

Teacher(s)	Sangita Pal, Radhika Kapoor	Subject group and discipline	MYP Science		
Unit title	How do we map matter?	MYP year	2	Unit duration (hrs)	90 hrs

Inquiry: How do we map matter?

Key concept	Related concept(s)	Global context
change	Models, patterns	Scientific and Technical innovation <ul style="list-style-type: none"> • processes and solutions
Statement of inquiry		
By changing matter we can identify patterns in properties that help us to make models, and the models help us invent new kinds of material		
Inquiry questions		
<p>Factual— What substances are pure? What substances are impure? How do pure substances combine? What's in an atom? What are the subatomic particles of an atom? How are the subatomic particles arranged in an atom? What are the properties of an acid and an alkali?</p> <p>Conceptual— How can patterns of properties be used to organize elements? What kinds of chemical reaction can take place? How can we represent chemical change?</p> <p>Debatable— To what extent can science be used to fix the problems science creates?</p>		

Objectives	Summative assessment Outline of summative assessment task(s) including Assessment criteria:	
A : All strands	Criterion A : Knowing and understanding	Link of SA to Statement of Inquiry
Approaches to learning (ATL)		
<p>Thinking skills- Critical thinking skills-Interpret data; Propose and evaluate a variety of solutions Activity- Interpret data from the given task on the atomic arrangement of the different substances to be a molecule of an element or compound. Collect record and verify data in the lab experiments</p> <p>Research-Information literacy- Access information to be informed and inform others; Make connections between various sources of information Activity -Access information about the symbols of elements. Access information about the timeline of discovery of elements</p>		

Thinking skills- Transfer skills- Students find out the solution to finding out the best antacid by their knowledge on neutralisation reaction and prior experiential learning.

Action: Teaching and learning through inquiry

Content	Learning process
<ol style="list-style-type: none"> 1. What substances are pure, what substances are impure 2. How do pure substances combine? 3. What is in an atom? 4. How can patterns of properties be used to organize elements? 5. What kinds of chemical reaction can take place? 6. How can we represent chemical change? 7. Acids and alkalis 8. Neutralisation reaction 	<ol style="list-style-type: none"> 1. See, Think, Wonder- Students will observe pictures of physical and chemical changes or live demonstration and will inquire about the different types of physical or chemical changes 2. Introduction to physical to chemical properties- Demonstration of elephant toothpaste 3. PPT on the early discovery of matter and the contribution of various scientists- Think Pair and Share 4. Construction of timeline on the discovery of various metals 5. Activity based on periodic table.Students would use colour codes to identify metal ,non metals & metalloids, research on their Latin names ,common names 6. Concept of diatomic, triatomic molecules of elements to be introduced with the help of ball and stick model 7. Students will be shown videos to introduce atomic structure- subatomic particles of an atom 8. Introducing patterns of properties be used to organize elements through Element card games 9. Task sheet will be given on the properties of group 1 and group 7 elements. 10. Lab Activity will be done to understand the reactivity of metals and placing the metals in the reactivity series 11. Testing of different chemicals using different indicators in order to identify acids and bases 12. Plant detectives- How can plants be used to detect acidity?

13. Indicators-extracting dye from plants
14. Understanding pH scale with the help of pH meter and universal indicator
15. Neutralization reaction will be explained by the help of pH change in a chemical reaction between acid and base

Formative assessment

1. Making Periodic Table Models
 2. FA-1 Lab activity- reactivity series (Graded)
 3. FA-2 Task sheet on conceptual understanding of acids and bases
 4. EOUA- Students would find the best antacid to cure stomach ache- criteria B and C
- Cri A – Knowledge and understanding- concepts taught throughout the topic**

Differentiation

Different teaching methodology has to be used while driving through the inquiry. Using models, graphic organisers, ppts, videos, lab experiments the concepts have to be delivered

Resources	
http://mrpuffsbio-chem-science.weebly.com/atoms-and-elements.html https://study.com/academy/lesson/what-are-elements.html https://www.legendsoflearning.com/learning-objectives/atoms-and-elements/ MYP Science 2- Hodder Complete Chemistry- Phillipa Gordom Hulme	

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	During teaching	After teaching the unit
<p>Demonstration of different changes are to be shown to differentiate between physical and chemical changes.</p> <p>Quiz will be conducted to assess the concept of acids and alkalis</p>	<p>Few students were well informed about the concept of elements, symbols and the concept of atom.</p> <p>Those students helped to drive the inquiry in the form of group activities, classroom interaction and demonstration.</p> <p>Bal and stick model helped them to visualise the concept of atomicity.</p> <p>Worksheets on symbols, formulae, properties of group 1 and Group 7 elements helped in understanding the trend and pattern of the arrangement of elements</p>	<p>The students although enjoyed every bit of the topic but were restless at the end due to the excessive content of the chapter.</p>

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Teacher(s)	Sangita Pal	Subject group and discipline	MYP Science		
Unit title	Who are we?	MYP year	2	Unit duration (hrs)	22 hours

Inquiry: How do living things work

Key concept	Related concept(s)	Global context
relationship	evidence, patterns	Identities and relationships
Statement of inquiry		
Because scientists understand the relationships between genes and inherited characteristics, we can use genetic patterns as evidence for identification and decision making		
Inquiry questions		
<p>Factual— What is DNA? What are genes? What is the relationship between DNA, genes and inherited characteristics?</p> <p>Conceptual— How are genetic patterns identified and used? How can individuals be identified through inherited characteristics and genetic patterns?</p> <p>Debatable—To what extent should legal cases depend on identifying people through DNA?</p>		

Objectives	Summative assessment	
<p>Criterion A : Knowing and understanding</p> <p>Criterion D: Reflecting on the impacts of science</p>	<p>To what extent should legal cases depend on identifying people through DNA</p>	<p>Link of Summative assessment with Statement of Inquiry</p>
Approaches to learning (ATL)		
<p>Research- Information literacy skills- Access information to be informed and inform others; Make connections between various sources of information Activity- Research on gel electrophoresis and how science has helped us in identifying an individual. Finding out the implications of DNA testing in identifying an individual</p> <p>Thinking- Critical thinking skills - Evaluate evidence and arguments; Gather and organize relevant information to formulate an argument Activity- Understanding the genetic pattern for inheritance of characteristics or diseases</p> <p>Self- Management- Reflection skills –Consider ethical, cultural and environmental implications Activity- Students will reflect on the ethical, cultural and social implications of DNA testing</p>		



Action: Teaching and learning through inquiry

Content	Learning process
<ol style="list-style-type: none">1. What is DNA?2. What are genes?3. What is the relationship between DNA genes and inherited characteristics?4. How are genetic patterns identified and used?5. How can individuals be identified through inherited characteristics and genetic patterns?	<ol style="list-style-type: none">1. Students would observe a video on similarities between parents and their children and try to identify the inherited characteristics and acquired characteristics.2. They read a quote of Stephen Chobsky and think about the following questions: What makes you? Is it the way you look or feel, or think? Can we change our identity or are we always the same person?3. Students will gain the concept of DNA and genes being inherited from parents through a small activity called 'Face It'- they determine certain characteristics of a face according to certain instructions. The specific instructions will depend on the combination of letters that they randomly choose. Follow up questions will be discussed like- What are genes made up of? What are the purpose of the genes in the activity?4. The concept of DNA, chromosome and its shape and constituents will be discussed by watching a relevant video, worksheets on DNA, chromosome, cell and nucleus identification,5. Students will do a cut and paste activity where they will compare the genes, DNA , chromosome, protein will be compared with that of recipes of a cake6. Finding out the relationship between genes, DNA and inherited characteristics – students go through a ppt and find out the number of chromosomes in cells and in sex cells. They also learn about the replication of the DNA both in sexual and asexual reproduction.7. Students will search the NCBI chromosome map viewer to find a map of each of the 23 different human chromosomes and discuss about the genes and inherited diseases, genetic disorders8. The concept of how are genetic patterns identified and knowing the terms like alleles, traits, recessive and dominant , phenotype are given through worksheets related to Harry Potter's inheritance of characteristics. The concept will be explored through a visual survey and making of Punnett squares.

9. DNA evidence collection and analysis through electrophoresis will be shown by a video and case studies

Formative assessment

1. Worksheet on DNA , chromosome and genes
2. Face it Activity
3. Research work on inheritable disease
4. Find out the Murderer through Gel Electrophoresis

Differentiation

1. **Cut and paste activity to understand the concept of genes, DNA and chromosomes**
2. **'Face it Activity to give characteristics to a face created by the students**
3. **Key term sheet to revisit the terms related to the topic**

Resources
<p>Inheritable disease-</p> <ol style="list-style-type: none"> 1. https://www.genome.gov/19016930/faq-about-genetic-disorders/ 2. https://www.ncbi.nlm.nih.gov/books/NBK22266/ 3. https://vimeo.com/64030073 4. https://vimeo.com/35540034 5. https://vimeo.com/102836050 6. https://www.nlm.nih.gov/exhibition/harrypottersworld/education/lessonplan1.html- a complete website on harry potter genetics 7. https://www.youtube.com/watch?v=71X7a8eu73k 8. https://www.youtube.com/watch?v=8m6hHRIKwxY 9. https://www.youtube.com/watch?v=5qSrmeiWsuc -- DNA replication 10. http://bookmarkurl.info/worksheet/dna-middle-school-worksheets-9.html

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	During teaching	After teaching the unit
<p>Student had no prior knowledge about the unit, although they were aware of the term genes and DNA</p>	<p>The concept of making of Punnett square took a longer time for the students to understand.</p> <p>The concept of mitosis and meiosis could not be delivered due to the level of the students.</p>	<p>The students enjoyed doing the Think Pair Share Activity.</p> <p>They also liked the Murder case suspect through gel electrophoresis.</p>

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Teacher(s)	Sangita Pal	Subject group and discipline	MYP Science		
Unit title	What does a wave tell us?	MYP year	2	Unit duration (hrs)	32

Inquiry: How do living things work

Key concept	Related concept(s)	Global context
relationship	Form, energy	Personal and cultural expression
Statement of inquiry		
Understanding the relationship between different forms of wave energy helps us better communicate and express our thought.		
Inquiry questions		
<p>Factual— What is a wave? What is light? What kind of energy travels as waves? What other kinds of electromagnetic radiations are there? How are we sensitive to sound waves?</p> <p>Conceptual— How does understanding waves helps us to better express ourselves? How does a colour wheel work? What are the primary colours and how are the primary colours combined to form the secondary colours? How doesan rtist express himself through a mix of colours?</p> <p>Debatable—Do artists and scientists have anything to say to each other?</p>		

Objectives	Summative assessment
<p>Criterion A : Knowing and understanding</p> <p>Criterion B: Inquiring and Designing</p> <p>Criterion D: Processing and Evaluating</p> <p>Criterion D: Reflecting on the impacts of science</p>	<p>Cri- B and C</p> <p>Make a Musical Instrument- Every student designs and builds a musical instrument that can play a series of 8 notes of increasing pitch and will play the notes for the class. The student plays a designated song for the class that uses as many of the notes as possible. Each student will describe how to change the pitch of his/her musical instrument and how to change the loudness (amplitude) of the instrument. Students will apply what they have learned about the properties of sound and acoustics as they build and play their instruments.</p> <p>Cri A and D- What is the impact of sound and music on the human brainwaves affecting our expression</p>
Approaches to learning (ATL)	
<p>Collaboration skills: listen actively to other perspective and ideas</p> <p>Communication skills: negotiate ideas and knowledge with peers; share ideas</p> <p>Information literacy skills: make connections between various sources of information; access information to be informed and inform others; access information to be informed and inform others; present information with a variety of formats</p> <p>Creative thinking skills: practise observation carefully; gather and organise relevant information to formulate an argument; draw reasonable conclusions and</p>	

generalisations; revise understanding based on new information and evidence; evaluate evidence and arguments; develop contrary or opposing arguments; interpret data

Action: Teaching and learning through inquiry

Content	Learning process
<p>What are waves?unit planner for myp 2.3.docx</p> <ol style="list-style-type: none"> 1. How are waves classified 2. What properties do waves have 3. What interactions can waves undergo? 4. How are waves in earth quakes like other waves? 5. What is light? 6. How does light interct with matter? 7. How does the sun send its energy to the earth? 8. How does our eye process the light it receives? 9. What is sound? 10. What are the properties of sound waves? 11. What is the difference between 	<p>A. SEE-THINK-WONDER: Waves activation strategy would be followed by</p> <ol style="list-style-type: none"> i. A case study- waves_activator (2).doc ii. Students after watching the videos- (Tsunami climbing, gentle wave motion boat, Mexican wave) will make notes of what they see, think and wonder. They will try to descriptive words for the motion <p>ACTIVITY- Students work with a partner. Each set of two students gets a slinky and work together to create a transverse and longitudinal wave https://www.youtube.com/watch?v=lfzQMWY1Nlc</p> <ol style="list-style-type: none"> B. DIFFERENT WAVES DIFFERENT MEDIA- Students will demonstrate different waves through different media. C. PROPERTIES OF WAVES- The different types of waves and their properties would be explained though a ppt. Students will take notes and draw a transverse waves and label the amplitude, trough, crest, wave length D. Worksheet provided for summarising the properties of different types of waves E. INTERACTION OF WAVES - Worksheet on interactions of waves F. LIGHT- DISCUSSION ON LIGHT- Discussion through ppt and hand outs, play with prisms and flash

<p>mechanical and electromagnetic waves</p> <p>12. How does our ear process the sound it receives?</p> <p>13. What causes hear loss?</p>	<p>lights</p> <p>G. HOW DOES SUN SEND ITS ENERGY TO EARTH- Students get to know about the electromagnetic spectrum and the various wave length</p> <p>H. HOW DOES EYE PROCESS THE LIGHT IT RECEIVES- video clips, Notes and printables to be given to the students. Students will draw a sketch of an eye and will label the different parts</p> <p>I. Exploring Light and colour through videos and quizzes</p> <p>J. Students will make a pin hole camera and the colour wheel to explore the way we perceive colour</p> <p>K. WHAT IS SOUND AND ITS PROPERTIES- Introduction to sound through scholastic study jam video where students will understand the energy transferred through sound and its vibrations.</p> <p>L. Students will get engaged with the topic through and ppt. they will further explore through mini lab activities on how sound is is produced through vibrations, affected by the change in the amplitude, size of the outer ear affects listening.</p> <p>M. PROPERTIES OF SOUND WAVES- Students will watch the video on Mr. Parr’s songs to know about the propertiesof sound waves</p> <p>N. HOW DOES OUR EAR PROCESS THE SOUND IT RECEIVES- Ear anatomy</p> <p>O. SURFING THROUGH THE SOUND WAVES STATIONS- Students will explore how are sound waves affected by changes in amplitude and pitch?</p>
	<p>Formative assessment- Making of Pin Hole camera will assess their knowledge and understanding of forming images in a camera</p> <p>Group presentation on a particular wave in the electromagnetic spectrum</p> <p>Lab activity on the reflection of light</p> <p>Exploration of how sound waves are affected by changes in amplitude and pitch</p>
	<p>Differentiation- Class demonstration and discussion ona concept, Presentation in the class which will enhance their communication and collaboration skill, enhancing the note taking skills by reinforcing to tke notes in the class in an organised manner, using virtual demonstration</p>

Resources	
https://www.youtube.com/watch?v=0C54NqkwB2c http://studyjams.scholastic.com/studyjams/jams/science/energylightsound/sound.htm https://www.youtube.com/watch?v=lfzQMWY1Nlc http://www.ducksters.com/science/physics/waves.php https://www.youtube.com/watch?v=zyphSTkW2U&t=76s http://www.classzone.com/books/ml_science_share/vis_sim/wslm05_pg18_graph/wslm05_pg18_graph.html http://phet.colorado.edu/sims/wave-on-a-string/wave-on-a-string_en.html	

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	During teaching	After teaching the unit
Prior assessment on the concept of waves Showing video clips on different forms of waves and and engaging the students to start up the inquiry		

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