International Baccalaureate
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MYP/3D Science Unit

Planner Marietta City Schools

MARIETTA CITY SCHOOLS

Grade & Course: 9-12 Chemistry	**Topic:** Lab Math, Safety, & Equipment	**Duration:** 3 weeks

Georgia Standards and Content:
The information in this unit is not directly addressed by the Georgia Standards of Excellence but are technical skills that are necessary for a student to master before learning the content addressed by the standards as well as laboratory and safety skills necessary for the student to master in order to perform 3D learning and experiments safely.

Narrative / Background Information

Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)
Students may have some experience with variables and graphing, so not too much time needs to be directed towards this area. Significant figures were covered in physics ***if*** a student has already taken that course metric conversions was covered in middle school, so the students will need a refresher. Assume the students have no prior lab or safety instruction and cover all topics before allowing students to engage in labs with chemicals, flame, sharp instruments, or heating elements.

Year-Long Anchoring Phenomena: (LEARNING PROCESS)
Changes to the measurement of chemicals added to Flint Michigan's water supply created dangerous levels of lead contamination in the drinking water.

Unit Phenomena (LEARNING PROCESS)
Changes to the measurement of chemicals added to Flint Michigan's water supply created dangerous levels of lead contamination in the drinking water.

MYP Inquiry Statement:
Repeat trials and measurements will reduce random errors but not systematic errors.

MYP Global Context:
Scientific and Technical Innovation

Approaches to Learning Skills: Asking questions and defining problems.
Planning and Carrying out investigations.
Analyzing and interpreting data.
Using mathematics and computational thinking.
Obtaining, evaluating, and communicating information.

Disciplinary Core Ideas: (KNOWLEDGE & SKILLS)

Graphical Techniques
Experimental design
Quantitative & Qualitative Measurements

Crosscutting Concepts: (KNOWLEDGE & SKILLS)
Scale, Proportion, and Quantity
Systems and System Models

MYP Key and Related Concepts:
Key Concept: Relationships

Related Concept: Models

Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)
Goggles only need to be worn occasionally in the laboratory.
Bar graphs are the best way to show a relationship between the independent and dependent variables.
Accuracy and precision are the same thing.
Only zeros at the end of the number are not significant.
A decimal point makes all zeros significant.

Key Vocabulary: (KNOWLEDGE & SKILLS)
Independent Variable
Dependent Variable
Controlled Variable
Quantitative Data
Qualitative Data
Accuracy Precision
Uncertainty
Significant Figures
Scientific Notation
Metric Units
Lab Equipment (i.e. Erlenmeyer flask, etc.)

Inquiry Questions:

Factual - When are zeros significant?
Conceptual - Which is larger, 1 liter or 1000 mL?
Debatable - Can there only be one independent variable in an experiment?

MYP Objectives	**Summative assessment**	
Sciences **Sciences** **Design** **Design**	Assessment Task: End of Unit Summative Exam on paper	Relationship between summative assessment task(s) and statement of inquiry: Students will answer questions that will help develop their understanding of data and measurements taken in the science laboratory.

Unit Objectives:

Learning Activities and Experiences	**Inquiry & Obtain: (LEARNING PROCESS)**	**Evaluate: (LEARNING PROCESS)**	**Communicate: (LEARNING PROCESS)**
Week 1:	Introduce Lab Safety Introduce Lab Equipment Review types of graphs used in chemistry and how to identify independent and dependent variables	Students will take a quiz covering material on their safety contract and material shared in class. Students will complete a gallery walk of lab equipment and draw pictures of lab equipment with their proper scientific names and functions on a graphic organizer. Students will complete a CER on phenomena. Students will be asked to graph scientific data.	Students will be asked to write a warning label to a younger student that covers 5 safety rules. Students will be shown a slideshow with pictures of equipment and randomly call on students to name the equipment. Students will be asked to write a paragraph that interprets the data from the graph.

Week 2:	Introduce/review metric conversions and dimensional analysis Introduce types of data, uncertainty, and significant figures	Students will complete practice problems about dimensional analysis and metric conversions. Students will complete various lab activities that require them to record qualitative and quantitative data (with uncertainty). Students will complete practice problems using significant figures.	Students will be asked the questions “Which is larger, 1 liter or 1000 mL?”. They will then get into groups to discuss and defend their answers. Students will research and present to the class how significant figures are used in the real world.

Resources (hyperlink to model lessons and/or resources):
Discovery Education Science Techbook
Lab Safety Video
Lab Equipment Quiz
Metric Conversions Quiz
Socrative.com
Nearpod.com
PLC Schoology group resources

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

Prior to teaching the unit	During teaching	After teaching the unit
-How can we engage our students more in this unit? -What laboratory activities can we do to help students learn about the equipment more? -How can we help students remember the rules for significant figures better?		