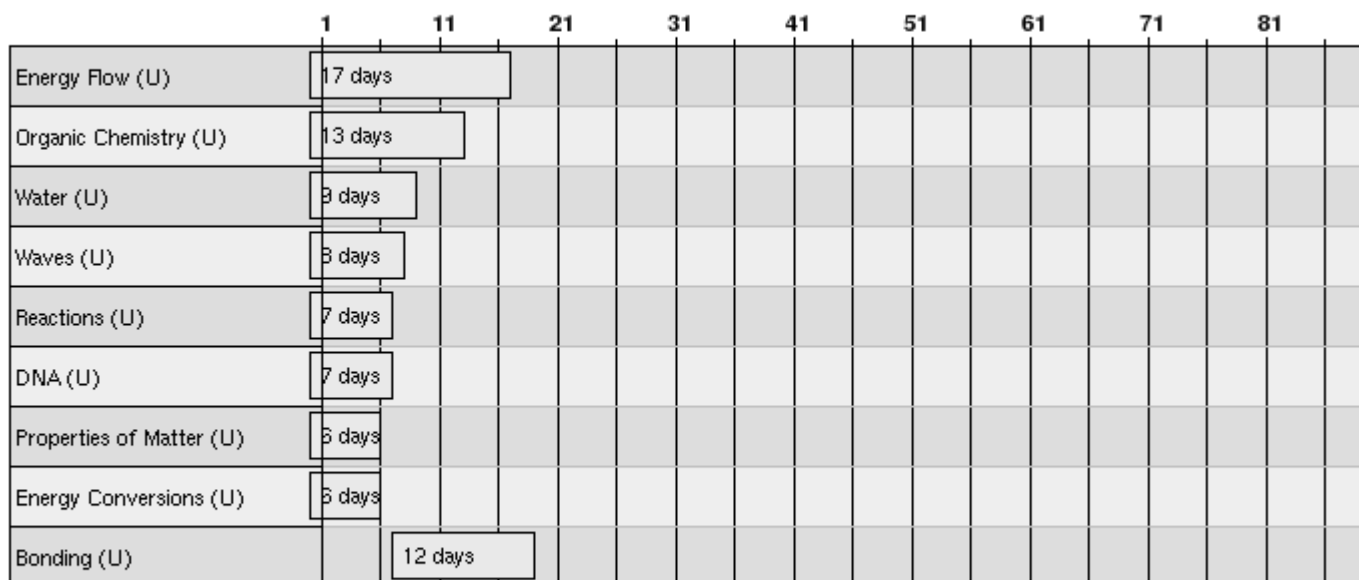


# Folder: Science

Group/District: PENNSYLVANIA

## Course Map Timeline Science - General Science

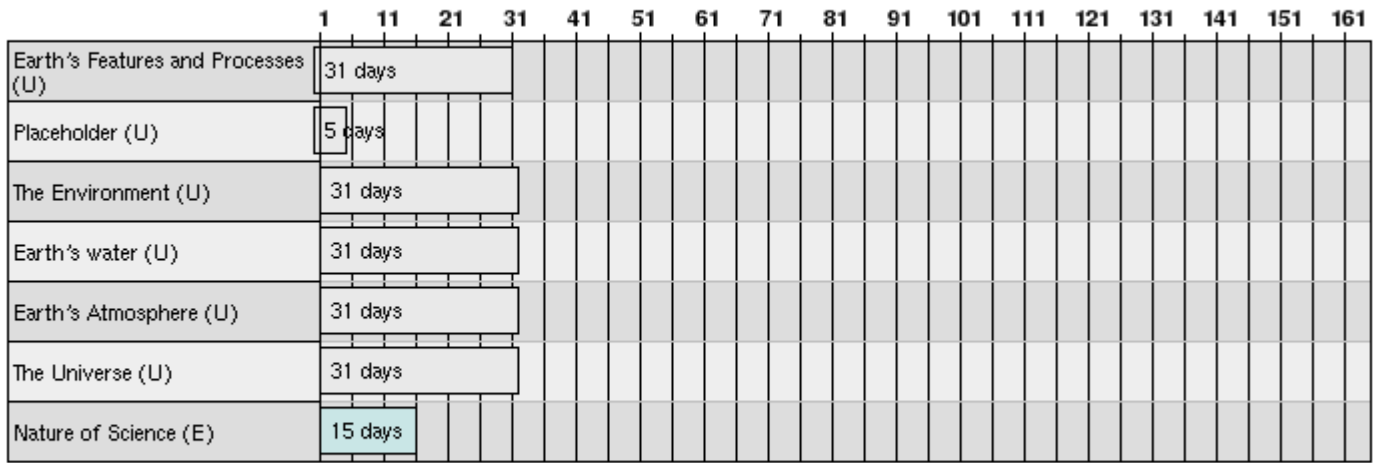


Essential (E)  
  Important (I)  
  Compact (C)  
  Unranked (U)

# Folder: Science

Group/District: PENNSYLVANIA

## Course Map Timeline Science - Earth/Space Science



Essential (E)  
  Important (I)  
  Compact (C)  
  Unranked (U)

Topic: Bonding

Days: 12

Subject(s): Science

Grade(s): 9th

Key Learning:

Electrons occupy various energy levels within the atom, each of which can hold a maximum number of electrons.

The octet rule guides the formation of chemical bonds because atoms gain, share, or lose electrons to achieve stability.



Unit Essential Question(s):

How do electrons determine bonding?



Concept:

**Energy Levels**

Concept:

**Bonding**



Lesson Essential Question(s):  
Where are the electrons? (A)

Lesson Essential Question(s):  
What makes an atom happy? (A)



Vocabulary:  
energy level, electron cloud, valence electron, Lewis dot diagram

Vocabulary:  
octet rule, ion, ionic compound, covalent bond, molecule

Additional Information:

Attached Document(s):

Vocab Report for Topic: Bonding

Days: 12

Subject(s): Science

Grade(s): 9th

**Concept: Energy Levels**

energy level -  
electron cloud -  
valence electron -  
Lewis dot diagram -

**Concept: Bonding**

octet rule -  
ion -  
ionic compound -  
covalent bond -  
molecule -

Topic: DNA

Days: 7

Subject(s): Science

Grade(s): 9th

Key Learning: How the structure of DNA allows for the transmission and conservation of the genetic code.



Unit Essential Question(s): How can one cell contain all of the information to run a complex organism like you?



Concept: <b>Structure of DNA</b>	Concept: <b>Transmission and Conservation of the Genetic Code</b>
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Lesson Essential Question(s): How many words can A, T, C, G spell? (A)	Lesson Essential Question(s): Why is simple so efficient? (A)
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Vocabulary: DNA, double helix, nucleic acid	Vocabulary: replication
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Additional Information:

Attached Document(s):

Vocab Report for Topic: DNA

Days: 7

Subject(s): Science

Grade(s): 9th

**Concept: Structure of DNA**

DNA -  
double helix -  
nucleic acid -

**Concept: Transmission and Conservation of the Genetic Code**

replication -

Topic: Energy Conversions

Days: 6

Subject(s): Science

Grade(s): 9th


**Key Learning:**

Energy can take many different forms including mechanical, thermal, chemical, and electromagnetic.

Energy can be transferred thermally, mechanically, electrically or chemically in a system.





Energy is conserved (Law of conservation of energy).

Heat energy is transferred between objects or regions by the process of convection, conduction, or radiation.



Unit Essential Question(s): **Why is energy efficiency essential to life?**



Concept: <b>Forms of Energy</b>	Concept: <b>Energy Transformations</b>
	
Lesson Essential Question(s): Where is NRG? (A)	Lesson Essential Question(s): Why is does a light bulb get so hot? (A)
	
Vocabulary: thermal, radiant, sound, mechanical, chemical, nuclear, electricity	Vocabulary: efficiency

Additional Information:

Attached Document(s):

Vocab Report for Topic: Energy Conversions

Days: 6

Subject(s): Science

Grade(s): 9th

**Concept: Forms of Energy**

thermal -  
radiant -  
sound -  
mechanical -  
chemical -  
nuclear -  
electricity -

**Concept: Energy Transformations**

efficiency -



Topic: Energy Flow


Days: 17

Subject(s): Science

Grade(s): 9th

**Key Learning:**

- The processes of photosynthesis and respiration.
- The energy transfers involved in photosynthesis and respiration.
- The role of bonding in cell metabolism.



Unit Essential Question(s): **How do cells use fuel?**

<b>Concept:</b> <b>Energy Flow</b>	<b>Concept:</b> <b>Metabolism</b>
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<b>Lesson Essential Question(s):</b> What are the energy transformations in living things? (A)	<b>Lesson Essential Question(s):</b> What fuels a cell? (A)
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<b>Vocabulary:</b> photosynthesis, respiration	<b>Vocabulary:</b> metabolism, ATP, aerobic, anaerobic, fermentation
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**Additional Information:**

**Attached Document(s):**

Vocab Report for Topic: Energy Flow

Days: 17

Subject(s): Science

Grade(s): 9th

**Concept: Energy Flow**

photosynthesis -  
respiration -

**Concept: Metabolism**

metabolism -  
ATP -  
aerobic -  
anaerobic -  
fermentation -

Topic: Organic Chemistry

Days: 13

Subject(s): Science

Grade(s): 9th

## Key Learning:

Organic compounds are a result of the unique properties of carbon.

Structure determines the functions of organic compounds.

The importance of enzymes in biochemical reactions.



Unit Essential Question(s):

What are the "jobs" of organic compounds?



Concept:

**Carbon Compounds**

Concept:

**Enzymes**

Lesson Essential Question(s):

How do we build and breakdown organic compounds? (A)

Lesson Essential Question(s):

Why are enzymes essential to life? (A)



Vocabulary:

monomer, polymer, synthesis, hydrolysis

Vocabulary:

enzyme, inhibitor, pH, acid, base, buffer

Additional Information:

Attached Document(s):

Vocab Report for Topic: Organic Chemistry

Days: 13

Subject(s): Science

Grade(s): 9th

### Concept: Carbon Compounds

monomer -  
polymer -  
synthesis -  
hydrolysis -

### Concept: Enzymes

enzyme -  
inhibitor -  
pH -  
acid -  
base -  
buffer -

Topic: Properties of Matter

Days: 6

Subject(s): Science

Grade(s): 9th

Key Learning:

All matter is made of atoms, which consist of protons, neutrons, and electrons that are identifiable by location, mass, and charge.

Elements within the same family on the periodic table have similar chemical properties because of similar atomic structure.



Unit Essential Question(s):

**What properties allow scientists to identify and classify matter?**



Concept:

**Subatomic Particles**

Concept:

**Elements**



Lesson Essential Question(s):  
What's in an atom? (A)

Lesson Essential Question(s):  
What is an element? (A)



Vocabulary:  
atom, nucleus, proton, neutron, electron

Vocabulary:  
atomic theory, atomic number, atomic mass

Additional Information:

Attached Document(s):

Vocab Report for Topic: Properties of Matter

Days: 6

Subject(s): Science

Grade(s): 9th

**Concept: Subatomic Particles**

atom -  
nucleus -  
proton -  
neutron -  
electron -

**Concept: Elements**

atomic theory -  
atomic number -  
atomic mass -

Topic: Reactions

Days: 7

Subject(s): Science

Grade(s): 9th

Key Learning:

The applications of the laws of conservation of mass in chemical reactions.

Factors that can affect the rate of a chemical change include temperature, concentration, nature of the reactant, and catalyst.



Unit Essential Question(s):

What happens when matter is rearranged?



Concept:

**Laws of Conservation of Mass**



Concept:

**Rate of Chemical Change**



Lesson Essential Question(s):

How is matter rearranged in a chemical reaction? (A)



Lesson Essential Question(s):

What affects the rate of reactions? (A)



Vocabulary:

reactant, product, stoichiometry

Vocabulary:

endothermic, exothermic

Additional Information:

Attached Document(s):

Vocab Report for Topic: Reactions

Days: 7

Subject(s): Science

Grade(s): 9th

**Concept: Laws of Conservation of Mass**

reactant -  
product -  
stoichiometry -

**Concept: Rate of Chemical Change**

endothermic -  
exothermic -



Topic: Water

Days: 9

Subject(s): Science

Grade(s): 9th

Key Learning:

- The unique properties of water.
- The significance of polar covalent bonds.
- The three normal states of matter.
- The difference between physical and chemical properties.



Unit Essential Question(s):

Where is water in its cycle?



<p>Concept: <b>Unique Properties of Water</b></p>	<p>Concept: <b>Polar Covalent Bonds</b></p>	<p>Concept: <b>Physical and Chemical Changes</b></p>
<p>Lesson Essential Question(s): What are the unique properties of water? (A)</p>	<p>Lesson Essential Question(s): What makes a molecule polar? (A)</p>	<p>Lesson Essential Question(s): What would it take to reverse that change? (A)</p>
<p>Vocabulary: specific heat</p>	<p>Vocabulary: hydrogen bonding, electro-negativity, polar molecule</p>	<p>Vocabulary: physical change, chemical change</p>

Additional Information:

Attached Document(s):

Vocab Report for Topic: Water

Days: 9

Subject(s): Science

Grade(s): 9th

**Concept: Unique Properties of Water**

specific heat -

**Concept: Polar Covalent Bonds**

hydrogen bonding -

electro-negativity -

polar molecule -

**Concept: Physical and Chemical Changes**

physical change -

chemical change -

Topic: Waves

Days: 8

Subject(s): Science

Grade(s): 9th

**Key Learning:**

Sound and light energy are transmitted by waves.

Waves can be characterized by their velocity, frequency, wavelength, amplitude, and period.

Mechanical waves can be classified according to their movement, standing or compression, and according to their direction of oscillation, which can be transverse or longitudinal.

Waves interact with matter by reflection and/or refraction, which can result in changes in wavelength and frequency.



Unit Essential Question(s): **How can we understand the energy we cannot see?**



Concept: <b>Waves</b>	Concept: <b>Sound &amp; Light</b>
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Lesson Essential Question(s): What do waves we can't see look like? (A)	Lesson Essential Question(s): How do waves carry energy? (A)
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Vocabulary: frequency, wavelength	Vocabulary: transverse, longitudinal, spectrum
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Additional Information:

Attached Document(s):

Vocab Report for Topic: Waves

Days: 8

Subject(s): Science

Grade(s): 9th

**Concept: Waves**

frequency -  
wavelength -

**Concept: Sound & Light**

transverse -  
longitudinal -  
spectrum -