
educational elements
Antietam
RECREATION

BRINGING LEARNING TO LIFE

Learning is fundamental at Antietam Recreation and your students are going to have a great time! It is a hands-on experience in areas all across the curriculum including physical education, science, history, the arts, and much more. We desire that your time spent here will draw your school closer together and will provide an exciting, educational and fun filled day.

Physical Education

Students will be able to experience unique PE activities such as: horseback riding, canoeing, kayaking, swimming, tennis and badminton. They will also be able to participate in challenge and adventure activities including rope swings, tight ropes and the Burma bridge. Also included are some fun and recreational activities in our game room like air hockey, table tennis, foosball, and bumper pool. These activities involve educational instruction as students are taught how to hold paddles, put on lifejackets, get in and out of boats, mount and dismount horses, hold reins, apply leg pressure, and numerous other procedures to insure their own safety and that of their classmates. Some schools start their day with a cross country run and fitness events to fulfill the Presidential Physical Fitness Test or just to encourage fitness.

Animal Science

Antietam Recreation's large number of live, caged, and stuffed animals and birds provide many science education experiences. The petting zoo allows students to pet, hold and feed animals. Included are domesticated animals such as sheep, goats, rabbits, kittens, pigs, ducks, chickens, puppies and some unique caged animals like the squirrel monkey, fennec fox, coati mundi, genet, macaw talking bird, ponies, donkey, and llama. Antietam Recreation also has a bird collection that is over 100 years old that includes a Caroline Parakeet, and Passenger Pigeon both now extinct, plus numerous other varieties. A butterfly, moth, and insect collection as well as numerous stuffed animals, including reptiles (rattlesnake, snapping turtle,) fish (shark, flying fish, saw fish) mammals (mink, fox, bat, and skunk) and many other collections are available. A walk or jog along one of the many nature trails along Antietam Creek where deer, red fox, and numerous wildlife abound is also an educational experience.

Physical Science

Many scientific principles are working at the specialized activities such as the boat slide (flume ride), cable ride, rope swings, Burma bridge, barge, carousel ride, downhill slide, swinging bridge, and boating activities.

American History & The Arts

The day always includes a 20 minute dramatic production of dance, music and singing. This not only includes world class entertainment but also dramatic performances by young performers. The show is different each year. Contact us about the specific information to be included.

Other Educational Areas

Activities in math, environmental education, English, writing, and acting and other subjects may be developed to fit into your curriculum by working individually with our staff. Please let us know if you are planning an educational trip to our facility so we can better tailor it to fit your needs. Activity sheets are included below which can be reproduced for your staff either before or after your field trip.

Petting Zoo: Animal Science

The petting zoo allows students to pet, hold and feed animals. Included are domesticated animals such as sheep, goats, rabbits, kittens, pigs, ducks, chickens, puppies and some unique caged animals like the squirrel monkey, fennec fox, coati mundi, genet, macaw talking bird, ponies, donkey, and llama. The petting zoo could include some of the following animals:

Coatimundi

Part of the raccoon family, a coatimundi is an excellent climbers but spend most of their time on the ground hunting. They will play, day-rest and night-nest in trees. They will often sleep balanced in the fork of a tree. They will eat lizards, small mammals, and occasionally birds and their eggs. They also like soft fruits. They are found from the southwestern United States to northern Argentina

Fallow Deer

Deer are found in many places around the world, including forests, rainforests, grasslands, and tundras. Deer are herbivores (plant eaters); most are browsers (eating leaves, shoots, soft vegetation, twigs, etc.), but some are also grazers (eating mostly grass). Deer are ruminants; they store partly-chewed food, and later regurgitate this cud and thoroughly chew it (this is called "chewing the cud"). This process lets deer process a large amount of low nutrient food.

Genet

Genets are related to the mongoose and a cat. Genets are nocturnal, which means they sleep during the day and are awake at night. They prefer to live in areas with dense vegetation, such as bushes, thickets, and evergreen oak forests. They are mostly solitary animals. They feed often on small mammals, such as rodents, shrews, and bats. They also eat birds, bird eggs, centipedes, millipedes, scorpions, and various fruits, including figs and olives.

Hedgehogs

Hedgehogs have an insectivore diet, including insects, snails, frogs and toads, snakes, bird eggs, carrion, mushrooms, grass roots, berries, melons, and watermelons. They prefer a warm climate. The hedgehog sleeps for a large portion of the daytime either under cover of bush, grass, rock or in a hole in the ground.

Lemurs

Ring-tailed lemurs have powerful scent glands and use their unique odor as a communication tool and even as a kind of weapon. Lemurs mark their territory by scent, serving notice of their presence to all who can smell. During mating season, male lemurs battle for dominance by trying to out stink each other. Lemurs usually eat fruit and leaves.

Patagonian Cavy

The cavy's appearance reminds one of a hare because of its long ears and its long slender legs. It feeds on grasses and other plants and lives in small groups of ten to fifteen individuals. It is a swift runner and makes leaps of up to six feet. It digs its den in the ground, or else uses the burrows of other animals, such as armadillos.

Habitat

A habitat is where a human, animal, or plant lives.

1. Describe your habitat.

_____

_____

2. What do you need to survive in your habitat?

_____

_____

Animals need four things to survive in their habitat: food, water, shelter, and living space. In the right hand column of the chart below, give examples of the food, water, shelter, and living space you have in your habitat.

Four Things Animals Need	My Habitat
Food	
Water	
Shelter	
Living Space	

Choose one animal in the petting zoo: _____.

1. Where does it live?

_____

_____

2. What kind of food does it eat?

_____

_____

Would you rather eat your animal's food or your food? Why or why not?

_____

_____

BIRDS: THEIR FEET AND BILLS

One of the best ways to understand birds, their habitats, their diet, and their ability to survive is to observe the feet and bill. Bird feet come in a variety of shapes and sizes and are used in a variety of ways. The bill is a specialized instrument that enables the bird to get at the type of food that forms its diet. It's also used for gathering nesting material, digging nesting sites and preening and smoothing the plumage. Whether small or large, delicate or strong, it is just right for each bird.

FEET	**BIRD**	**CHARACTERISTIC**
Climbers	Woodpeckers	Two toes in front and two in back
Graspers	Hawks and owls	Large curved sharp claws (talons)
Perchers	Robins, doves, songbirds	Three toes forward and one backward
Runners	Ostrich, roadrunners, killdeer	Two and three toes all point forward
Scratchers	Pheasants and chickens	Rake like toes
Swimmers	Ducks and coots	Webbed paddle like feet
Waders	Flamingoes and herons	Splayed toes

Grasper:
Eagle

Percher:
Robin

Swimmer:
Duck

Wader:
Snipe

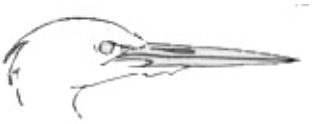
Climber:
Woodpecker

Now You Decide…

Habitat	Bird	Foot Type	Why?
Desert			
Grassy Waters			
Mountain			
Open Prairie			
Woodlands			

BILLS	BIRD	CHARACTERISTIC
Flesh Tearing	Hawks, owls, eagle	Meat hook to tear its food into strips
Insect Eater	Woodpecker	Chisel digging into wood to reach insects
Seed Eater	Sparrow, cross bills	Like pliers to pry seeds from cones
Sifter	Flamingo, ducks	Beak and tongue work like a sieve
Spearing	Herons, penguin	Dagger for stabbing fish
Sipping	Hummingbirds	Straw for sipping nectar from flowers
Hooked	Parrots	For eating fruits and seeds

Flesh Tearing:
Hawk



Spearing:
Heron

Seed Eater:
Sparrow

Sifter:
Duck

Insect Eater:
Woodpecker

Did you know?

The largest beak is on the pelican. The pelican's beak is an average of 18 inches long. Swifts have the shortest beaks, just one-quarter of an inch long. The longest beak, in relation to the size of the bird, is the sword-billed hummingbird. The little hummingbird's bill is just over four inches long, not much shorter than its tiny body!

Now You Decide…

Habitat	Bird	Bill Type	Types of Food
Desert			
Grassy Waters			
Mountain			
Open Prairie			
Woodlands			

Newton's Three Laws at Antietam

1. An object will not move unless external force is applied to it. An object will keep moving in uniform motion until an external force is applied to it.

Example: The boat slide would continue moving unless the external force of the water and the rope acted on it.

Predict: What force would stop you on the cable ride if you didn't use your feet or the staff member didn't stop you?

2. Acceleration refers to the speed at which an object moves; this speed depends on the amount of force applied to the object. The more force used, the faster the object will move.

Example: When you try to pull the barge on your own, it moves slowly. The number of people pulling the barge increases the force applied to the barge and makes it move faster.

Experiment: While you are canoeing, start by rowing with very little force. Increase the amount of force with which you row. What happened to the speed of the canoe when you increased the force of your rowing?

3. For every action, there is an equal and opposite reaction.

Example: When a horse gallops forward, the rider's body jolts backward. The action of the horse galloping forward creates and equal and opposite reaction of the rider moving in the opposite direction. This is why a rider holds onto the reins!

Observe: When you pull the rope towards you on the barge, what happens to the barge? Draw an illustration and use arrows to show which direction you are pulling the rope and which direction the barge is going.

BOAT SLIDE

What scientific principles are at work?

Statistics

The idea for the boat slide was conceived, and construction was begun by hand on the flume in1990. The boat slide was completed in 1991. Owner Bob Rotz, with the help of his father and uncle, designed and constructed the slide.

Potential Energy (PE)

The boat has potential energy at the top of the slide. That PE is converted into Kinetic Energy (KE) as the boat moves down the slide. When the boat hits the water, the KE is converted to heat by the friction of the boat moving through the water.

Force

Force is necessary to move the boat. Force is the push or pull that starts an object. Newton's Second Law states that force is equal to the mass of an object multiplied by its acceleration. Force is required to make the boat move down the flume and overcome friction.

Gravity

Gravity is the force from the earth that starts the boat to move down the hill. The pull from the tractor must be greater than the force of gravity in order for the boat to be pulled up the flume.

Friction

Friction is caused by the boat rubbing against the wooden flume (ramp). Friction has been lessened by adding four wheels at the bottom of the boat, and having the water on the flume.

Inertia

Inertia is the tendency of an object to remain at rest or in movement unless acted upon by an external force. Inertia is when the boat hits the water; it continues to move because of its inertia. It will move until friction with the water and the pull from the rope (an external force) causes it to stop.

Motion

A body in motion tends to stay in the same direction and speed unless acted by some outside force such as air on wind, water current, rope pull or friction.

Displacement Theory

The boat floats because it is pushed up by a force equal to the weight of the water displaced by the boat. When the boat hits the water it weighs less than the water; therefore, it displaces the water and the force of the up thrust will keep the boat and its load afloat. If the boat and its passengers weigh more than the water they displace, then the boat will sink). That's why we recommend the boat be loaded with 500 pounds or less.

Water in Creek + Boat = How much water has been displaced.
It has the same mass as the boat and the riders.

Inclined Plane

The inclined plane is the flume. The steeper the inclined plane, the greater the force of gravity. (The first 40 feet, the incline is a 6-12 pitch; from 40-100 feet, the incline is a 4-12 pitch.)

Effort

The flume, pulley and rope are used to reduce the effort required to pull the boat back up the hill. The slope takes much of the weight off the load.

Outside Forces

As the boat hits the water, the current of the Antietam Creek pulls the boat downstream. Gravity, the water current, friction, and the weight of the boat and the riders all need to be overcome in order to pull the boat up the flume (incline) to the top of the hill.

Power

The boat is attached to a winch by a rope. The rope turns around a drum which is powered by a 26 horsepower tractor. The wheel is fixed to the axle and together they transmit the increased force, and the boat moves up the flume.

Safety Features

- Seat belts keep passengers in place in case of emergency stopping.
- Padded seats cushion the ride of the passengers.
- Hoisting rope with ultraviolet inhibitor has a tensile strength of 14,000 pounds; it is checked daily for frays and defects.
- The operator located at the bottom of the flume checks for water traffic and passenger safety in the creek.
- A flotation device in the boat prevents it from sinking.
- A brake on the tractor will stop the boat in case of an emergency.
- Life jackets keep passengers afloat if the boat sinks.

Specifications

- Boat weighs approximately 400 pounds, 8’2” long, 3’ 9.5” wide, 9.75” deep on the inside
- Slide bed: 43 1/2 inches wide, 100 feet + 10' flap, 16” deep on the inside, 18.5” deep on the outside, 40’ has a 6-12 pitch, and 60’ has a 4-12 pitch, 35.5’ high
- The creek is approximately 80 feet wide.
- Tractor is 26 horsepower. One horsepower is equal to 550 ft.- lb. per second

Notes

If you want to get wet increase the load (weight of the people). If you do not want to get wet lessen the load (weight of the people). The speed is also dependent on the weight. If the speed is constant, the velocity (distance, time and direction) is constant because it is traveling in a straight line.

Carousel RIDE

Statistics

The Carousel was designed in 1985 by owner Bob Rotz. It began with the mechanism of a Horse Walker. A Horse Walker is commonly used at horse races. Horses are placed on the walker to warm up for a race and then again when the race is over to cool down. It was then converted into a Carousel for people instead of horses.

Overview

Sometimes you just go and go, yet never seem to get anywhere. You're just running in circles. So, how far did you really go to get nowhere?

Materials

Watch with a second hand or stopwatch (for extension only)

Directions/Activity

1. As the ride begins to move (you can do this as you ride or while watching the ride from the side), count the number of times you go around before the ride stops.

2. Record this number on the data table.

3. Repeat your count several times to ensure its accuracy. You may want to take an average of your counts.

4. What distance did you travel?

Radius=
Circumference= 2 x pi x radius
$C= 2\pi r$
$C= 2\pi(\quad)$
C=
Number of Rotations=
Distance Travelled= Number of Rotations x Circumference
D=NC
D=( )( )

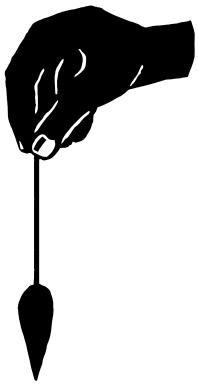
5. By timing each of the rides, you can also determine the carousel's speed. Use a stopwatch or a watch with a second hand to time the ride.

Distance Travelled=
Time=
Distance= Rate x Time
D=Rt
( )=R( )
R=

ROPE SWING

What scientific principles are working at the rope swing?

Pendulum



The Rope Swing is a simple Pendulum, a free-swinging object attached at a fixed point. Potential Energy (PE) at the starting platform is converted to Kinetic Energy (KE) as you swing out, then back to PE at the other end of the arc. The KE is highest (and you will swing the fastest) at the low point of the arc (where you are the nearest to the water.) This conversion from PE to KE back to PE continues as you swing back and forth on the rope swing.

Period

The time to swing from one end to the other and back again is the period of the pendulum. The Period (T) of this rope swing pendulum is determined by the length (L) of the rope and the earth gravity (G). The longer the rope the greater the period; the stronger the gravity the shorter the period. Each period is exactly the same except for the affects of friction (at the top of rope it rubs against the tree and the air resistance against your body.) The effects of air friction are minimal.

- Experiment-release an empty seat and count the seconds it takes to complete a period. Now have a student sit on the seat and count the seconds it takes to complete a period. Try the same experiment with the rope swing at the badminton court (it is much shorter)

Specifications

- This rope swing pendulum has a length of 18.3 M.
- The gravity is 9.8 meter per sec
- To figure the period of the rope swing pendulum, first multiply 2 times π (3.14). Then multiply this answer time the square root of 18.3 divided by 9.8. (See the formula on the right.) The answer is 8.6 seconds.

$$T = 2\pi\sqrt{\frac{\ell}{g}}$$

Statistics and Safety Features

- The weight of the load on the rope is distributed over two supports.
- Tensile strength of rope is 6500 pounds.
- The rope hooks onto the harness to prevent slipping.
- A helmet is worn to protect the head.
- The rope is 1.6 centimeters (5/8 inches) thick, and approximately 18.3 meters (60 feet) long.

CABLE RIDE

What scientific principles are working at the cable?

Potential Energy

The axle of the pulley allows the wheel to turn freely as the cable runs over it to reduce the friction between the load and the pulley.

Gravity

The force of gravity starts the movement from the platform. The inclined plane increases the velocity. The pulley reduces friction. The weight of the person will increase the speed and distance traveled. Landing on the ramp makes for an easy landing and reduces the effort to lift the person.

Statistics

- Designed in 1979.
- Oldest rider: Helen Overington, 93 years old
- Youngest rider: Oliver Andrew Distad, 7 months and 12 days (July 28, 2011)

Goal

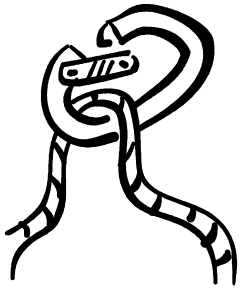
- Push off the platform
- Rotate hips to keep a forward motion
- Place feet down and land on the feet
- Run along the ground until you stop

Safety Features

- Harness worn
- Aircraft cable line has 1400 lb. tensile strength
- The cables have been installed at different specified heights and distances to work effectively
- It is important that there will be sufficient starting energy to prevent from being "stuck," in the middle of the ride.

Specification

- Length 300'
- Height-Varies



EXPLORE MORE!

Science is all around us. The following scientific principles are all demonstrated through the activities of Antietam Recreation.

- Centripetal Force
- Friction
- Potential and Kinetic Energy
- Displacement (Archimedes Principle)
- Gravity
- Newton's Laws of Motion
- Pendulum
- Acceleration
- Power
- Force
- Speed

Consider these activities and see which principles you can identify:

- Barge
- Boat Slide
- Burma Bridge
- Cable Ride
- Canoeing and Kayaking
- Carousel Ride
- Downhill Slide
- Horseback Riding (bit and reins)
- Rope Swing
- Swinging Bridge
- Tight Rope