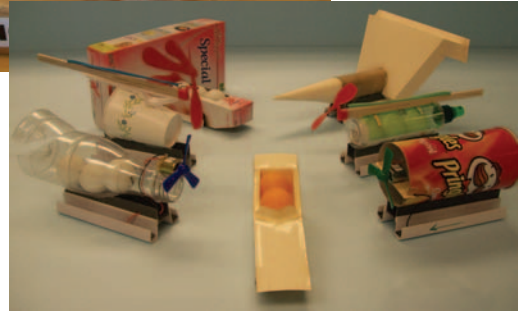
MIDDLE SCHOOL CHALLENGE: MAGNETIC LEVITATION (MAGLEV)

Core Outcomes:

Students will understand and be able to state the Universal law of Gravity and demonstrate an understanding of it; and define and demonstrate what magnetic "attraction" and magnetic "repulsion" is. Students will be able to explain what a "magnetic field" is, and relate it to magnets, as well as Maglev vehicles and a Maglev track. Students will also be able to describe how a magnetic levitation vehicle benefits the environment.

Challenge:

Using prefabricated CPEP kits, students are challenged to design, construct, evaluate, test and enter a Maglev vehicle that transports two passengers (see details below) in the CPEP Day competition.



Rules:

Each student team will build a Maglev vehicle using the chassis components provided by CPEP. Each vehicle must incorporate a body that is constructed from recyclable materials. The body design must also contain a compartment for two passengers (ping pong balls). This compartment must retain its shape with or without the passengers, and these passengers must be easily loaded/unloaded by the Maglev judges on CPEP Day. The vehicle will be disqualified if it loses a passenger while being track tested. All vehicles must fit within a 12"(30.4cm) cube.

Each kit will contain the following items to construct the chassis:

- (1) Plastic "U" Channel
- (2) Plastic "J" Channels
- (4) Magnets

* Additional component parts based on Maglev category:

Rubber Band Powered Maglev:

- (1) 5" Propeller
- (1) 3/16" x 7/16" x 10 ½" Propeller Support
- (1) 7" Rubber Band

Electric Motor Powered Maglev:

- (1) Electric Motor
- (1) 3" Propeller
- (2) 6" long, 24ga Copper Coated Steel Wires

Each school will be provided with a 5-foot Maglev test track for trial runs. A ten-foot long track will be used during the CPEP Day competition.

Maglev Categories and Rules:

Students may choose one of the following categories for the Maglev challenge. We suggest that students start with building a Gravity Powered Maglev vehicle first.

• Gravity • Wind • Rubber Band • Electric Motor

Gravity Powered Maglev: Students can use their creativity to test various designs that include additional weights, and their placement.

Wind Powered Maglev: The sail for the vehicle can be made from any recyclable material. A 20-inch fan will be used to power the vehicle at CPEP Day.

Rubber Band Propeller Powered Maglev: Students must use the propeller, propeller support, and rubber band supplied in the kit. Sails or wings are not permitted.

Electric Motor Powered Maglev: Students must use the motor and propeller supplied in the kit. Vehicles can be tested by using a 9-Volt battery to supply power to the 5' test track.

Judging and Scoring:

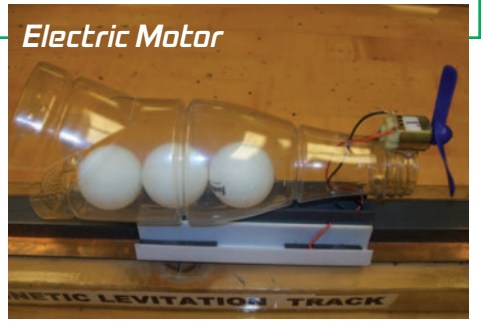
Each team will be allowed two trial runs for each category of Maglev vehicle. Electronic timers will be used to determine the fastest trial for each team.

Prototype Maglev: An award will be given for a Prototype Maglev project that uses the same specifications mentioned previously, but incorporates environmentally sensitive chassis materials as well.

HIGH SCHOOL CHALLENGE: MAGNETIC LEVITATION (MAGLEV)

Core Outcomes:

Students will understand and be able to state the Universal law of Gravity and demonstrate an understanding of it; and define and demonstrate what magnetic "attraction" and magnetic "repulsion" is. Students will be able to explain what a "magnetic field" is, and relate it to magnets, as well as Maglev vehicles and a Maglev track. Students will also be able to describe how a magnetic levitation vehicle benefits the environment.



Challenge:

Using prefabricated CPEP kits, students are challenged to design, construct, evaluate, test and enter a Maglev vehicle that transports three passengers (see details below) in the CPEP Day competition.

Rules:

Each student team will build a Maglev vehicle using the chassis components provided by CPEP. Each vehicle must incorporate a body that is constructed from recyclable materials. The body design must also contain a compartment for three passengers (ping pong balls). This compartment must retain its shape with or without the passengers, and these passengers must be easily loaded/unloaded by the Maglev judges on CPEP Day. The vehicle will be disqualified if it loses a passenger while being track tested. All vehicles must fit within a 12"(30.4cm) cube.

Each kit will contain the following items to construct the chassis:

- (1) Plastic "U" Channel
- (2) Plastic "J" Channels
- (4) Magnets

* Additional component parts based on Maglev category:

Rubber Band Powered Maglev:

- (1) 5" Propeller
- (1) 3/16" x 7/16" x 10 ½" Propeller Support
- (1) 7" Rubber Band

Electric Motor Powered Maglev:

- (1) Electric Motor
- (1) 3" Propeller
- (2) 6" long, 24ga Copper Coated Steel Wires

Each school will be provided with a 5-foot Maglev test track for trial runs. A ten-foot long track will be used during the CPEP Day competition.

Maglev Categories and Rules:

Students may choose one of the following categories for the Maglev challenge. We suggest that students start with building a Gravity Powered Maglev vehicle first.

- Gravity Powered
- Wind Powered
- Rubber Band Propeller Powered
- Electric Motor Powered

Gravity Powered Maglev: Students can use their creativity to test various designs that include additional weights, and their placement.

Wind Powered Maglev: The sail for the vehicle can be made from any recyclable material. A 20-inch fan will be used to power the vehicle at CPEP Day.

Rubber Band Propeller Powered Maglev: Students must use the propeller, propeller support, and rubber band supplied in the kit. Sails or wings are not permitted.

Electric Motor Powered Maglev: Students must use the motor and propeller supplied in the kit. Vehicles can be tested by using a 9-Volt battery to supply power to the 5' test track.

Judging and Scoring:

Each team will be allowed two trial runs for each category of Maglev vehicle. Electronic timers will be used to determine the fastest trial for each team.

Prototype Maglev: An award will be given for a Prototype Maglev project that uses the same specifications mentioned previously, but incorporates environmentally sensitive chassis materials as well.