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| T_home:kateprumm:Desktop:CHS.jpg  | **Teaching and Learning Program** |
| **Title/Type of Unit: Biology- Living Space****Program Risk Level: Low**  | **Duration: 10 Weeks, 1 lesson per week****By Ursula** |
| **Syllabus Outcomes****Stage 4 and 5** | *A student:***Stage 4:**SC4-1VA appreciates the importance of science in their lives and the role of scientific inquiry in increasing understanding of the world around them.SC4-2VA shows a willingness to engage in finding solutions to science-related personal, social and global issues, including shaping sustainable futuresSC4-3VA demonstrates confidence in making reasoned, evidence-based decisions about the current and future use and influence of science and technology, including ethical considerationsSC4-4WS identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledgeSC4-5WS collaboratively and individually produces a plan to investigate questions and problemsSC4-6WS follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individuallySC4-8WS selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problemsSC4-9WS presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representationsSC4-14LW relates the structure and function of living things to their classification, survival and reproductionSC4-15LW explains how new biological evidence changes people’s understanding of the world**Stage 5:**SC5‑1VA appreciates the importance of science in their lives and the role of scientific inquiry in increasing understanding of the world around themSC5‑2VA shows a willingness to engage in finding solutions to science-related personal, social and global issues, including shaping sustainable futuresSC5‑3VA demonstrates confidence in making reasoned, evidence-based decisions about the current and future use and influence of science and technology, including ethical considerationsSC5‑4WS develops questions or hypotheses to be investigated scientificallySC5‑5WS produces a plan to investigate identified questions, hypotheses or problems, individually and collaborativelySC5‑6WS undertakes first-hand investigations to collect valid and reliable data and information, individually and collaborativelySC5‑8WS applies scientific understanding and critical thinking skills to suggest possible solutions to identified problemsSC5‑9WS presents science ideas and evidence for a particular purpose and to a specific audience, using appropriate scientific language, conventions and representationsSC5‑14LW analyses interactions between components and processes within biological systemsSC5‑15LW explains how biological understanding has advanced through scientific discoveries, technological developments and the needs of society |
| **Connectedness****Why does this learning matter?** | **Students learn to:*** The function of living things to their classification, survival and reproduction
* The effects of environmental changes on ecosystems
* Understanding how science influences the development of some management practices
 | **Students learn about:*** Understand the living world in relation to living things
* Cells and how it is the basic unit of life and that there is a diverse range of living things that have evolved on Earth.
* The interdependence of living things and how they interact with each other and the environment.
* How the structure of living things relate to the functions that their body systems perform and how these features aid their survival.
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| **Background and Key Ideas** | Students have shown an interest in the subject science. Last term they enjoyed the topic chemical reactions and are keen to further and expand their knowledge within the subject science.Students will have knowledge in conducting experiments.Students have background knowledge in group discussions and individual learning |
| **Literacy Continuum** | Reading Texts | Comprehension | Vocabulary Knowledge | Aspects of Writing | Aspects of Speaking | Phonics | Phonemic Awareness | Concepts About Print |
| Clusters: range from 7- 11Activities linked to program to increase learning:* Reading of different text from worksheets, and science experiments
* Understands and creates graphs and tables for science experiments
* Use of technology to create word documents
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| **Numeracy Continuum** | Counting Sequences | Counting as Problem Solving | Pattern and Number Structure | Place Value | Multiplication and Division | Fraction Units | Length, Area and Volume |
| Elements: range 3- 5Activities linked to program to increase learning:* Counting in numbers when creating graphs
* Finding numeric information to be placed in tables and graphs
* Number structure in graphs and tables
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| **Quality Teaching** |
| **Intellectual Quality** | **Quality Learning Environment** | **Significance** |
| * IQ1 Deep Knowledge
* IQ2 Deep Understanding
* IQ3 Problematic Knowledge
* IQ4 Higher-order Thinking
* IQ5 Metalanguage
* IQ6 Substantive Communication
 | * QLE1 Explicit Quality Criteria
* QE2 Engagement
* QE3 High Expectations
* QE4 Social Support
* QE5 Students’ Self-regulation
* QE6 Student Direction
 | * S1 Background Knowledge
* S2 Cultural Knowledge
* S3 Knowledge Integration
* S4 Inclusively
* S5 Connectedness
* S6 Narrative
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| **Teaching and Learning Lesson Overview** |
| **The Elements of Learning & Achievement**F:\Mock ups\Square elements\Numeracy.jpgE:\Final V1\Final sq NO border\Sq Technology no bdr.jpg | **Week 1- Introduction and understanding cells as the basic structural unit in the human body****Introduction: Mind map task** To introduce the new topic of biology the teacher will engage the students in questioning their understanding of biology. On the whiteboard the teacher will create a mind map showing students understanding.Question to be asked: What makes up the subject biology?What is involved in biology?What equipment might be used in biology?Afterwards the teacher will explain what they will be unpacking in this subject for term 3. Students will be looking at cell structures in the human body and plants, cell functions, what a cell is made up of, looking at multicellular organism, what happens to cells when their environment changes, forms of bacteria, DNA and genes.**Body: The brick metaphor**Students are asked to draw a house on a blank page. Students are asked what are the main features of the house that has been drawn? Most responses would be windows, walls, roof and front door.Students are then shown images of houses, particularly brick houses. Students are then asked:What do they see?What are the main features of the houses? Is it different from the one they have drawn?What materials have been used?What is the basic structure that makes up each house?Are all the brick in the images the same type of brick?Are they all the same shape and size?Are there any imperfections?Teacher is to suggest to students that bricks are the basic structural unit of the house. Without the bricks the house would not be complete sturdy or whole.The teacher will explain that as houses have a basic structural unit of bricks, human bodies have a basic structural unit that makes them up. If bricks are the foundations for a house what are the foundations for a human body?Students may respond with DNA or cells. The teacher is to tell the students that the most basic structure of a human body is a cell and that DNA is kept within the cell. The teacher is then to explain to the students that the human body is composed of trillions of cells. Just like a building is built with thousands of bricks. These bricks are all different sizes and shapes; cells that make up a body are all different shapes and sizes.Teacher is to explain that all organisms are made up of cells. Plants, animals and humans all have cells that differ from each other. Although cells are similar to bricks in that they make up the basic structure of the body, they are more complex then bricks.Students are given play dough and told to make a miniature wall. They must make the play dough into small bricks and then form these bricks into a wall. Teacher is to explain whilst students are making their wall that cells form together to make muscle tissue within the body. Just like we are using bricks to make a wall, cells stack together to make muscle tissue. Cells help an organism grow. Cells multiply and divide to be able to replace damaged or worn out cells. Teacher will then ask students to remove a number of bricks. Teacher is to tell the students that the brick was damaged and needs to be thrown out. Teacher tells students that this is similar to the body where cells do wear out and become damaged. Like in a wall we need to replace these cells or bricks. To fit in the wall, the new brick must be the same as the old one. This is the same as cells. Exact copies or replacements are needed. Cells divide or multiply to do this. The cells that are made through dividing cells must be identical to their parent.Teacher will then show a YouTube clip and stop it at 2.50mins.<http://www.youtube.com/watch?v=gwcwSZIfKlM>Students see that cells multiply and divide into exact copies. Students are to then draw a circle shape on their page and make it textured. The student will pass their book to a partner and the partner is to try and make an exact copy of the circle. The teacher points out that it is not easy. **Conclusion: Written work and discussion**Students are to write in their science books:Cells are like bricks. Bricks are the structural unit of house and cells are the structural unit of a body.Cells stick together to make body tissue. Cells multiply and divide to make exact copies of themselves to replace damaged cells.Discussion what is a cell?**Week 2: Understanding the functions and location of the major parts of a cell****Introduction: Discussion**Teacher is to ask students what makes up a cell. Teacher will then explain to students that they will be looking at the parts that make up a cell and its functions.**Body: Video and worksheet activity**The teacher will show a YouTube clip to the students so they understand the major parts of a cell and the use of each part. For students to understand how a multicellular organism responds to changes in the environment they must first understand the function of a cell.Students are to watch the YouTube clip through in its entirety once. After students have watched the clip the teacher is to hand out the cell function cut-out worksheet. The teacher is to play the video again and stop at key intervals. Students are to match the definitions and the cell sections together at each interval. Students are to paste these into their books.<http://www.youtube.com/watch?v=MfopLilIOeA>**Conclusion: Discussion**Teacher to make sure students understand the major parts and functions of a cell.**Week 3: Understanding the functions and location of the major parts of a cell****Introduction: Recap from last lesson**Teacher to ask the students about last lesson. From what the students can recall what are the major parts of a cell and what was its function. Teacher to write on the white board what the students say and come up with.**Body: Modelling of a cell**Students are to use modelling clay to make a replication of what is inside a cell. Once students have created the cell out of clay, they are to attach sticky labels to each part into the model. Students are to then use appropriate colours to paint the cell made from clay. During the sculpting phase of the lessons, the teacher is to ask questions and describe each part of the cell in detail.Students are learning about the functions and life of a cell as well as the complex nature of a cell. Students are understanding the role each part has within the cell. **Conclusion: Discussion**Teacher will let students know that this lesson is to help build knowledge of a cell that will transfer to their understanding of a multicellular organism.**Week 4: What is a multicellular organism?****Introduction: Class discussion**Teacher is to start a discussion by asking students the following questions:Are all living things made up of cells?Are all cells the same?Think about a cow or a monkey, do they have the same cells as a human?Teacher is to tell students that cells look different and have different functions depending on which living organism the cell lives in.**Body: Cell snap or cell memory game**Students play cell snap or cell memory game. *Cell snap rules*: students are given images of different cells. Students are to play in pairs. Students mix the cell images and then deal the cards so each have half. Students are to play traditional snap using these cards.*Cell* *memory game*: Students place all cards face down. Students take it in turns to flip over two cards to get a pair. Students collect cards that they have paired. Students with the most pairs at the end of the game wins. Teacher is to tell students the cards with the corresponding coloured dot's on the front corner are to be placed all in separate piles.Teacher is to point out that although the cells with the red dot all look different they are all found in a human body. All the images with a blue dot are plant cell's and yellow are animal cells.Teacher is to select each one of these cells separately and tell students which part of the body the cell is found and what it's function is. Students are given an image of a human body and are to glue the corresponding images from the snap game in with a line that connects the image to the location.**Conclusion: Class Discussion**Teacher is to explain that a human is a multicellular organism, because the body has more then one type of cell. Multi - meaning multiple and cellular - meaning cell. Teacher is to make sure the students understand the concept of multicellular cell and answer any questions students may ask.**Week 5: Experiment in changing a plants environment****Introduction/ Body: Plant experiment**Class uses 6 plants for an experiment. Students are given the plants and 6 small pots. Students are to label each pot. Students label the pots as the following: cupboard, cupboard watered, watered sun, unwatered sun, water and vinegar and all vinegar. Students are to place the plants in the pots. According to the labelling, students are to place the pots in varying areas of the classroom.Plants 1 and 2 - Inside the cupboardPlants 3- 6 - in a tray that is put in the sun each day.Students are to mark down in their books what they think will happen to the plants on a weekly basis. Students are to water each designated plant daily and mark down any changes in their books.**Conclusion: Instruction of experiment**Teacher to let students know that at the beginning of week 8 the experiment will be finished. Each week students are to observe and record what has occurred within the plant and what has happened to the plant cells.**Week 6: Role of a cell in the internal system of a multicellular organism and how it receives water, nutrients, food and remove waste****Introduction: Discussion**Students begin with a discussion about what makes a living thing live? Students are to discuss why living things are defined as living. The teacher will ask studentsWhy do we call plants, animals and humans all living things? What are the basic functions or structures that are needed to live? Students are expected to produce answers such as, eat, drink, sun, breath etc.**Body: Activity**Teacher is to explain that a cell is a living thing and like all living things must receive nutrients from food, gases and air, water and must be given space to remove cell waste. Students are given a cut-out of a human. Students are asked what is the smallest structural unit of a human. From previous lessons students should understand that cells make up a human body. Students are then to attach this and the corresponding callout to the dowel attached to the cut-out of the human. Students are then asked what does an organised number of cells create. From previous lessons students should answer tissue. This and its corresponding callout are to be attached to the dowel. Students are then to attach the lung and corresponding callout, the digestive system and callout and finally the nervous system. Students are then asked now that you can see how the body is formed with internal structures, how does the cell get the oxygen all the way from the lungs?Students are given to the oxygen cell image and are told that the oxygen that comes into the body is held by the red blood cells and distributed around the body. Students are to attach these images up the dowel to the cell. Down the alternative side students are to attach the energy image to go down the dowel all the way to the human. Teacher explains to students that the cell gets oxygen from the lungs and uses it to release energy from the food within the cell.**Conclusion: Individual discussion and understanding**Students are to individually explain (towards the teacher and SLSO) how the oxygen travels to the cell and how energy travels out. Students are to explain that without this process cells would not survive.**Week 7: What is bacteria and what do cells do to fight bacteria and non-infectious diseases****Introduction: Discussion**Teacher is to ask students, what is the word starting with "b" that gets into your body when you are sick?Students should answer with bacteria. Teacher is to tell students that bacteria cell and bacteria are always in your body.**Body: Brain teaser**Teacher is to present students with the brainteaser. Students are to use the cut-outs to manipulate and work through the brain teaser. Students are using the brain teaser to understand that large numbers of bacteria are hurtful to the body. Teacher starts a discussion. If the body had too many bacteria out numbering the blood cells then what would happen? (Infection or disease). Teacher is to introduce students to the concept that the body is always fighting disease cells within the body. Students are given play dough to make a bacteria cell. Once students have made the cell, the teacher describes what happens. The teacher suggests that the good cells in the body make a wall around the cell. The teacher hands students a cardboard strip to fold as a wall around the bacteria. The teacher describes that the bacteria is then consumed by the cells surrounding it. Teacher is to show students the "live science immune system video <http://www.livescience.com/26579-immune-system.html>for further understanding. Students are given cut-outs of the different stages that healthy cells take in the process of fighting a non-infectious disease. Students are to glue these in order of functioning.**Week 8: The role the coordination systems have in maintaining humans as functioning organisms: study 1- the cardiovascular system. Study 2- digestive system****Introduction: Cardiovascular and digestive system**Students have been introduced to the cardiovascular and digestive systems of the human body in previous lessons. Students are learning about the function of these systems in the human body. Students are to be told that they are doing two studies to investigate two systems.**Body: Cardiovascular system and Digestive system**Study 1: Cardiovascular systemStudents make a "before chart" of what they think happens to the body when you are exercising.Teacher asks students how does the body stop itself from overheating, burning out and running out of energy.Students watch the video on the cardiovascular system.Teacher sets up a track for students. Students observe their bodies during the resting state. Students are to use the before and after sheet for this activity. Students are to write down their measurements prior to the running activity. Students are to run through the obstacle course. After completing the obstacle students are to observe their bodies reactions and measure their heart rate, describe their perspiration and breathing.Teacher asks students what aspects changed from before running to after running? The teacher points out that their bodies are functioning in specific ways to keep the body functioning.Teacher asks students what role each observation in maintaining a functioning body.1. Students should find that perspiration regulates their body temperature. Teacher compares this to a car engine, asking students what happens when a car engine gets too hot? What would happen if the body couldn’t regulate temperature?2. Teacher asks what role does an increased heart rate do for the body? Teacher asks students what does your heart do? (pump blood around the body.) When you increase the heart rate what do you think happens? (more blood is pushed around the body quicker) Teacher tells students that oxygen is what muscles need to produce energy to keep working. Oxygen is carried in the blood. Teacher compares this to a car. What does a car need to keep running? (fuel) What happens if it runs out of fuel? (it stops working)3. What role does oxygen play in the body? (students should know this from previous question) (fuel muscle to produce energy) with this in mind, why do you think your body increases breathing rate? (for more oxygen to enter the lungs and be used by the muscles.)Students are to connect the images of each observation with the outlined function from the handout. Teacher shows students that the circulatory system increases heart rate and breathing rate to get more oxygen to the muscles whilst excreting sweat from the nervous system to manage the human body.Study 2: digestive systemTeacher asks students how does the human body get energy to continue working? (students should reply with food.) Teacher asks students how does the food get transferred from a hotdog to energy in the body? (digestive system) What parts of the body are included in the digestive system?Teacher uses the interactive guide to lead a discussion around the digestive system.<http://kidshealth.org/teen/interactive/digestive_it.html>Teacher points out the major parts involved in the digestive system and their function in maintaining body functioning.**Week 9: Transition of DNA and gene****Introduction: Finish off experiment**Students are to fill in the final column of the observation sheet, teacher discusses what has occurred within the cell of the plants from week 6.**Body: DNA and genes**Students are asked why do children look like their parents. Teacher uses visual aides to show a child that looks like her mother.Students are learning about the role of DNA within the human body. Students are given five sets of faces that have been cut horizontally into four strips. The strips are mixed; students are required to remake the faces by matching the appropriate strips to the corresponding faces.Students are asked how they knew that each strip belongs to a certain face. Teacher uses on students example, sliding an alternative nose strip in and asking what is it makes this person not have this nose. Students should be able to determine that genes and DNA are the cause of our characteristics.Teacher asks students what is a gene? Teacher uses power point to explain what a gene is and where it is found. Teacher asks students how does a gene relate to DNA. Teacher uses the power point and YouTube clip to explain to students how they are related, what DNA looks like and what its use is.Students are to use pipe cleaners to make a replica of DNA. Students are to use blue pipe cleaners to create the outside of the DNA and yellow, red, pink and orange pipe-cleaners to make the inside of the DNA strand.Teacher describes that genetic information is transferred as genes in the DNA of a chromosome.The teacher uses one student’s replica or a pre-made DNA strand to demonstrate how it is replicated and transmitted to another generation. Teacher untwists the demonstration strand and shows how it is broken and carried for transmitted to another generation.**Conclusion: Re-cap and discussion**Teacher will ask students to explain the function of a DNA strand and what it is made of. This is to help students understanding of a DNA and genes.**Week 10: Quiz****Introduction/ Body:**Teacher will tell students that they will be playing a game of jeopardy. The game will have categories relating to what they have been taught. Cells, multicellular cells, bacteria and DNA and genes.**Conclusion: Evaluation discussion**Teacher will ask students what they though of the topic of biology.What were the lessons that they enjoyed?What was the information that they remember?What would they like to differently?Is there any need for improvement in this topic? | **Aboriginal 8 Ways of Learning***The following ways of learning are incorporated throughout the program through pedagogical practices*4_symbol.jpgSymbols & Images7_deconstruct.jpgDeconstruct/ Reconstruct6_non-linear.jpgNon-LinearLand LinksNon-Verbal |
| **Special Needs Adjustments** | **School to Work** |
| 1:1 support where requiredDiscussion basedScaffolded responsesExtensive positive reinforcement | Comprehension skillsUnderstanding of others positionsBackground knowledge of science terminologyBackground knowledge of structure of human body, plants and animalsImpact their choices could have |
| **Assessments** |
| **Tasks** | **Weighting** | **Outcomes** |
| 1. Depth of understanding in verbal communication and discussion | 5% | SC4-1VA, SC5-1VA, SC4-4WS, SC5-4WS |
| 2. Plant experiment | 10% | SC4-2VA, SC5-2VA, SC4-3VA, SC5-3VA, SC4-5WS, SC5-5WS, SC4-9WS, SC5-9WS  |
| 3. Quiz | 5% | SC4-6WS, SC5-6WS, SC4-8WS, SC5-8WS, SC4-15LW, SC5-15LW |
| **Roles and Responsibilities** |
| **Teacher** | **SLSO** | **Student** |
| Engaging class discussionsCreating safe working environmentsProvide assistance in student learning | Support teacher in class decisionsSupport students in learningProvide 1:1 support for students | Gain understanding and knowledge of answering questions verbally and writtenFurther skills in verbal languageGain knowledge in biology particularly in cell structure and functions, DNA and genes, and conducting experiments |

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| **Teacher Evaluation****Comments / Variations** |
| Guiding QuestionsWhat worked well?What needed to be changed?What do I think the students gained from this lesson?How well did this unit match the Elements of Learning and Achievement?What did I learn?How will I use this experience to extend my practice in the future?  |
| **Date Commenced**:  | **Date Finished**:  |
| **Teachers Signature**: | **Assistant Principals Signature**: |