Inq-ITS

Massachusetts Planning Document

GENERAL INQUIRY

MA Standards

Basic Tutorial

SEP 1-8

Summary

- 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

Advanced Tutorial

SEP 1-8

Summary

- 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.

PHYSICAL SCIENCE

MA Standards

Phase Change

8.MS-PS1-4
HS-PS1-3
HS-PS1-5

Summary

- 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.

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.	8.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.	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.	7.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.	HS-PS3-1 HS-PS3-2

Summary	 CER	**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.	8.MS-PS1-2 HS-PS1-2
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.	6.MS-PS2-4 HS-PS2-4 5-PS2-1
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.	6.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.	6.MS-PS2-1

Summary		**Collisions: Advanced** • 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.	HS-PS2-3
Summary		**Collisions: Inelastic (Trains)** • 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.	8.MS-PS2-1 HS-PS2-3
Summary		**Forces & Motion: Introduction** • 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.	8.MS-PS2-2 8.MS-PS2-4 HS-PS2-1
Summary		**Forces & Motion: Different Planetary Bodies** • 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.	6.MS-PS2-4 8.MS-PS2-2 HS-PS2-1
Summary		**Waves on a String: Introduction** • 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.	6.MS-PS4-1 HS-PS4-1

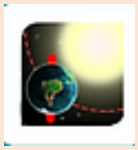
Summary		**Waves on a String: Advanced** • Determine how the wave frequency changes. • Determine how the loudness changes. • Determine how the wave speed changes.	HS-PS4-1
Summary		**Waves in a Drum: Introduction** • Determine how the substance in the drum (medium) influences the wave speed. • Determine how the mallet position influences the loudness of the sound produced. • Determine how the mallet speed influences the pitch of the sound produced.	6.MS-PS4-2 HS-PS4-1
Summary		**Waves in a Drum: Advanced** • Investigate what affects the loudness of the sound produced. • Investigate what affects the pitch of the sound produced. • Investigate what affects the wave speed.	HS-PS4-1
Summary		**Waves & Thermal Energy** • 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.	6.MS-PS4-2 8.MS-PS1-4 HS-PS4-1
Summary		**Chemical Reactions** • 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.	6.MS-PS1-2 7.MS-PS3-4

LIFE SCIENCE			MA Standards
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.	6.MS-LS1-2 HS-LS1-7 HS-LS2-5
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.	6.MS-LS1-2 HS-LS1-7 HS-LS2-5
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.	6.MS-LS1-2 HS-LS1--5 HS-LS2-5
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.	6.MS-LS1-2 HS-LS1--5 HS-LS2-5
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.	6.MS-LS4-6 HS-LS2-3 HS-LS2-6 HS-LS3-3 HS-LS4-2 HS-LS4-3 HS-LS4-4 HS-LS4-5

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.	8.MS-LS4-4 HS-LS4-2 HS-LS2-2 HS-LS3-2 HS-LS3-3
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.	8.MS-LS4-4 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.	7.MS-LS2-1 7.MS-LS2-4
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.	7.MS-LS2-1 7.MS-LS2-4

EARTH SCIENCE			MA Standards
Summary	 CER	**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.	6.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.	6.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
Summary		**Plate Tectonics: Convergent Plates-Introduction** • Determine how the plate type affects the formation type. • Investigate how the duration of plate movement impacts the formation heights at the convergent boundary.	6.MS-ESS2-2 6.MS-ESS2-3 HS-ESS1-5 HS-ESS2-1

		• Investigate how plate size impacts the number of earthquakes at the convergent boundary.	
Summary		Plate Tectonics: Convergent Plates- Advanced • 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.	HS-ESS1-5 HS-ESS2-1
Summary		Plate Tectonics: Divergent Plates • 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.	6.MS-ESS2-2 6.MS-ESS2-3 HS-ESS1-5 HS-ESS2-1 HS-ESS2-3
Summary		Plate Tectonics: Divergent Plates- Advanced • 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.	HS-ESS1-5 HS-ESS2-1 HS-ESS2-3
Summary		Seasons: Introduction • 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.	6.MS-ESS1-1 HS-ESS1-4
Summary		Seasons: Advanced • Determine how the angle of sunlight changes. • Determine how the average temperature changes. • Determine how the distance of Earth from the Sun changes.	HS-ESS1-4

Summary		Seasons: Earth has NO Tilt! Introduction ● 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.	6.MS-ESS1-1 HS-ESS1-4
Summary		Seasons: Earth has NO Tilt! Advanced ● 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.	HS-ESS1-4