Diploma Programme subject outline—Group 4: sciences

School name	Spojená škola Pankúchova 6, Bratislava	**School code**	061749
Name of the DP subject *(indicate language)*	Biology		
Level *(indicate with X)*	Higher x	Standard completed in two years X	Standard completed in one year *
Name of the teacher who completed this outline	Silvia Dadajová	**Date of IB training**	October 2021
Date when outline was completed	11 January, 2022	**Name of workshop** *(indicate name of subject and workshop category)*	Biology (Cat.1)

* All Diploma Programme courses are designed as two-year learning experiences. However, up to two standard level subjects, excluding languages ab initio and pilot subjects, can be completed in one year, according to conditions established in the *Handbook of procedures for the Diploma Programme*.

1. Course outline

- Use the following table to organize the topics to be taught in the course. If you need to include topics that cover other requirements you have to teach (for example, national syllabus), make sure that you do so in an integrated way, but also differentiate them using italics. Add as many rows as you need.
- This document should not be a day-by-day accounting of each unit. It is an outline showing how you will distribute the topics and the time to ensure that students are prepared to comply with the requirements of the subject.
- This outline should show how you will develop the teaching of the subject. It should reflect the individual nature of the course in your classroom and should not just be a “copy and paste” from the subject guide.
- If you will teach both higher and standard level, make sure that this is clearly identified in your outline.

	Topic/unit (as identified in the IB subject guide) *State the topics/units in the order you are planning to teach them.*	Contents	Allocated time One class is 45 minutes. In one week there are 3/5 classes.	Assessment instruments to be used	Resources *List the main resources to be used, including information technology if applicable.*
Year1	Topic 2		**28**		
	Molecular biology	2.1 Molecules to Metabolism	3	**FA :** - Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) - Including data-based questions - Protein posters – group work - Revision quizzes - Class work and discussion - Relevant worksheets End of Unit 2 Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students.
		2.2 Water	3		
		2.3 Carbohydrates and lipids	3		
		2.4 Proteins	4		
		2.5 Enzymes	3		
		2.6 Structure of DNA and RNA	3		

				style). Practical work: Molecules to metabolism Students will test different food items for lipids, proteins, starches, and glucose. They will compare the results. A written report detailing the investigation over the separation of photosynthetic pigments by chromatograph (IA style). Practical work: Enzymes Experimental investigation of a factor affecting enzyme activity. A written report detailing the investigation over factors which affect rate of enzymes reactions (IA style). All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF **https://ib.bioninja.com.au/**

		2.7 DNA replication, transcription and translation	3	2.8 Cell respiration: Students will investigate the rate of respiration in different organisms. Practical work: Photosynthesis-Separation of photosynthetic pigments by chromatograph. All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	
		2.8 Cell Respiration	3		
		2.9 Photosynthesis	3		
Year 1	Topic1		**21**		
	Cell biology	1.1 Introduction to cells	3	**FA** -Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions - Revision quizzes - Class work and discussion - group project - Relevant worksheets - Ultrastructure posters - Cancer leaflets	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma
		1.2 Ultrastructure of cells	4		
		1.3 Membrane structure	3		
		1.4 Membrane transport	4		
		1.5 The origin of cells	3		
		1.6 Cell division	4		

				- Stem cells presentation/debate End of Unit 1 Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style). Practical work:Introduction to the cell Use of a light microscope to investigate the structure of cells and tissues, with drawing of cells. Calculation of the magnification of drawings and the actual size of structures and ultrastructures shown in drawings or micrographs. A written report detailing the investigation over the surface area to volume ratio (IA style). 1.4 Practical work: Membrane transport- Estimation of osmolarity in tissues by bathing samples I hypotonic and hypertonic solutions. A written report detailing the	Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF **https://ib.bioninja.com.au/**

				investigation over osmorality of a tissue (IA style). All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	
Year1	Topic 3		**21**		
	Genetics	3.1 Genes	4	**FA :** - Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions -group project - Revision quizzes End of Unit 3 Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style). Practical work: Genetic modification and biotechnology-Students will do a gel electrophoresis lab using DNA from different organisms	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing
		3.2 Chromosomes	4		
		3.3 Meiosis	4		
		3.4 Inheritance	4		
		3.5 Genetic modification and biotechnology	5		

				All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF **https://ib.bioninja.com.au/**
Year 1	Topic 4		**16**		
	Ecology	4.1 Species, communities and ecosystems	4	**FA :** - Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions - Carbon cycle poster - Revision quizzes - Class work and discussion - Relevant worksheets	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford
		4.2 Energy flow	4		
		4.3 Carbon cycling	4		
		4.4 Climate change	4		

				End of Unit 4 Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style) Practical work:Species, communities and ecosystems- Setting up sealed mesocosms to try to establish sustainability. All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF **https://ib.bioninja.com.au/**
Year 2	Topic 5		**16**	**FA :** - Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) o Including data-based	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard
	Evolution and biodiversity	5.1 Evidence for evolution	4		
		5.2 Natural selection	4		
		5.3 Classification of biodiversity	4		

				questions -group work project - Revision quizzes - A dichotomous key End of Unit 5 Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style) Practical work: Evidence for evolution-Students will do an evolution simulation using iPADS All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF **https://ib.bioninja.com.au/**
		5.4 Cladistics	4		
Year 2	Topic 6		**27**		
	Human physiology	6.1 Digestion and absorption	5	**FA :** -Test yourself questions of	IBDP course books and revision books published by different publishers, students have one and others

		6.2 The blood system	5	coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions - Revision quizzes End of Option D Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style) Practical work: Gas exchange- Monitoring of ventilation in humans at rest and after mild and vigorous exercise. All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com
		6.3 Defence against infectious disease	4		
		6.4 Gas exchange	4		
		6.5 Neurons and synapses	5		

					https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF **https://ib.bioninja.com.au/**
		6.6 Hormones, homeostasis and reproduction	4		
	Additional High level (AHL) 80				
Year 1	Topic 9		18		
	Plant biology	9.1 Transport in the xylem of plants	4	FA: - Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions - Revision quizzes - Class work and discussion - Relevant worksheets End of AHLTest: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion
		9.2 Transport in the phloem of plants	4		
		9.3 Growth in plants	5		
		9.4 Reproduction in plants	5		

				data-based question (IB Paper 3 style) Practical work: Transpiration - Measurement of transpiration rates using potometers. A written report detailing the investigation over the effect of temperature on transpiration rate (IA style) All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF https://ib.bioninja.com.au/
	Topic 7		12		
	Nucleic acids	7.1 DNA structure and replication	4	FA : - Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook,	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB
		7.2 Transcription and gene	4		

		expression		and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions - Revision quizzes End of unit 7 AHL test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style) All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF
		7.3 Translation	4		

					https://ib.bioninja.com.au/
Year 1	Topic 8		19		
	Metabolism, cell respiration,photosynthesis	8.1 Metabolism	5	FA. - Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions - Revision quizzes - Class work - Any relevant worksheet End of Unit 8 AHL Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style) All lab work to be assessed according to IA criteria.	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class
		8.2 Cell respiration	7		
		8.3 Photosynthesis	7		

					Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF https://ib.bioninja.com.au/
Year 2	Topic 10		11		
	Genetics and evolution	10.1 Meiosis	4	FA. -Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions - Revision quizzes - Class work - Any relevant worksheet End of unit 10 AHL Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to
		10.2 Inheritance	4		
		10.3 Gene pools and speciation	3		

				(IB Paper 3 style) Test: Multiple Choice All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF https://ib.bioninja.com.au/
Year 2	Topic 11		21	FA. - Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed - Homework to be monitored via Toddle (Edupage) • Including data-based questions - Revision quizzes - Class work - Any relevant worksheet	IBDP course books and revision books published by different publishers, students have one and others are available in school library BIOZONE,IB Biology,Second edition, SB+WB C.J.Clegg: Biology For The IB Diploma, Second edition Biology Developed For The IB Diploma, Standard level, Pearson Baccalaureate Ghalayini, Rita Y.: Biology, Third edition, Standard level for use with the IB
	Animal physiology	11.1 Antibody production and vaccination	4		
		11.2 Movement	5		
		11.3 The kidney and osmoregulation	6		
		11.4 Sexual reproduction	6		

				End of unit 11 AHL Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style) All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	Bkerat, Marwa: Biolofy For IB Diploma Course preparation, Oxford Allot,Andrew, Mindorff,David: Biology, IB Diploma Programme, Course Companion Inthinking Biology resource i sused by teachers to see different perspectives and materials are shared with students. IBDP Online Question bank i sused for producing quizes, mock exams and homework. Simulation,Data logging, databases, and spreadsheets are in use in class Vernier software and hardware are used for experimental work. www.biologycorner.com https://www.youtube.com/watch?v=QnQe0xW_JY4&list=PL3EED4C1D684D3ADF https://ib.bioninja.com.au/
	Options		21 / 33		
	D. Human physiology 21Sl/33 Hl	D.1 Human nutrition	5	FA: -Test yourself questions of coursebook on each subtopic to be completed - Exam style question of coursebook, and past exam questions on each topic to be completed	
		D.2 Digestion	5		
		D.3 Functions of the liver	5		

		D.4 The heart	5	- Homework to be monitored via Toddle (Edupage) • Including data-based questions - Revision quizzes End of Option D Test: Multiple Choice (IB Paper 1 style) mixed with written response (IB Paper 2 style) and data-based question (IB Paper 3 style). All lab work to be assessed according to IA criteria focusing on: Personal engagement,Exploration,Analysis,Evaluation and Communication.	
HL		D.5 Hormones and metabolism	6		
HL		D.6 Transport of respiratory gases	7		

2. The group 4 project

As the IB guides say, “The group 4 project is a collaborative activity where students from different group 4 subjects work together on a scientific or technological topic, allowing for concepts and perceptions from across the disciplines to be shared in line with aim 10—that is, to ‘encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method.’” Describe how you will organize this activity. Indicate the timeline and subjects involved, if applicable.

Students will be required to participate in a group 4 project as outlined in the IB biology syllabus. First of all, students will be broken into small groups (the smaller the group the easier for students it is to take an active role so making small groups enables them to succeed more easily) and asked to develop their own research question related to the biology core curriculum and other scientific and technological disciplines. Students are informed about the rationale and requirements of G4 (rather than product, process and collaboration are important). Students will spend approximately 4 hours of in class time planning their projects/experiments, focusing on research, determining their goals, hypothesis, and end product. The remaining 6 hours will be devoted to executing their procedures and communicating their findings to members of the Spojená škola IB staff, their peers, or other appropriate audience.

Timeline:

June (1 hour):1st session to brainstorm and discuss a central topic, sharing ideas and information. Students could use a vacation time to think about how they are going to tackle the project and would be ready to start work early in the second year.

September (8hours): students will investigate the topic in mixed-subject groups. The time will be dedicated to the actual project work and it will be the students´ responsibility to make sure they use all the time.

October (1hour): presentations of the students´ works: posters, videos, web pages etc.

3. IB practical work and the internal assessment requirement to be completed during the course

As you know, students should undergo practical work related to the syllabus.

- Physics, chemistry and biology: 40 hours (at standard level) or 60 hours (at higher level)
- Computer science: 40 hours (at standard level) or 40 hours (at higher level)
- Design technology: 60 hours (at standard level) or 96 hours (at higher level)
- Sport, exercise and health science: 40 hours (at standard level) or 60 hours (at higher level)

Use the table below to indicate the name of the experiment you would propose for the different topics in the syllabus.

An example is given. Add as many rows as necessary.

Name of the topic	Experiment	Any ICT used? *Remember you must use all five within your programme.*
Acids and bases	Titration	Yes
1.1 Introduction to cells	Use of a light microscope to investigate the structure of cells and tissues, with drawing of cells. Calculation of the magnification of drawings and the actual size of structures and ultrastructures shown in drawings or micrographs.	Yes
1.4 Membrane transport	Estimation of osmolarity in tissues by bathing samples I hypotonic and hypertonic solutions.	Yes
2.1 Molecules to metabolism	Students will test different food items for lipids, proteins, starches, and glucose. They will compare the results.	Yes
2.5 Enzymes	Experimental investigation of a factor affecting	Yes

	enzyme activity.	
2.8 Cell respiration	Students will investigate the rate of respiration in different organisms.	Yes
2.9 Photosynthesis	Separation of photosynthetic pigments by chromatograph.	Yes
3.5 Genetic modification and biotechnology	Students will do a gel electrophoresis lab using DNA from different organisms	Yes
4.1 Species, communities and ecosystems	Setting up sealed mesocosms to try to establish sustainability.	Yes
5.2 Evidence for evolution	Students will do an evolution simulation using iPADS	Yes
6.4 Gas exchange	Monitoring of ventilation in humans at rest and after mild and vigorous exercise.	Yes
9.1 Transpiration	Measurement of transpiration rates using potometers.	Yes

4. Laboratory facilities

Describe the laboratory and indicate whether it is presently equipped to facilitate the practical work that you have indicated in the chart above. If it is not, indicate the timeline to achieve this objective and describe the safety measures that are applicable.

The current science classrooms have sinks, outlets, lab tables, safety shower, eyewash station, fire extinguisher, and a fire blanket, data logger Vernier. There is an emergency shut-off for electricity, fire extinguishers in the lab space(s), fire blankets in the lab space(s), an emergency shower in the lab space, a fume hood in the lab space(s), an eyewash station in the lab space, appropriate chemical waste management systems in place. All chemicals and other hazardous materials are stored in a lockable, ventilated room with no direct access for students. Flammable or corrosive chemicals are stored separately in cabinets designed for this purpose. Emergency exits are clearly posted. Safety regulations/precautions are clearly posted. All chemical containers are labelled with the name of the chemical and the appropriate hazard warning. The school maintains an inventory of their laboratory chemicals. There are lab coats and safety goggles for student and teacher use. Space is provided outside of the lab, or away from the lab benches, for the storage of bookbags, coats and other personal items. Available resources include subject specific data loggers and accompanying ICT equipment, as described in the DP sciences course guides.

5. Other resources

Indicate what other resources the school has to support the implementation of the subject and what plans there are to improve them, if needed.

There is space for both individual and group workin the school library.The space (or part of) is inviting and appropriate for DP students; appropriately sized furniture, wall displays and decorations, etc. Students have access to computers, printers, WiFi within the library space. There are available resources (books, periodicals, reference) representing all languages offered in the DP Resources are catalogued in a manner easy for students to use (Dewey Decimal). There are IB course guides and textbooks available .There are resources available for teacher professional development and research. If printed materials are limited, students and teachers have access to a digital library database (EBSCO, JStor, etc.). There are resources relevant to the local community (local newspapers, etc.). Students have access to computers, in appropriate numbers, during school hours; BYOD, school provided, etc. There is internet accessibility throughout the school building. Students and teachers can access school internet portal from home
Classrooms are equipped with video and audio projection equipment.

Visual Arts Spaces

Designated space for DP arts resources and materials storage. Space and time for students to use arts studio outside of scheduled class period. Designated storage space for safekeeping of unfinished/in progress work. Designated digital camera

6. Links to TOK

You are expected to explore links between the topics of your subject and TOK. As an example of how you would do this, choose one topic from your course outline that would allow your students to make links with TOK. Describe how you would plan the lesson.

Topic	Link with TOK (including description of lesson plan)
Topic 1	There is a difference between the living and non-living environment. How will you be able to know? Students will be asked to explain to non-biologists why a copper sulfate crystal growing in a solution of copper sulfate (or stalactites and stalagmites growing in a cave) are not living, yet corals are. Students will be guided to think about general characteristics of life and to compare them using their scientific knowledge.

7. Approaches to learning

Every IB course should contribute to the development of students' approaches to learning skills. As an example of how you would do this, choose one topic from your outline that would allow your students to specifically develop one or more of these skill categories (thinking, communication, social, self-management or research).

Topic	Contribution to the development of students' approaches to learning skills (including one or more skill category)
Practical Work	Students are consistently refining their communication and social skills as part of their lab practical work in IB Biology SL/HL. They are motivated to collaborate with their peers in order to reach the goal. They have to manage their work, discuss the procedures, collaborate in leading the experiments and take control over their co-workers´ activities. Through these actions they develop communication skills, self-management skills, organization skills. Active participation of students into discussion about the whole practical work opens an opportunity window to improve their thinker and communicator characteristics.

8. International mindedness

Every IB course should contribute to the development of international-mindedness in students. As an example of how you would do this, choose one topic from your outline that would allow your students to analyse it from different cultural perspectives. Briefly explain the reason for your choice and what resources you will use to achieve this goal.

Topic	Contribution to the development of international mindedness (including resources you will use)

Topic 11 Animal Physiology	Students are learning about benefits of vaccination helped us required IM because we saw how epidemics and pandemics were prevented through global cooperation of medical facilities in many countires. Based on the statistics of vaccination in the particular countries, students analyse the the pandemic incidence and the benefits of vaccination.

9. Development of the IB learner profile

Through the course it is also expected that students will develop the attributes of the IB learner profile. As an example of how you would do this, choose one topic from your course outline and explain how the contents and related skills would pursue the development of any attribute(s) of the IB learner profile that you will identify.

Topic	Contribution to the development of the attribute(s) of the IB learner profile
Topic 1 Cellular Biology	Students will be inquiries during laboratory investigations. During the labs they will be doing data analysis which will require them to be thinkers. After their lab, they will write a lab report making them knowledgeable.
Topic 2 Molecular Biology	Students will be inquiries during the lab investigations. Students will be reflective and write Cornell notes where they will answer essential questions and look back at their notes. Students will also reflect during the discussion section of their lab reports.
Topic 3 Genetics	Students will be open minded when they read articles about topics such as epigenetics and discuss with classmates. Students will present about different genetic disorders which will demonstrate risk taking and knowledge.
Topic 4 Ecology	Students will read articles and do research of how dams affect local ecosystems. They will also investigate urbanization of rural communities and how that affects populations in that area, which will shape a caring student.
Topic 5 Evolution and Biodiversity	Students will be open minded during Socratic seminars and become communicators while they discuss natural selection and speciation.
Topic 6 Human Physiology	Students will be inquiries during laboratory investigations and communicators as they share the knowledge they gained through presentations.