

## Juelfs - 7<sup>th</sup> Science Syllabus –18-19

“Show me the evidence!”

Subject to sequential adjustment

What Science is and is not

Science or Engineering

Scientific experimentation, methodology, protocols, problem solving, procedures

Tools of the trade as they apply in the classroom including but not exclusively

Measurement

General vocabulary introduction

Cause and effect

Evidence

Data collection and presentation

Benefits and consequences

Faulty interpretations

Much of the above will be incorporated into class experiences as appropriate rather than presented as freestanding material.

Note – Standards listed below apply to all topics shown within and below each of the four major units shown in bold type. They are not, for the most part, tagged to specific sections herein because, as a learned person once said, “nothing exists in isolation.”

### **Matter**

*7.PS1.1 develop and use models to illustrate the structure of atoms, including the subatomic particles with their relative positions and charge.*

*7.PS1.2 Compare and contrast elemental molecules and compound molecules.*

*7.PS1.3 Classify matter as pure substances or mixtures based on composition.*

*7.PS1.4 Analyze and interpret chemical reactions to determine if the total number of atoms in the reactants support the Law of Conservation of Mass.*

*7.PS1.5 Use the periodic table as a model to analyze and interpret evidence relating to physical and chemical properties to identify a sample of matter.*

*7.PS1.6 Create and interpret models of substances whose atoms represent the states of matter with respect to temperature and pressure.*

Matter and atoms

Substances and mixtures

Structure of atoms

Matter – Properties and changes

Properties of matter

Changes in matter

States of matter

Liquids, solids, gases, plasma, others (many others)

State changes

Gas behaviors

Chemical reactions and equations

Reaction processes

Types of reactions

Energy rules (Endothermic, exothermic, why, how)

## **Life Structure and Functions**

*7.LS1.1 Develop and construct models that identify and explain the structure and function of major cell organelles as they contribute to the life activities of the cell and organism.*

*7.LS1.2 Construct an investigation to demonstrate how the cell membrane maintains homeostasis through the process of passive transport.*

*7.LS1.3 Evaluate evidence that cells have structural similarities and differences in organisms across kingdoms.*

*7.LS1.4 Diagram the hierarchical organisms from cells to organism.*

*7.LS1.5 Explain that the body is a system comprised of subsystems that maintain equilibrium and support life through digestion, respiration, excretion, circulation, sensation (nervous and integumentary), and locomotion (musculoskeletal).*

*7.LS1.6 Develop an argument based on empirical evidence and scientific reasoning to explain how behavioral and structural adaptations in animals and plants affect the probability of survival and reproductive success.*

#### Cell structures and functions

Basic structure of cells and life

Pieces and parts of plant animal cells

Passive and active transport of cellular material

Energy rules (photosynthesis and cellular respiration)

#### Organism organization

Cell cycle

Cell division

Levels of organization within organism

#### **Exploring Life**

*7.LS1.7 Evaluate and communicate evidence that compare and contrasts the advantages and disadvantages of sexual and asexual reproduction.*

*7.LS1.8 Construct an explanation demonstrating that the function of mitosis for multicellular organisms is for growth and repair through the production of genetically identical daughter cells.*

*7.LS1.9 Construct a scientific explanation based on compiled evidence for the processes of photosynthesis, cellular respiration, and anaerobic respiration in the cycling of matter and flow of energy into and out of organisms.*

*7.LS2.1 Develop a model depict the cycling of matter, including oxygen and carbon, including the flow of energy among biotic and abiotic parts of an ecosystem.*

*7.LS3.1 Hypothesize that the impact of structural changes to gene (i.e., mutations) located on chromosomes may result in harmful, beneficial, or neutral effects to the structure and function of the organism.*

*7.LS3.2 Distinguish between mitosis and meiosis and compare the resulting daughter cells.*

*7.LS3.2 Predict the probability of individual dominant and recessive alleles to be transmitted from each parent to offspring during sexual reproduction and represent the phenotypic and genotypic patterns using ratios.*

*7ETS2.1 Examine a problem from the medical field pertaining a biomaterials and design a solution taking into consideration the criteria, constraints, and relevant scientific principles of the problem that may limit possible solutions.*

## Human body system

Transport and defensive mechanisms within blood cells

Organ systems

Reproduction and development

## Reproduction of Organisms

Meiosis and sexual reproduction (mostly non-botanical))

Asexual reproduction

## Plant processes and reproduction

Energy rules (photosynthesis and cellular respiration)

Responses to stimuli

Meiosis and sexual reproduction

Asexual reproduction

## Animal behavior and reproduction

Types of behavior

Interactions

Animal reproduction and development

## Genetics

Gregor Mendel and peas

Genetic inheritance and Punnett squares

DNA

## Energy rules – matter and the environment

Biotic and abiotic factors

Cycles in nature

Energy rules in ecosystems

## **Earth**

*7.ESS3.1 Graphically represent the composition of the atmosphere as a mixture of gases and discuss the potential for atmospheric change.*

*7.ESS3.2 Engage in a scientific argument through graphing and translating data regarding human activity and climate.*

Planet Earth

Spheres in spheres

Cyclic physical process

Nothing exists in isolation – interactions

Environmental impacts

Humans and the environment

Impacts on land, water, atmosphere

Standardized testing – form and function

Epilogue

\*Tests, any projects completed outside the classroom, and many quizzes will be announced in advance in the classroom and, for the most part, on “Remind.”

\*Links to many resources available on website

\*All standards available at [www.tn.gov/education](http://www.tn.gov/education)