University of British Columbia - Okanagan	BIOL 200	No		BIOL 265	No		BIOL 203		1 hr
University of the Fraser Valley	BIO 201	Yes		BIO 220	Yes		BIO 210	Yes	
University of Northern BC	BIOL 311	Combined lab & tutorial	Combined lab & tutorial	BIOL 210	Yes		BIOL 201		1 hr
University of Victoria	BIOL 225	Yes		BIOL 230	Yes		BIOL 215	Yes	
VCC									
VIU	BIOL 200	1.5 hr		BIOL 212		1.5 hr	BIOL 202	1.5 hr	
Yukon							BIOL 220	Yes	

Table 6. Second Year Non-Core Courses in Biology Offered by BC Transfer System Member Institutions

Institution	Course Vertebrate	Lab	Course Biochemistry	Lab	Tut	Course Microbiology	Lab	Tut
Alexander College								
Athabasca University	BIOL 320	4 day				BIOL 325	4 day	
Camosun College						Biol 202	Yes	
Capilano University	BIOL 213	Yes	BIOL 215	Yes		BIOL 222	Yes	
College of New Caledonia			BIO 202	Yes		BIO 205/206 Not offered in 2013	Yes	
College of the Rockies	Biol 208	Yes	Biol 202	Yes				
Columbia College								
Coquitlam College								
Douglas College			BIOL 2421	No	Yes	BIOL 2400	Yes	
Kwantlen Polytechnic University			BIOL 2421	No		BIOL 2330	2 hr	
Langara College	BIOL 2350	2 hr	BIOL 2315	2 hr				
North Island College			Bio 201		1.5 hr	BIO 215	Yes	
Northern Lights College								
Northwest Community College	Biol 202	Yes	Biol 206	Yes		Biol 213	Yes	
Okanagan College	BIOL 254	Yes	BIOL 220	No	1 hr	BIOL 228	Yes	
Quest University								
Selkirk College	BIOL 214	1.5 hr				BIOL 212	1.5 hr	
Simon Fraser University	BISC 316	Yes	MBB 222	No	1 hr	BISC 303	Yes	
Trinity Western University	BIOL 308	Yes	BIOL 384	Yes		BIOL 334	Yes	
Thompson Rivers University			Biol 3130	No		Biol 2160	Yes	
Thompson Rivers University – Open								

Institution	**Course Vertebrate**	**Lab**	**Course Biochemistry**	**Lab**	**Tut**	**Course Microbiology**	**Lab**	**Tut**
Learning								
University of BC - Vancouver	BIOL 204	Yes	BIOL 201		1 hr	MICB 201/202	One semester	
University of BC - Okanagan	BIOL 204	Yes				BIOL 228	Yes	
University of the Fraser Valley			BIO 202	Yes		BIO 203	Yes	
University of Northern BC			BIOL 204	No	No	BIOL 203	Yes	
University of Victoria	BIOL 307	Yes						
Vancouver Community College								
Vancouver Island University	BIOL 329	Yes	BIOL 201			BIOL 210	1.5 hr	
Yukon College								

At the articulation committee meeting in May 2012, there seemed to be a willingness of cooperation in trying to pursue this project into the next phase. Institutions with some specialty courses were willing to work with those institutions that could not offer those courses. It was also apparent that some institutions will probably not agree to participating in a Flexible Pre-Major, and that would not be a stumbling block to reaching an agreement among those institutions that decide to participate. The only way the Flexible Pre-Major can move forward is if there are some degree-granting institutions willing to work with those smaller institutions that only offer the first two years of biology courses. Identifying those degree-granting institutions will be one of the first things that a Flexible Pre-Major implementation project would have to determine. The smaller rural colleges have the most to gain and potentially the most to lose, depending on whether a Flexible Pre-Major agreement can be reached.

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