IB Middle Years Program Year 3 Science
8th grade science, Willows Preparatory School

Course Description:

MYP Science

With inquiry at the core, the MYP sciences framework aims to guide students to independently and collaboratively investigate issues through research, observation and experimentation. The MYP sciences curriculum must explore the connections between science and everyday life. As they investigate real examples of science applications, students will discover the tensions and dependencies between science and morality, ethics, culture, economics, politics, and the environment.

Scientific inquiry also fosters critical and creative thinking about research and design, as well as the identification of assumptions and alternative explanations. Students should learn to appreciate and respect the ideas of others, gain good ethical-reasoning skills and further develop their sense of responsibility as members of local and global communities.

Learning science involves more than simply learning technical terminology. The MYP considers all teachers to be language teachers and, thus, MYP sciences should enable students to access, use and communicate scientific knowledge correctly and confidently in oral, written and visual modes.

Student Learning Outcomes:

The goals of MYP Science are to:

- Understand and appreciate science and its implications
- Consider science as a human endeavor with benefits and limitations
- Cultivate analytical, inquiring and flexible minds that pose questions, solve problems, construct explanations and judge arguments
- Develop skills to design and perform investigations, evaluate evidence and reach conclusions
- Build an awareness of the need to effectively collaborate and communicate
- Apply language skills and knowledge in a variety of real-life contexts
- Develop sensitivity towards the living and non-living environments
- Reflect on learning experiences and make informed choices.

Course Schedule:

Semester 1:

Unit 1: A Colossal Collisions- *What are the effects of an asteroid collision and how can we prevent a future one?*

- MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

- MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

- MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.

- MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.*

- MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

- MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.

- MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

- MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

- MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

- MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

- MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.*

- MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

- MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

- MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

- MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

- MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Unit 2: Travelling Through Space- *What forces keep the parts of our solar system together and how can we use this knowledge to plot a telescope route through space?*

- MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

- MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

- MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.

- MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

- MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.

- MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

- MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact

- MS-PS3-1.Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

- MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

- MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
- MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

Semester 2:

Unit 3: Adapt or Die? -*How do species change over time and should we intervene?*

- MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

- MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

- MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

- MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

- MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

- MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.

- MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

- MS-LS4-5. Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.

- MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

Unit 4: Using Engineering & Technology to Sustain Our World -*How are humans harming Earth, plants, and animals, and what can we do about it?*

- MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*****

- MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

- MS-LS4-5. Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.

- MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

- MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

- MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

- MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

- MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

- MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

- MS-ETS1-4. Develop a model to generate data for iterative

MYP Science Content Brief**:** https://www.ibo.org/globalassets/digital-toolkit/brochures/myp-brief_sciences_-2015.pdf

Homework
In general, homework is not assigned in science class. Most work done at home will be studying, finishing projects and assignments, completing readings, etc.

Assessment:
For a detailed description of our Assessment Policies, please see our assessment Policy Handbook on our website.

Willows Preparatory School teachers create and implement both formative and summative assessments, both of which are related to each other and integral to the learning process.

Formative Assessment (20% of semester grade) – _assessments that provide smaller amounts of feedback on specific learning objectives and/or require students to demonstrate their knowledge of specific targeted aims in order to drive future instruction (e.g. at WPS: lesson exit ticket, daily warm-ups, comprehension quizzes, etc.).

Summative Assessment (80% of semester grade)– _assessments that are designed to provide evidence for evaluating student achievement using required MYP subject-group specific assessment criteria2 (e.g. at WPS: written assessments, projects, presentation, performances, etc.).

Submission Guidelines
*Guidelines are subject to change. These are general course guidelines, and it should be noted that Mrs. Jensen may alter or add additional, more specific requirements to any formative or summative assignment throughout the year.

Files

1. All work is submitted in Managebac, I do not accept submissions anywhere else
2. Files cannot be JPG's
3. Files must be named with name or initials and name of assignment/submission
    a. Ex. JG_unit3_conceptmap.pdf

Late Work

1. After unit 1, a deduction of 10% per school day will occur for formative late work, and one score down per school day for summative
2. I encourage students to revise their work for credit
3. You have until the end of the unit in which the work was assigned to re-submit revised work, or to submit late-work
4. There is no late penalty for revisions
5. YOU MUST NOTIFY ME THROUGH EMAIL when you have submitted late work or revised work
    a. YOU MUST PUT 'LATE WORK' IN THE SUBJECT LINE
    b. YOU MUST STATE WHAT ASSIGNMENT WAS SUBMITTED IN THE EMAIL
    c. I usually don't respond to Late Work emails, they are like a checklist for me to use when grading

Tests/Quizzes

1. If you miss a quiz or test (unless it is a documented emergency and have a doctor's note or other documentation) you will NOT be able to make it up and will receive a 0
2. If you know you will be missing school the day of a test or quiz, you may ask permission from me to take the test/quiz **early**
3. NO MAKE-UP TESTS/QUIZZES ARE ALLOWED (unless it is a documented emergency and have a doctor's note, or other documentation)

Missing Class

1. If you are missing class, please notify me through email to ask for work you're missing.
2. It is your responsibility to ask about and complete work you have missed.
3. Please ask for help if you are uncertain about the concepts, or need assistance!

Student Conduct

In order to maintain a safe and enjoyable time at school, students are expected to behave in a responsible manner. Violations of student conduct expectations may result in disciplinary measures, which are explained later in this document. The following are expectations of all WPS students:

• Demonstrate courteous and respectful behavior at all times, including with use of school equipment/property and other people's belongings
• Follow staff instructions promptly
• Arrive to class fully equipped, ready to engage and in a timely manner
• Keep up to date with academic submissions and timelines
• Discuss your academic needs with your classroom teachers
• Walk in shared spaces and speak at a respectful volume while others are working and learning

• Conduct themselves with a sense of decorum

- When applicable, follow all guidelines outlines in the COVID-19 Handbook.

Zero Tolerance Policies

Willows Preparatory School has zero tolerance for alcohol, drugs, tobacco, weapons, age-inappropriate material, graffiti and repeated instances of bullying behavior. If any students are found in possession of or engaging in any related activities of the above, whether on campus and/or during school hours, appropriate referrals will be made, and consequences/outcomes will be documented on the student's file.

Consequences

Any student misconduct will be documented and may result in the following:

- A referral to Head of School or Assistant Head of School
- Support services through Counselor referral
- Meeting with parent, teacher, and administration
- Probation from extracurricular activities or other privileges (i.e. sport, clubs, lunch outside)
- Restricted use of facilities

Misconduct issues of a more serious nature, such as those related to zero tolerance policies include:

- Suspension – You are expected to keep up with your schoolwork during this time, as no allowances will be made in this regard.
- Expulsion – You are permanently disenrolled from Willows Preparatory School

Technology

Every student at WPS is required to have their own laptops at school. WPS's official Laptop/Technology Policy is found at the end of this document.

Teacher-Student E-mail Communication

You have the opportunity to reach out to teachers and staff using email; however, when applicable, face-to-face communication is preferred. Student email addresses should only be used for communication about academic issues or to ask questions in a respectful and professional manner. Students are expected to check email **on a daily basis.** If a student receives an email or message from another student that is confusing or inappropriate, please notify a teacher or staff member immediately. Willows Preparatory School reserves the right to access all WPS student emails, reset all passwords, and if necessary, suspend all email activity.

Cell Phones and smart devices

We understand that cell phones and other smart devices are an essential part of daily life. Smart watches while linked to cell phones are considered cell phones. Please make sure that the watches are on Do Not Disturb mode during the school day. Students are permitted to bring cell phones to school each day subject to the following conditions:

- Cell phones should remain OFF when students are present on the school campus. Cell phones must be stored in book bags during the 1st semester (or for however long COVID-19 Handbook guidelines are in place) or in student lockers.
- Students may use their cell phones to contact parents upon request. All authorized cell phone use must occur at the Front Desk in the main building and/or under the supervision of an administrator or teacher.

If a member of staff can see or hear a cell phone, the phone will be confiscated and turned over to the front desk. Confiscated phones will be returned at the end of that school day from the front desk after a parent is notified about the violation of this policy. All incidents are documented and recorded—repeat violations may result in additional consequences.

In case of a personal emergency on campus (illness, personal situation, etc.) the student's first line of contact is a staff member. In family emergency situations, parents should contact the front office if they need to reach a student.

Classroom Computer Use

Laptops will be used regularly in class for lessons, notes, and activities. Students should not be checking emails, grades, chatting via Teams, or any other activities on their computer unless the teacher has given them permission. If a student is found not using a computer appropriately, the computer will be taken away until the end of class and the following will take place:

- 1st Time: A warning from administration.
- 2nd Time: An email sent home to parents.
- 3rd Timer: Meet with administration and discuss possible repercussions.

WPS Students will no longer be allowed to use headphones for personal use in any place of the school building unless a) the headphones are being used for specific class content (i.e. sound editing a video for a project); or b) they are being used before or after school hours (8:30am-3:30pm). Students should not have Spotify or any other streaming music program on their school computers.

Student Name (Print) _____

Student Signature _____ Date _____

Parent/Guardian Signature _____ Date _____

Please return by September 10, 2021