

GENERAL INQUIRY

NJ Standards

[Summary](#)



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Basic Tutorial

- Determine how the **sugar** in the water affects the **petal loss**.
- Determine how the **salt** in the water affects the **petal loss**.
- Determine how the **red dye** in the water affects the redness of the **petals**

[SEP 1-8](#)

[Summary](#)



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Advanced Tutorial

- Determine how the **size** of the sled affects the total **distance** traveled from the end of the ramp.
- Determine how the **height** of the tower affects the total **distance** traveled from the end of the ramp.
- Determine how the **roughness** of the ramp affects the **time** to end of the ramp.

[SEP 1-8](#)

PHYSICAL SCIENCE

NJ Standards

[Summary](#)



Phase Change

- Determine how the amount of **heat** affects the **boiling point** of water.
- Determine how the **size** of the container affects the **time** the water takes to boil.
- Determine how the **amount of ice** affects the **boiling point** of water.
- Determine how the **amount of ice** affects the **melting point** of ice.

[MS-PS1-2](#)

[MS-PS1-4](#)

[HS-PS1-3](#)

[HS-PS1-5](#)

[Summary](#)



Velocity: Free Fall

- Determine how the **height** of the drop affects the **final speed** of the ball.
- Determine how the **height** of the drop affects the **time** to drop.
- Determine how the **mass** of the ball affects the **time** to drop.

[4-PS3-1](#)
[MS-PS2-2](#)
[HS-PS2-1](#)

[Summary](#)



Velocity & Air Resistance

- Determine how the **height** of the drop affects the **velocity** of the ball before it hits the ground.
- Determine how the **mass** of the ball affects the **acceleration** before the ball hits the ground.
- Determine how the **volume** of the ball affects the **force** as the ball hits the ground.
- Determine how the **volume** of the ball affects the **time** before the ball hits the ground.

[4-PS3-1](#)
[MS-PS2-2](#)
[HS-PS2-1](#)

[Summary](#)

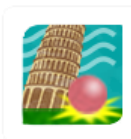


Energy: Free Fall

- Determine how the **height** of the drop affects the **kinetic energy** as the ball hits the ground.
- Middle School: Determine how the **height** of the drop affects the **potential energy** before the ball is dropped.
- High School: Determine how the **mass** of the ball affects the **mechanical energy** as the ball hits the ground.

[4-PS3-1](#)
[MS-PS3-2](#)
[MS-PS3-4](#)
[MS-PS3-5](#)
[HS-PS3-1](#)
[HS-PS3-2](#)

[Summary](#)



Energy & Air Resistance

- Determine how the **height** of the drop affects the **potential energy** before the ball is dropped.
- Determine how the **mass** of the ball affects the **mechanical energy** as the ball hits the ground.
- Determine how the **volume** of the ball affects the **thermal energy** of the system.
- Determine how the **volume** of the ball affects the **kinetic energy** as the ball hits the ground.

[4-PS3-1](#)
[MS-PS3-2](#)
[MS-PS3-5](#)
[HS-PS3-1](#)
[HS-PS3-2](#)

[Summary](#)



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Density

- Determine how the **type of liquid** affects the **density** of the liquid.
- Determine how the **shape** of the container affects the **density** of the liquid.
- Determine how the **amount** of liquid affects the **density** of the liquid.

[MS-PS1-4](#)
[HS-PS1-3](#)
[HS-PS1-5](#)

[Summary](#)



Gravity & Mass: Introduction

- Determine how the **planetary body** we are orbiting affects the **weight** of the gold.
- Determine how the **planetary body** we are orbiting affects the **mass** of the gold.
- Determine how the **amount** of gold affects the **weight** of the gold.

[MS-PS2-4](#)
[HS-PS2-4](#)
[HS-ESS1-4](#)

[Summary](#)

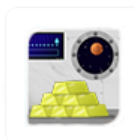


Gravity & Orbit Distance

- Determine how the **amount** of gold affects the **force of gravity** on gold.
- Middle School: Determine how the gold's **distance** from the planet's center affects the force of **gravity** on gold.
- High School: Determine how the planet's **mass** affects the force of **gravity** on gold.

[MS-PS2-4](#)
[HS-PS2-4](#)
[HS-ESS1-4](#)

[Summary](#)



Gravity & Forces

- Determine how the **orbital distance** affects the gold's **mass**.
- Determine how the **planet's mass** affects the force of **gravity**.
- Determine how the **orbital distance** affects the force of **gravity**.

[HS-PS2-4](#)

[Summary](#)

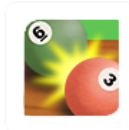


Collisions: Introduction

- Determine how the **mass** of the green ball affects the **final velocity** of the green ball.
- Determine how the **initial velocity** of the red ball affects the total final **momentum** to the right.
- Determine how the **mass** of the red ball affects the total final **momentum** to the right.

[4-PS3-4](#)
[MS-PS2-1](#)
[HS-PS2-3](#)

[Summary](#)



Collisions: Advanced

[HS-PS2-3](#)

- Determine how the **mass** of the green ball affects the final **velocity** of the green ball.
- Determine how the initial **velocity** of the red ball affects the total final **momentum** to the right.
- Determine how the **mass** of the red ball affects the total final **momentum** to the right.

[Summary](#)



Collisions: Inelastic (Trains)

[HS-PS2-3](#)

- Determine how the initial **velocity** of the red train affects the total final **momentum** to the right.
- Determine how the initial **velocity** of the green train affects the total final **momentum** to the right.
- Determine how the **mass** of the red train affects the final **velocity** of the red train.

[Summary](#)



Forces & Motion: Introduction

[MS-PS2-2](#)

[MS-PS2-4](#)

[HS-PS2-1](#)

- Determine how the **mass** of the sled impacts the **force** of the sled on the spring.
- Determine how the **roughness** of the ramp impacts the **time** to end of the ramp.
- Determine how the **height** of the tower impacts the **velocity** of the sled.

[Summary](#)



Forces & Motion: Different Planetary Bodies

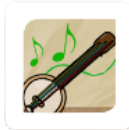
[MS-PS2-2](#)

[MS-PS2-4](#)

[HS-PS2-1](#)

- Determine how the **gravity** of the planetary body impacts the **force** of the sled on the spring.
- Middle School: Determine how the **gravity** of the planetary body impacts the **time** to end of the ramp.
- High School: Determine how the **gravity** of the planetary body impacts the **velocity** of the sled.

[Summary](#)



Waves on a String: Introduction

[MS-PS4-1](#)

[HS-PS4-1](#)

- Determine how the **tension** of the string impacts the **wave frequency**.
- Determine how the **length** of the string impacts the **wave speed**.
- Determine how the **strength** of the strum impacts the **loudness** of the sound.

[Summary](#)

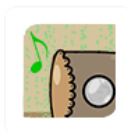


Waves on a String: Advanced

[HS-PS4-1](#)

- Determine how the **wave frequency** changes.
- Determine how the **loudness** changes.
- Determine how the **wave speed** changes.

[Summary](#)



Waves in a Drum: Introduction

[HS-PS4-1](#)

- Determine how the substance in the drum (**medium**) influences the **wave speed**.
- Determine how the mallet **position** influences the **loudness** of the sound produced.
- Determine how the mallet **speed** influences the **pitch** of the sound produced.

[Summary](#)



Waves in a Drum: Advanced

[MS-PS4-2](#)

[HS-PS4-1](#)

- Investigate what affects the **loudness** of the sound produced.
- Investigate what affects the **pitch** of the sound produced.
- Investigate what affects the **wave speed**.

[Summary](#)



Waves & Thermal Energy

[MS-PS1-4](#)

[MS-PS4-2](#)

[HS-PS4-1](#)

- Determine how the **temperature** in the drum influences the **wave speed**.
- Determine how the **temperature** in the drum influences the **loudness** of the sound produced.
- Determine how the **temperature** in the drum influences the **pitch** of the sound produced.

[Summary](#)



Chemical Reactions

[MS-PS1-2](#)

[MS-PS1-4](#)

- Determine how the **substance added to vinegar** impacts the **temperature** change.
- Determine how the **amount of baking soda** impacts the **temperature** change.
- Determine how the **amount of vinegar** impacts the **temperature** change.

[MS-LS1-2](#)
[HS-LS1-7](#)

[Summary](#)



Cells: Animal - Function

- The **Golgi body** is not receiving enough **protein**. Investigate how you can fix this problem.
- The cell is producing too many **ribosomes**. Investigate how you can decrease the production of ribosomes.
- The cell has too much **protein**. Investigate how you can reduce the amount of protein.

[MS-LS1-2](#)
[HS-LS1-7](#)

[Summary](#)



Cells: Animal - Energy & Storage

- The cell **cannot break down food**. Investigate how you can fix this problem.
- The cell is storing **too many nutrients**. Investigate how you can fix this problem.
- The cell is **low on energy**. Investigate how you can increase its energy.

[MS-LS1-2](#)
[HS-LS1-5](#)

[Summary](#)

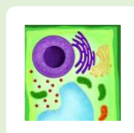


Cells: Plant - Function

- The **Golgi body** is not receiving enough **protein**. Investigate how you can fix this problem.
- The cell is producing too many **ribosomes**. Investigate how you can decrease the production of ribosomes.
- The cell has too much **protein**. Investigate how you can reduce the amount of protein.

[MS-LS1-2](#)
[HS-LS1-5](#)

[Summary](#)



Cells: Plant - Energy & Storage

- The cell does not have enough **storage** space.
- The cell is not producing enough **food**. Investigate how you can fix this problem.
- The cell is **low on energy**. Investigate how you can increase its energy.

[MS-LS4-4](#)
[MS-LS4-6](#)
[HS-LS2-2](#)
[HS-LS2-6](#)
[HS-LS3-3](#)
[HS-LS4-2](#)
[HS-LS4-3](#)
[HS-LS4-4](#)
[HS-LS4-5](#)

[Summary](#)



Natural Selection

- Investigate the optimal amount of **foliage** for the **green**, long furred slinquettes' population.
- Investigate the optimal amount of **foliage** for the **red**, short, furred slinquettes' population.
- Investigate the optimal **temperature** for the green **short furred** slinquettes' population.
- Investigate the optimal **temperature** for the red, **long furred** slinquettes' population.

[Summary](#)

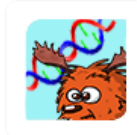


Diversity of Traits

- Investigate how **foliage** influences the presence of **red, short furred** living in the environments.
- Investigate how **fur color mutation** influences the final number of **green, short furred** living in the environments.
- Investigate how a **fur length mutation** influences the presence of red, **long furred** living in the environments.
- Investigate how **temperature** influences the final number of green, **long furred** living in the environments.

[MS-LS4-4](#)
[HS-LS2-2](#)
[HS-LS3-2](#)
[HS-LS3-3](#)
[HS-LS4-2](#)

[Summary](#)



Genetics

- Determine how the Mother's F **alleles** impact the chance of producing the **offspring with red fur**.
- Determine how the Mother's L **alleles** impact the chance of producing the **offspring with short fur**.
- Determine how the Mother's H **alleles** impact the chance of producing the **offspring with horns**.

[3-LS3-1](#)
[3-LS3-2](#)
[3-LS4-2](#)
[3-LS4-3](#)
[MS-LS3-2](#)
[HS-LS2-2](#)
[HS-LS3-1](#)
[HS-LS3-2](#)

[Summary](#)



Predation: Introduction

- Investigate how **seal birthrate** influences the **maximum shark population**.
- Investigate how **shark birthrate** influences the **maximum seal population**.
- Investigate how a **starting seal population** influences the **length of the predation cycle**.
- Investigate how a **starting shark population** influences the **length of the predation cycle**.

[MS-LS2-2](#)
[HS-LS2-1](#)
[HS-LS2-2](#)
[HS-LS2-6](#)

[Summary](#)



Predation: Advanced

- Investigate how an **initial seal population** influences the **duration of predation cycles**.
- Investigate how **seal birthrate** influences the **final seal population**.
- Investigate how **shark birthrate** influences the **duration of predation cycles**.

[HS-LS2-1](#)
[HS-LS2-2](#)
[HS-LS2-6](#)

[Summary](#)

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Lunar Phases

- Determine how the **position of the moon** impacts the **percent of the Moon facing the Sun**.
- Determine how the **location of the observer** impacts the **percent of the Moon lit up**.
- Determine how the **orbital speed of the moon** impacts the **duration of lunar orbit**.

[MS-ESS1-1](#)
[HS-ESS1-4](#)

[Summary](#)

Lunar Phases: Advanced

- Determine how the **percent of the Moon lit up** changes.
- Determine how the **duration of lunar orbit** changes.
- Determine how the **percent of the Moon facing the Sun** changes.

[HS-ESS1-4](#)

[Summary](#)

Eclipses: Introduction

- Determine how the **phase of the Moon** affects the **possibility** of viewing a **lunar eclipse**
- Determine how the **phase of the Moon** affects the **possibility** of viewing a **solar eclipse**
- Determine if the **orbital tilt of the moon** impacts the average number of **lunar eclipses**.
- Determine how the **time of year** impacts the average number of **solar eclipses**.

[MS-ESS1-1](#)
[HS-ESS1-4](#)

[Summary](#)

Eclipses: Advanced

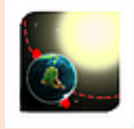
- Determine how the average number of **lunar eclipses** changes.
- Determine how the average number of **solar eclipses** changes.
- Determine how the possibility of viewing a **lunar eclipse** changes.
- Determine how the possibility of viewing a **solar eclipse** changes.

[HS-ESS1-4](#)

<p>Summary</p>		<p>Plate Tectonics: Convergent Plates- Introduction</p> <ul style="list-style-type: none"> • Determine how the plate type affects the formation type. • Investigate how the duration of plate movement impacts the formation heights at the convergent boundary. • Investigate how plate size impacts the number of earthquakes at the convergent boundary. 	<p>MS-ESS2-1 MS-ESS2-2 HS-ESS1-5 HS-ESS2-1</p>
<p>Summary</p>		<p>Plate Tectonics: Convergent Plates- Advanced</p> <ul style="list-style-type: none"> • Investigate what affects the formation type at the convergent boundary. • Determine the impact of the duration of plate movement. • Investigate what affects the number of earthquakes. 	<p>HS-ESS1-5 HS-ESS2-1</p>
<p>Summary</p>		<p>Plate Tectonics: Divergent Plates</p> <ul style="list-style-type: none"> • Investigate what affects the formation observed at the divergent boundary. • Middle School: Investigate what affects the age of crust. • High School: Investigate what affects the spreading rate at the divergent boundary. 	<p>MS-ESS2-1 MS-ESS2-2 HS-ESS1-5 HS-ESS2-1</p>
<p>Summary</p>		<p>Plate Tectonics: Divergent Plates- Advanced</p> <ul style="list-style-type: none"> • Investigate what affects the formation observed at the divergent boundary. • Investigate what affects the spreading rate at the divergent boundary. • Investigate what affects the age of crust at the divergent boundary. 	<p>HS-ESS1-5 HS-ESS2-1</p>
<p>Summary</p>		<p>Seasons: Introduction</p> <ul style="list-style-type: none"> • Determine how the tilt of the Earth affects the average temperature. • Determine how the location of Earth in orbit affects the distance of Earth from the Sun. • Determine how the location of the observer on Earth affects the angle of sunlight. 	<p>HS-ESS1-1</p>

Seasons: Advanced

[Summary](#)



- Determine how the **angle of sunlight** changes.
- Determine how the average **temperature** changes.
- Determine how the **distance** of Earth from the Sun changes.

Seasons: Earth has NO Tilt! Introduction

[Summary](#)



- If the Earth has no tilt, determine how the **location of Earth in orbit** affects the **average temperature**.
- If the Earth has no tilt, determine how the **location of Earth in orbit** affects the **distance** of Earth from the Sun.
- If the Earth has no tilt, determine how the **location of the observer** affects the **angle of sunlight**.

Seasons: Earth has NO Tilt! Advanced

[Summary](#)



- If the Earth has no tilt, determine how the **angle of sunlight** can change.
- If the Earth has no tilt, determine how **the average temperature** can change.
- If the Earth has no tilt, determine how the **distance** of Earth from the Sun can change.