



Aerospace Education

News



[Group 1, Illinois Wing, Civil Air Patrol, GLR-IL-](#)

September2008

Welcome

to the inaugural issue, of the quarterly, Group 1, Aerospace Education Newsletter.

What I hope to accomplish in this newsletter is increase the communication among all members, especially, Aerospace Education Officers and Aerospace Education members within Group 1.

Civil Air Patrol announces Aerospace Connections in Education national lift-off

The Civil Air Patrol will hold a national lift-off celebration for its Aerospace Connections in Education program on Oct. 7, from 9-10 a.m., EDT, at the outdoor sports field of the San Jose Catholic School in Jacksonville, Fla.

Planned festivities include the landing of a HSL-46 Squadron Navy Seahawk helicopter, which will be available for student tours; patriotic music; the launch of a variety of aerospace vehicles; demonstration of aeronautics by remote-controlled aircraft; a CAP fly-over; and a performance by a CAP color guard. The celebration is expected to draw 700 adults and students.

The Civil Air Patrol's Aerospace Connections in Education (ACE) program is an enrichment program designed to motivate K-6 students through aerospace awareness and careers. Educators are provided with national standards-based materials that can be adapted to fit a wide variety of curriculum. ACE includes three core components - character education, knowledge of aerospace and related career opportunities and physical fitness.

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The FORCE be with You Class outline

Forces of Flight Class outline

Group 1, Illinois Wing, Aerospace News is a quarterly publication and is produced by the Group 1, Illinois Wing, Aerospace Directorate with contributions from AEO's and AEM's with-in Group 1. This newsletter may be include in the Group 1 Newsletter.

If you have any Aerospace news, events or ideas, please submit them electronically to: Lt Col Paul Hertel cc@ilgpl.org

[September - October 2008, NHQ, Aerospace Education Newsletter](#)

The Civil Air Patrol is the official, uniformed, volunteer Auxiliary of the U.S. Air Force. Related site: www.cap.gov .



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The FORCE be with You

Demonstration with egg drop

CAP website under eservices, AE Resources, Lesson Plan archive, October 2005 9-12

- What forces and ideas have been demonstrated?
- Inertia
- Gravity
- Newton's laws
- ✦ First law – object at rest will remain at rest until acted upon an outside force
- ✦ Object will remain in motion, in a straight line at a steady speed until acted upon by an outside force – INERTIA

How else can we describe inertia? Answer - Force required to get something moving

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Cadet Greer assists SM Gillespie

Forces of Flight

Four Force of Flight

- Lift
- Described more in detail in this lesson
- Newton's Laws and Bernoulli's Principle
- Weight
- Gravity
- Thrust
- Engine
- Drag
- Surface of object

All forces in equilibrium in unaccelerated flight

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Cadet Sanders tries to move FO Pratt



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The FORCE be with You *Continued from Page 1*

Example

- Small vs. Large volunteer
- Who needs more inertia?
- Why?
- Person to push both volunteers to demonstrate
- Can we change an object's inertia?
- How?
- ✦ Decrease friction e.g. a wagon, skateboard, placing the volunteer on wheels/ice etc
- ✦ Now demonstrate
- ✦ What happened and why
- ✦ What did we change

Friction

Friction

- Is there friction when you pull a sled?
 - Push a car?
 - Which one has more?
 - Does friction change when something is standing still or moving
 - Static vs. Kinetic Friction
 - Application – keep a car moving once you have it rolling
- Joke about how a pilot knows he's landed gear up – Takes more power to taxi



Momentum

- Large and small volunteer
- Who has more momentum
- Trick question – Both the same
- How possible
- Momentum is mass (who has more mass?) times velocity
- What is their velocity – zero

Define velocity - Speed with a vector (direction)

Experiment "Topple the Commander" – Experiment on momentum

Large and Small volunteer run into Commander

Required formulas

$R=D/T$ Rate equals distance divided by time

$P=M \times V$ Momentum equals Mass times velocity

Large volunteer would seem to have more momentum, but velocity becomes the key factor

First have large volunteer walk slowly over a given distance to get rate (velocity)

Get weight (mass) of volunteer

Compute momentum – Mass times velocity

Second, have the small volunteer run/jog depending on size of individual (for safety) and compute the same way. Does the smaller volunteer have more momentum? Demonstrate

Exercise can be repeated with several size people and/or speeds



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Forces of Flight *Continued from Page 1*

Newton's Laws

- First Law. A body at rest tends to remain at rest, and a body in motion tends to remain moving at the same speed and in the same direction. E.g. A plane at rest on the ramp will remain at rest unless a force is applied which is strong enough to overcome its inertia
- Second Law. When a body is acted upon by a constant force, its resulting acceleration is inversely proportional to the mass of the body and is directly proportional to the applied force. $Force=ma$
- Third Law. For every action there is an equal and opposite reaction. This principle applies whenever two things act upon each other. E.g. Gun, air and wing on plane

Demonstration on each point – may review earlier example from The Force be with You Lesson

Bernoulli's Principle

Swiss mathematician, expanded on Newton's ideas and further explored the motion of fluids – 1783 publication Hydrodynamics

Demonstrations

- Blowing over a piece of paper
- Moving air (cupped hand) quickly by a standing piece of paper. Does it fall toward or away from you?

Explanations

Principle – “As the velocity of a fluid (air) increases, its internal pressure decreases” – Derived from Newton's Second Law. (Requirement of an unbalanced force < in this case pressure > to produce an acceleration <velocity change>)

Applications – Airfoil

- Draw airfoil
- Bernoulli applies to faster air on top creating lower pressure thus creating lift (First of the forces of flight).
- Downward-backward flow results in upward force – Newton's Third Law
- Importance of smooth airfoil
- ✦ Review effects of frost, ice
- ✦ Review stall
- ✦ High Pressure always moves to low pressure
- Airfoil
- Weather patterns

Illustration of mountain and depression

Demonstration

- Beach ball on fan
 - Tilt the fan – does the ball fall? Depending on power of fan and degree of tilt
 - Ball wants to remain in center and will resist moving out because of a pressure differential that is created
- Try to pull the ball out. Does it resist?



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The National Conference on Aviation and Space Education (NCASE) is the premier aerospace education conference of its kind in the nation. It is also one of Civil Air Patrol's major contributions to America's aerospace education classrooms. Presented annually since 1968, NCASE brings together educators from around the nation to learn from a variety of gifted speakers and motivational teachers.

Aerospace-oriented hands-on activities for all grade levels are offered in a variety of break-out sessions. Educators share new experiences and discover learning tools that will capture the imagination of their students. Teachers learn how the wonders of aviation and space make ordinary subjects come alive in an extraordinary way. NCASE is also a venue for Civil Air Patrol members to network with others, expand knowledge and share techniques to use in classrooms/squadrons across the country. NCASE provides resources and addresses the needs of the home schooling community as well.

Several awards are presented during the conference including A. Scott Crossfield Aerospace Education Teacher of the Year Award, the National Aeronautic Association's Frank G. Brewer Trophy, National Coalition for Aviation Education Leadership Award, and the National Conference Crown Circle for Aerospace Education Leadership.

Check the [NCASE website](#) for updates





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Welcome and An Appeal For Help Continued from page 1

In order to make this work, I'll need input from each AEO and AEM. I or the Group 1 AEO can't do this newsletter by ourselves. What are we looking for? A write up about each squadrons Aerospace activities from each units AEO. This newsletter is intended to get each others units involved in each others activities. What are you planning in the future? Class room topics. What did you just cover and what's next and when. AE current events discussion topics. How about an Aerospace question of the quarter? What are some historical events that took place during the next quarter, 10 years ago?, 25?, 50?, Or 100? If a unit or AEM had success in getting an AE grant, let us know in this newsletter. If any big aerospace event occurs in your unit like recruiting an AEM, giving an AE presentation to an outside group, scouts or school.

With enough input this newsletter could be monthly. I ask that you please use the Arial #11 Font. Please edit your input as much as possible. The less we have to do, the easier it will be to get this newsletter out on time. I'd like the next one out right after Christmas, unless it goes monthly. The it should go out by the 28th of each month. With each AEO's help this could be a monthly letter.

Lt Col Paul Hertel

Aerospace Connections in Education Continued from page 1

"The Aerospace Connections in Education program is designed to spark the limitless imaginations of younger students, promoting a lifelong love of learning while introducing students to aerospace-related careers," said CAP National Commander Maj. Gen. Amy S. Courter. "Through ACE, we hope to inspire the next generation of great scientists, engineers and aerospace pioneers. We also want to promote positive character traits that will help them be better students, friends and citizens."

Nationwide, approximately 350 teachers – all CAP Aerospace Education members – and 7,500 students, are participating in the program at 29 sites, including public, private, parochial, home, and Department of Defense schools in Alabama, Florida, Georgia, Michigan, Nevada, Pennsylvania, Puerto Rico, South Carolina, Virginia and Washington.

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