Civil Air Patrol

Aerospace Education and STEM

www.gocivilairpatrol.com

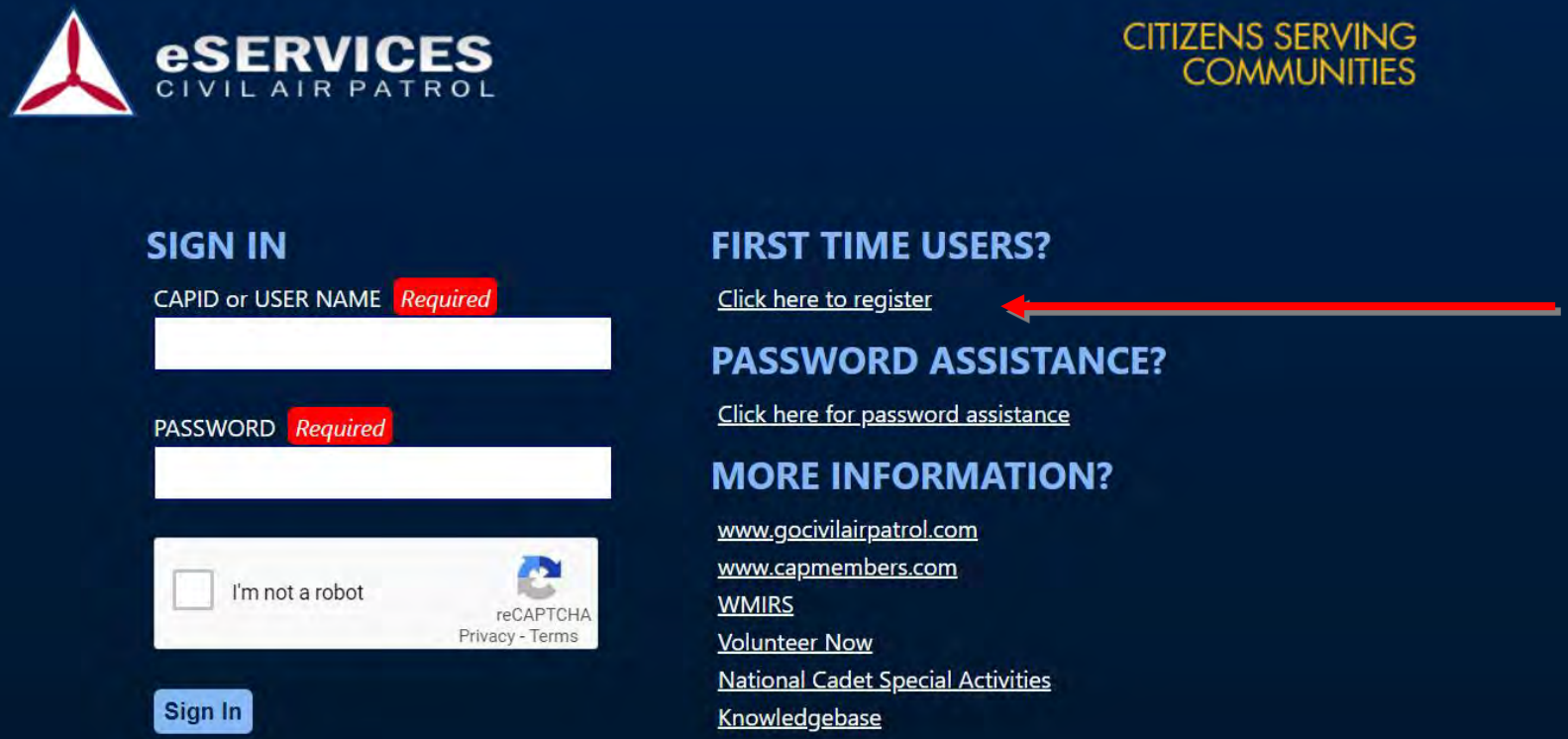



Lynda MacPherson

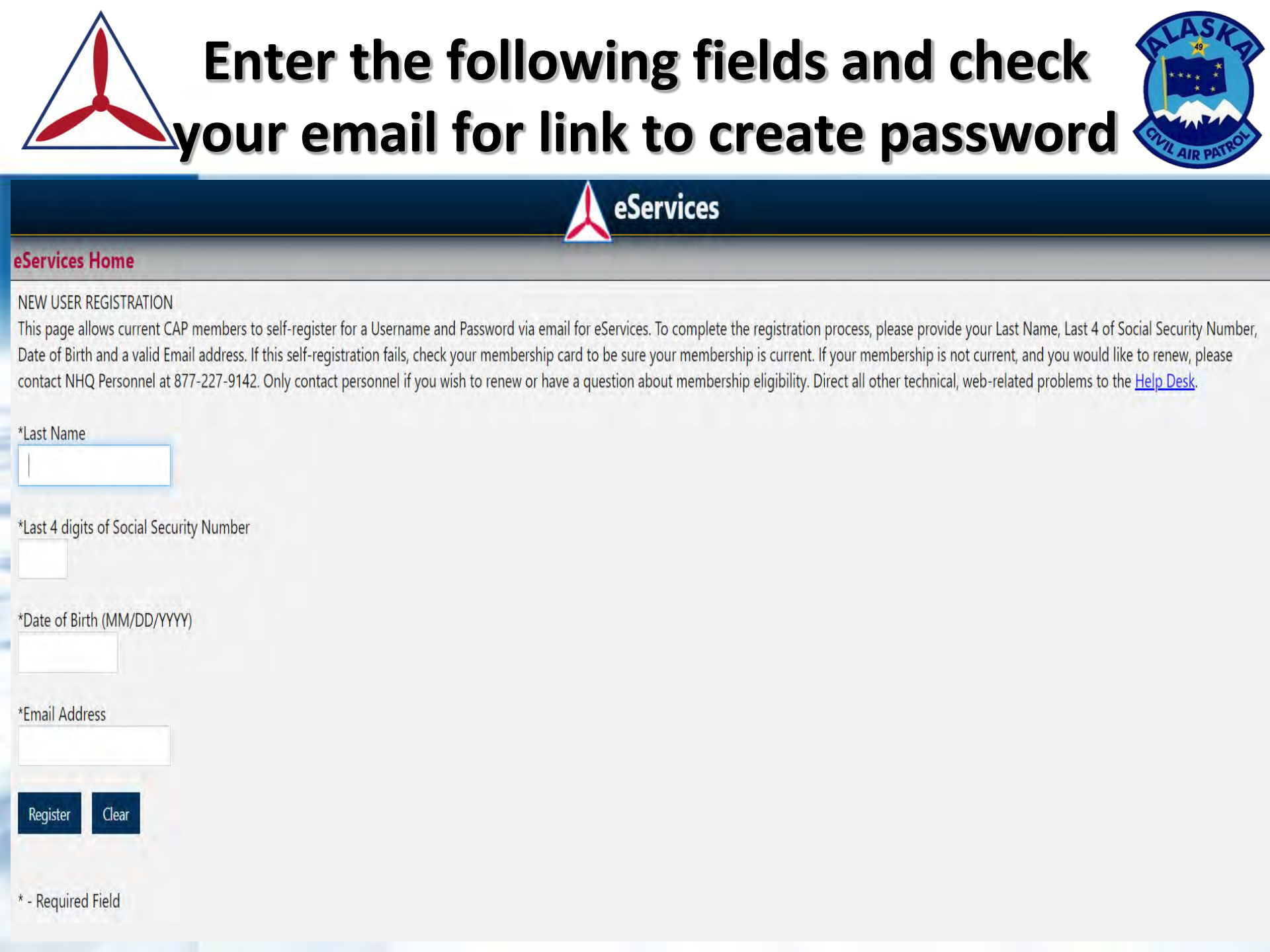
Alaska Wing Director of Aerospace Education

Getting Started

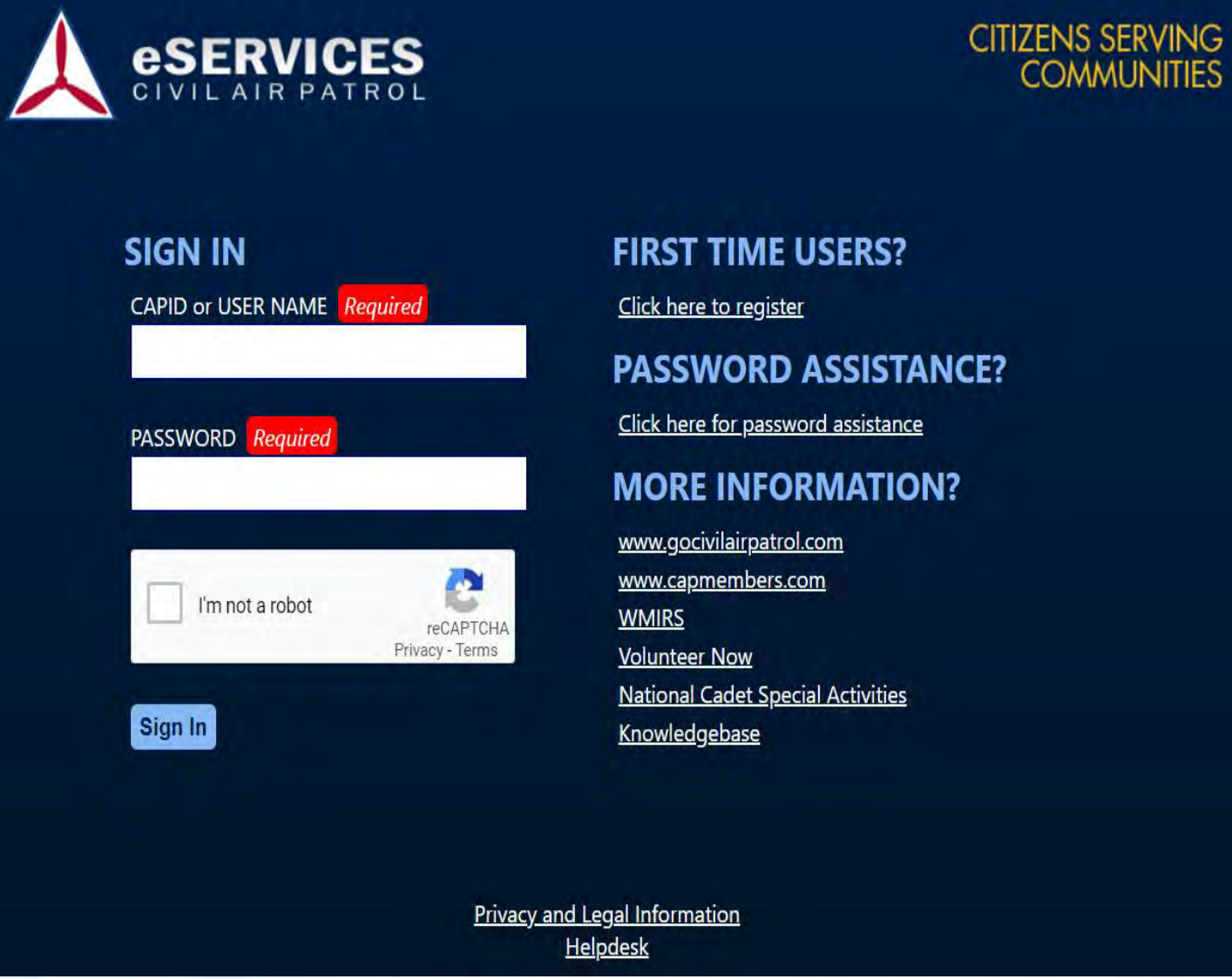
- Go to: www.capnhq.gov
- Click on *First Time User*



Enter the following fields and check your email for link to create password



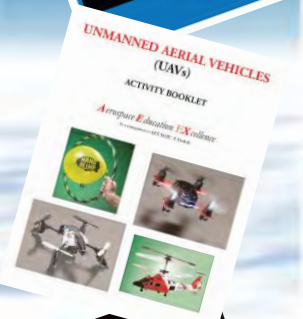
With your new password you just created log into eServices

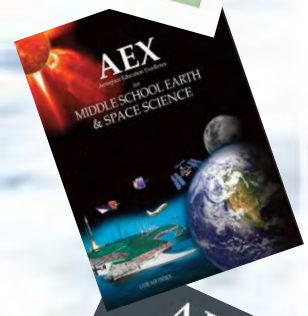


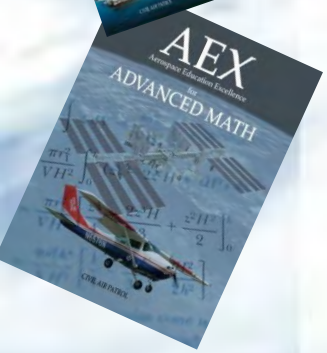
Next we will learn how to:

- Order and download curriculum
- How to order STEM kits
- How to complete STEM kit evaluation
- How to enroll class in ACE program
  - Aerospace Connections in Education K-6 grades
- How to enroll class in AEX program
  - Aerospace Education Excellence K-12 grades
- How to schedule TOP flight
  - Teacher Orientation Program

Aerospace Curriculum
Grades PK-12



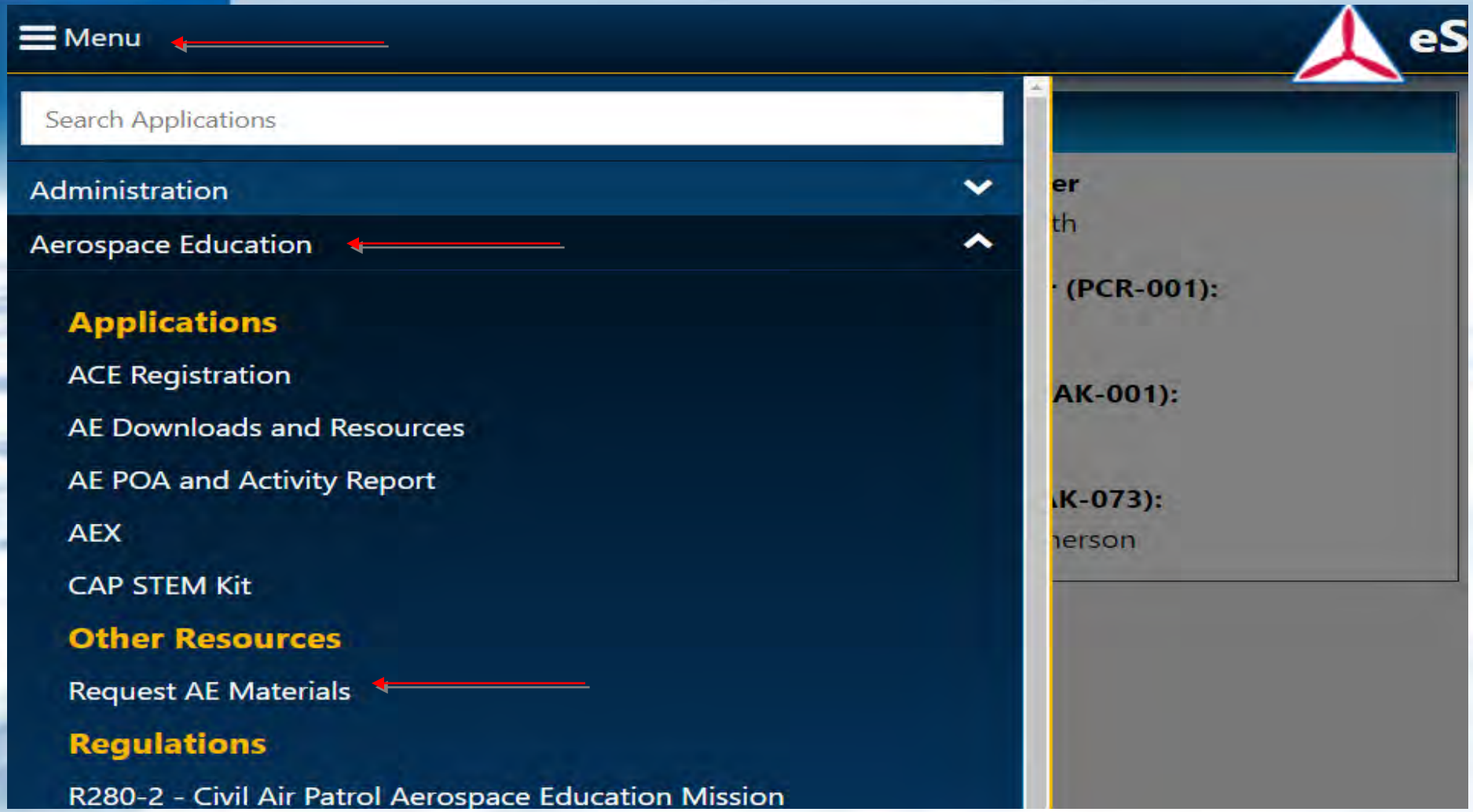




- ★ Astronomy
- ★ Model Rocketry
- ★ Unmanned Aerial Vehicles
- ★ Advanced Math
- ★ Journey of Flight
- ★ Women in Aviation
- ★ Robotics
- ★ Cybersecurity
- ★ Middle School Physical/Life Science
- ★ STK Toolkit Satellites
- ★ Aerospace Careers
- ★ Wright Brothers
- ★ Charles Lindbergh
- ★ Amelia Earhart
- ★ Uncle Wiggly Wings
- ★ Air/Space Vehicles
- ★ Logic and Puzzles
- ★ Aerospace for the Very Young
- ★ Aerospace Excellence
- ★ Fun in Flight
- ★ CAP-TERS
- ★ International Space Station
- ★ MARC – Model/Remote Aircraft
- ★ Aerospace Dimensions

How do I order books/curriculum?

Start on Menu and Click Aerospace Education then Request AE Materials



Select which curriculum you want
Limit 6 hard copies

Overview
Instructions

Materials

Order Request
Order Status

*Denotes Required Fields

***Material Category**
AE Materials

Requester: 1st Lt Lynda S. MacPherson
Receiver: Lynda MacPherson
Address 1:
Address 2:
City:
State: AK Zip: 9962393

***Reason for request** max. 0/250 characters

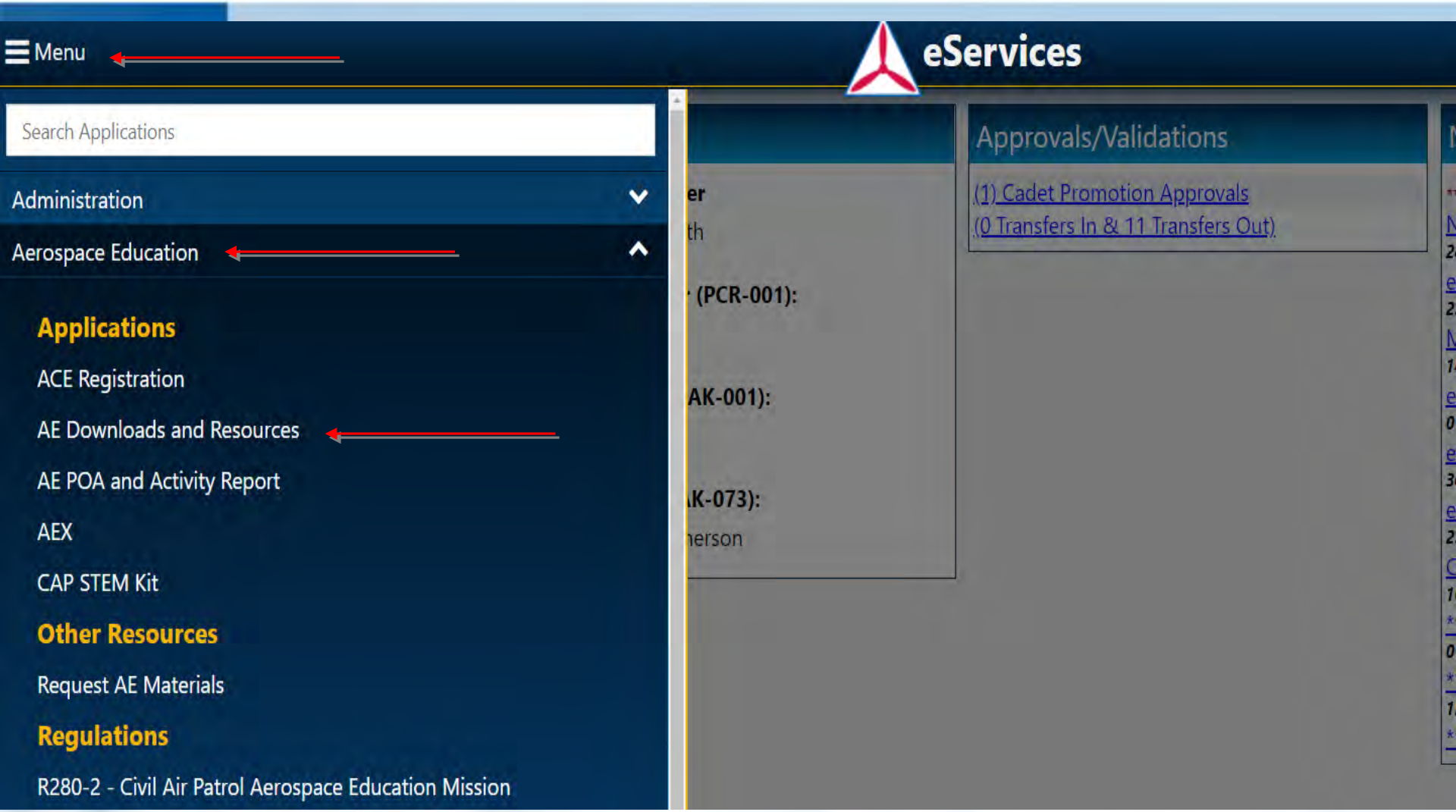
Need By Date

IMPORTANT: At least two weeks advance are needed for AE order request!

Material Name	Material Group	Max Quantity	*Quantity
AEX MARC (Model Aircraft and Remote Control)	Grades 6-12 and Adults	1	
AEX MARC II	Grades 6-12 and Adults	--	
Advanced Math	Grades 10-College	--	
Advanced Rocketry	Grades 6-12	--	
Aerospace for the Very Young (ages 4-8)	Grades K-3	1	
Amelia Earhart Activity Booklet	Grades K-3	1	
Amelia Earhart Learning Booklet	Grades 4-9	1	
Astronomy Activity Book	Grades 5-12 and Adults	--	
Astronomy Module	Grades 5-12 and Adults	--	
CAP Paper Airplanes (1 package = 25 paper airplanes)	ALL	1	
Charles Lindbergh Activity Booklet	Grades K-6	1	
Charles Lindbergh Learning Booklet	Grades 6-9	1	
Earth and Space Science	Grades 6-9	--	
Fun in Flight: Exploring Careers in the Aerospace World Booklet	Grades K-3	1	
Historical Aircraft Drawing Lessons from Aerospace History (dot-to-dot drawing book)	Grades K-6	1	
Introduction to Robotics	Grades 6-9	1	
Life Science	Grades 6-9	--	
Model Rocketry	Grades 6-9	1	
Physical Science	Grades 6-9	1	
The Aerospace Curriculum (an index of related topics)	Grades K-12	1	

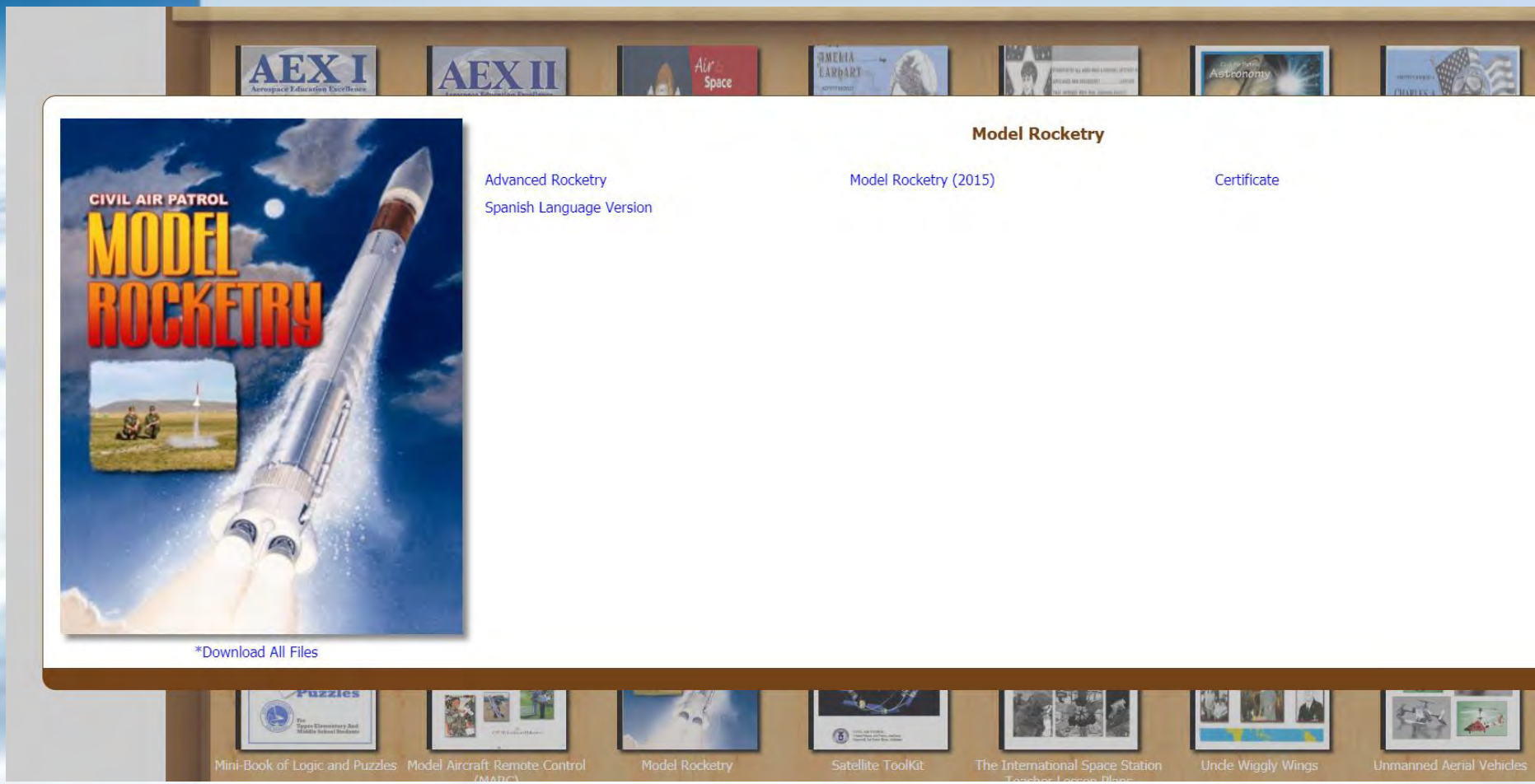
How do I download books/curriculum?

To Download Unlimited Curriculum Main Menu Select Aerospace Education the AE Downloads and Resources



Select any book to download
Many have different versions to choose from

Click the book you are interested in and this will pop up all books available in that series



EXAMPLES
AEX I Vol I

Activity Seven: Robotic Arm

Objective:
Children will build a robotic arm and learn about how robots can assist people.

National Science Standards
Content Standard E: Science and Technology
- Abilities of technological design
- Understandings about science and technology

Background Information:
Robots are excellent helpers. They never get bored, tired, care about getting dirty nor are concerned about getting hurt on the job. Robots help in manufacturing, research, medical treatment, entertainment and space. NASA uses robots to explore Earth and the other planets and to move payloads around on the Space Shuttle. They also help out on the International Space Station.

One of the important objectives in the development of robots is to enable robots to interact with their environment. Interaction is often accomplished with some sort of arm and gripping device or end effector.

Materials:
- Wooden craft sticks
- Drill
- Small brass paper fasteners
- Light materials to pick up

Procedure:
1. The teacher should drill holes through the craft sticks as shown in the diagram. Each child will need four drilled sticks, four brass paper fasteners, and one craft stick broken in half (for the end effector). Dampening the sticks before drilling can reduce cracking the wood.

2. Have children assemble the robotic arm as shown in the diagram.

3. Children can break one of the sticks in half and glue each half to the end of the arm (pointing in) making an end effector or you can let them experiment with other ways to create an end effector to pick up a Styrofoam™ cup or other light materials.

AEX II Vol II pg.52

CD HOVERCRAFT

OBJECTIVE

The purpose of this activity is to build a simple hovercraft from inexpensive, everyday supplies.

NATIONAL SCIENCE STANDARDS (NRC)

Content Standard B: Physical Science
Motions and forces
Content Standard E: Science and Technology
Abilities of technological design
Unifying Concepts and Processes
Evidence, models, and explanation

BACKGROUND

A hovercraft is also known as an ACV or "air cushion vehicle." It travels on a layer of compressed air that keeps just above the surface of the Earth. The compressed air serves as an invisible cushion that eliminates almost all of the friction between the vehicle and the ground. Numerous hovercraft are used around the world for civilian and military purposes.

MATERIALS

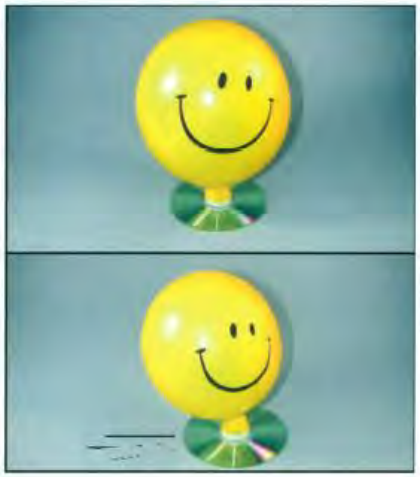
1. A toy balloon
2. A pop-up lid from a water bottle
3. A hot glue gun
4. A used CD

PROCEDURE

1. The pop-up lid is hot-glued to the water-bottle cap. Be sure that your glue is applied only to the perimeter of the lid and that you make a good air-tight seal to the CD.
2. Make sure the lid is in the closed position.
3. Inflate the balloon, twist it so that the air doesn't come out.
4. Install the balloon onto the bottle lid.
5. Try sliding the balloon along and you will notice a resistance to movement.
6. Now carefully release the lid sealer and let the air flow through the CD. You will notice the little hovercraft starts to move.
7. Blow the balloon up again and when the pressure is released, flick it with your finger and you will be amazed to see it glide away.
8. Variations on this project include a larger balloon and various surfaces. Fun Stuff!

CREDIT - This wonderful activity was taken from the "Energy and Control - Energy From Wind and Water" by the Quinte School Group, WOW Science Initiative- May 2001.

Related web sites:
http://www.jameshovercraft.co.uk/Frames/index.htm
http://www.hoverclubofamerica.org/



AEX II Vol II pg. 30

activity six

BUILDING THE NASA WIND TUNNEL

OBJECTIVE

A wind tunnel is a great test device and the purpose of this activity is to build an inexpensive model that can be constructed as a classroom or squadron project.

A Great Scientific Tool - For A Cost of About 50 Cents

Table 1. Drag Force Value

	FAN SPEEDS								
	Low Speed			Medium Speed			High Speed		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
Tetrahedron									
Pyramid									
Cube									
Cone									

Observations:_____

_____

_____

_____

_____

Table 2. Drag Force Value Calculations

	FAN SPEEDS								
	Low Speed			Medium Speed			High Speed		
	Mean	Median	Mode	Mean	Median	Mode	Mean	Median	Mode
Tetrahedron									
Pyramid									
Cube									
Cone									

How do I order a STEM kit?

Currently Raspberry Pi and RC airplane are not available

Civil Air Patrol/Aerospace Education Member's

STEM Kit Program

AVIATION	SPACE	CYBER
AngLegs	Astronomy	Bee-Bot/ Code & Go Mouse
Build & Learn Geometry	Hydraulic Engineering	Kano
Cross Country Navigation	Renewable Energy	Raspberry Pi
Flight Simulator	Robotics	Sphero Mini/ Sphero SPRK+
Quadcopter	Rocketry	Virtual Reality Goggles
Ready To Fly Quads	Weather Station	
Remote-Controlled Aircraft		
Snaptricity		

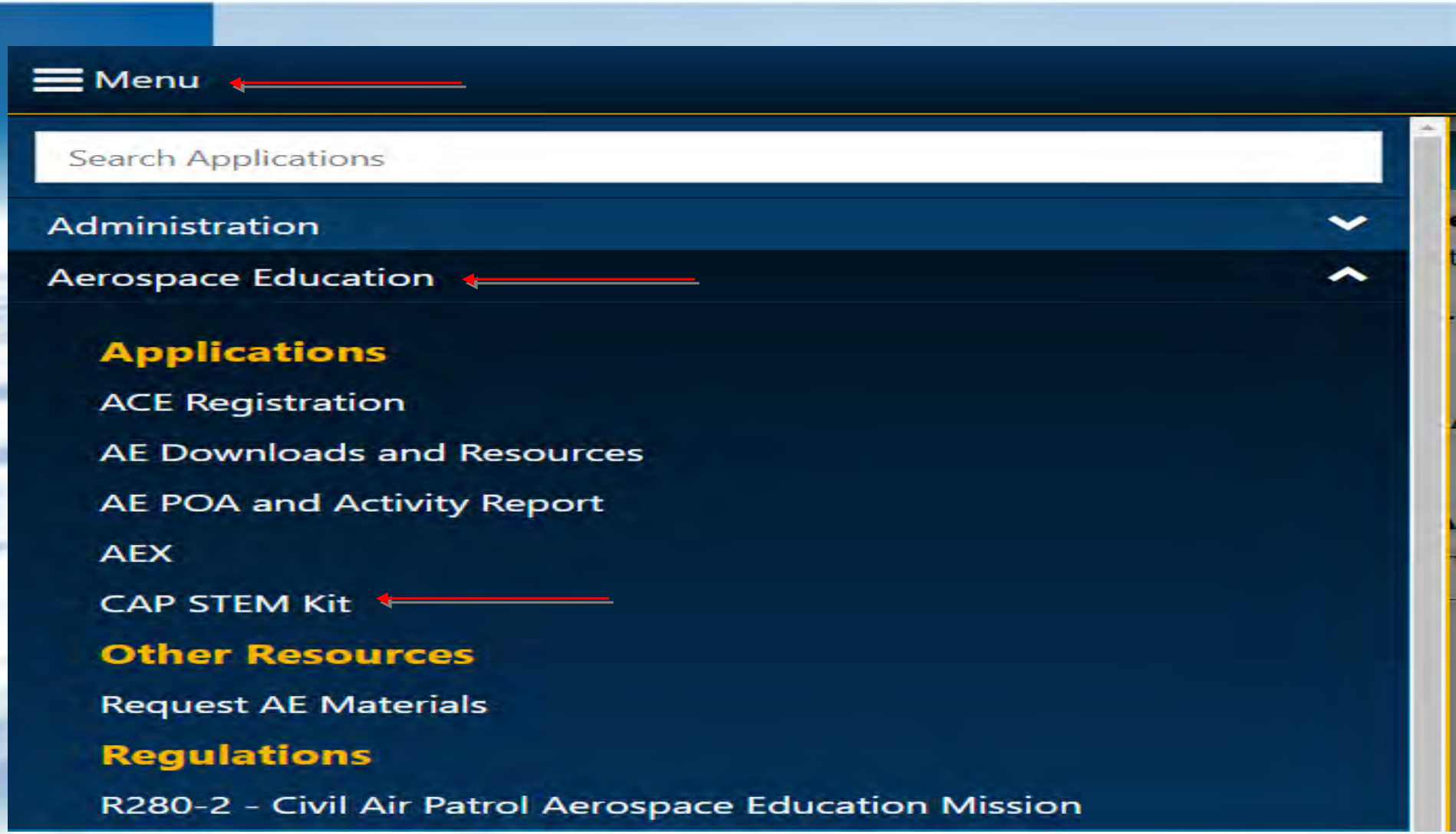
gocivilairpatrol.com/stem-ed

STEM Kit Timeline

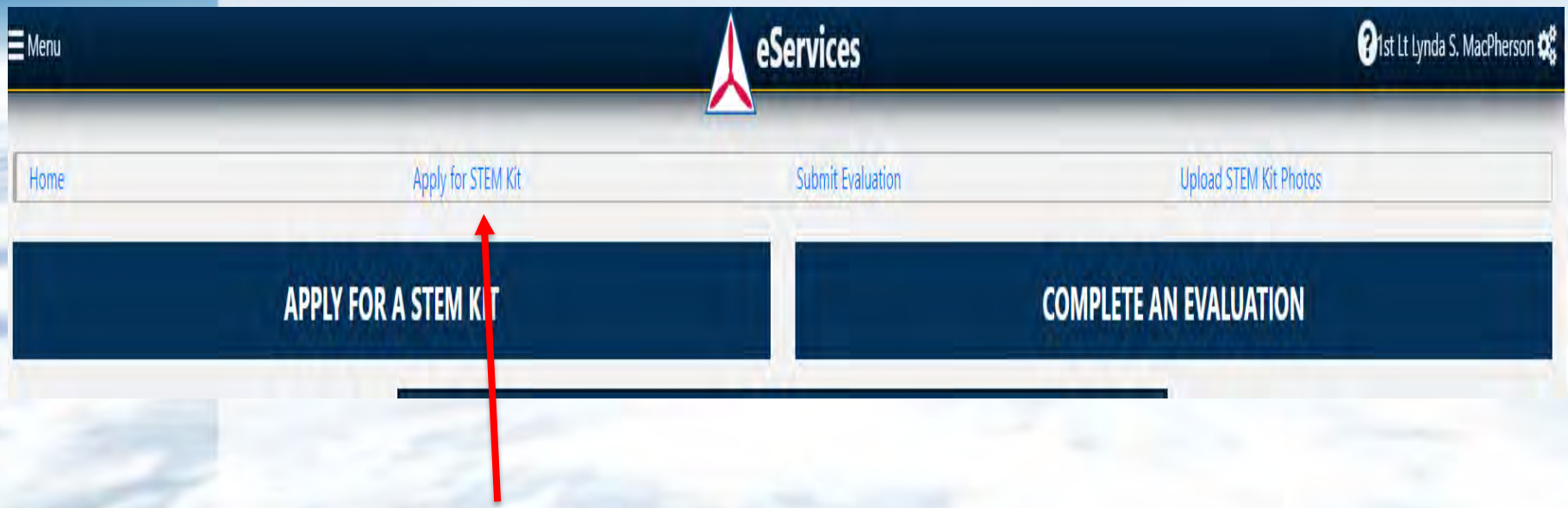
- Complete CAP STEM Kit application through eServices
  - National Headquarters determines the number of Free STEM kits being sent based on (number of students & value of STEM kit)
- Applications are reviewed on 1st of each month therefore, always place your order BEFORE the end of the month
- You typically will receive your STEM kit before the end of the month
- Complete the 10 question online evaluation in eServices
- Submit your next application for a different STEM kit

*Remember you can use STEM kits to teach other subjects or share them with other teachers

Main Menu select Aerospace Education then CAP STEM kit



Click Apply for STEM kit at top of the page



Complete all boxes on the application

STEM Kit Application

Step: 1 of 2

Applicant Info

Rank: 1st Lt
First Name: Lynda
Last Name: MacPherson
CAPID: 605271
Email Address: lynda.macpherson@akwg.cap.gov
Phone Number: (907) 240-7888
Select Category: --Select One--

School or Organization Info

Complete Name of School or Organization
Mailing Address
City
State: --Select--
Zip

Commander's, School Principal's, or Supervisor's Info

Name: Col Kevin A. McClure
Phone Number: (907) 248-3918
Email Address: 105982@akwg.cap.gov

STEM Kit History

Is this your first STEM kit?

YES NO

Select ONE STEM Kit from the following 3 Core Areas:

Aviation
- AngLegs
- Build & Learn Geometry
- Cross Country Navigation
- Flight Simulator
- Quadcopter
- Ready To Fly Quads
- Remote-Controlled Aircraft
- Snaptricity

Cyber
- Bee-Bot/Code & Go Mouse
- Kano
- Raspberry Pi
- Sphero Mini/Sphero SPRK+

Space
- Astronomy
- Hydraulic Engineering
- Renewable Energy
- Robotics
- Rocketry
- Weather Station

Number of Participants: Number Only

Age(s) Involved
- 0-5
- 6-11
- 12-18
- 18-21
- 21 and above

How many computers will be dedicated to this project?: Number Only

STEM Kit Project Description (Plan)
max. 0/1000 characters

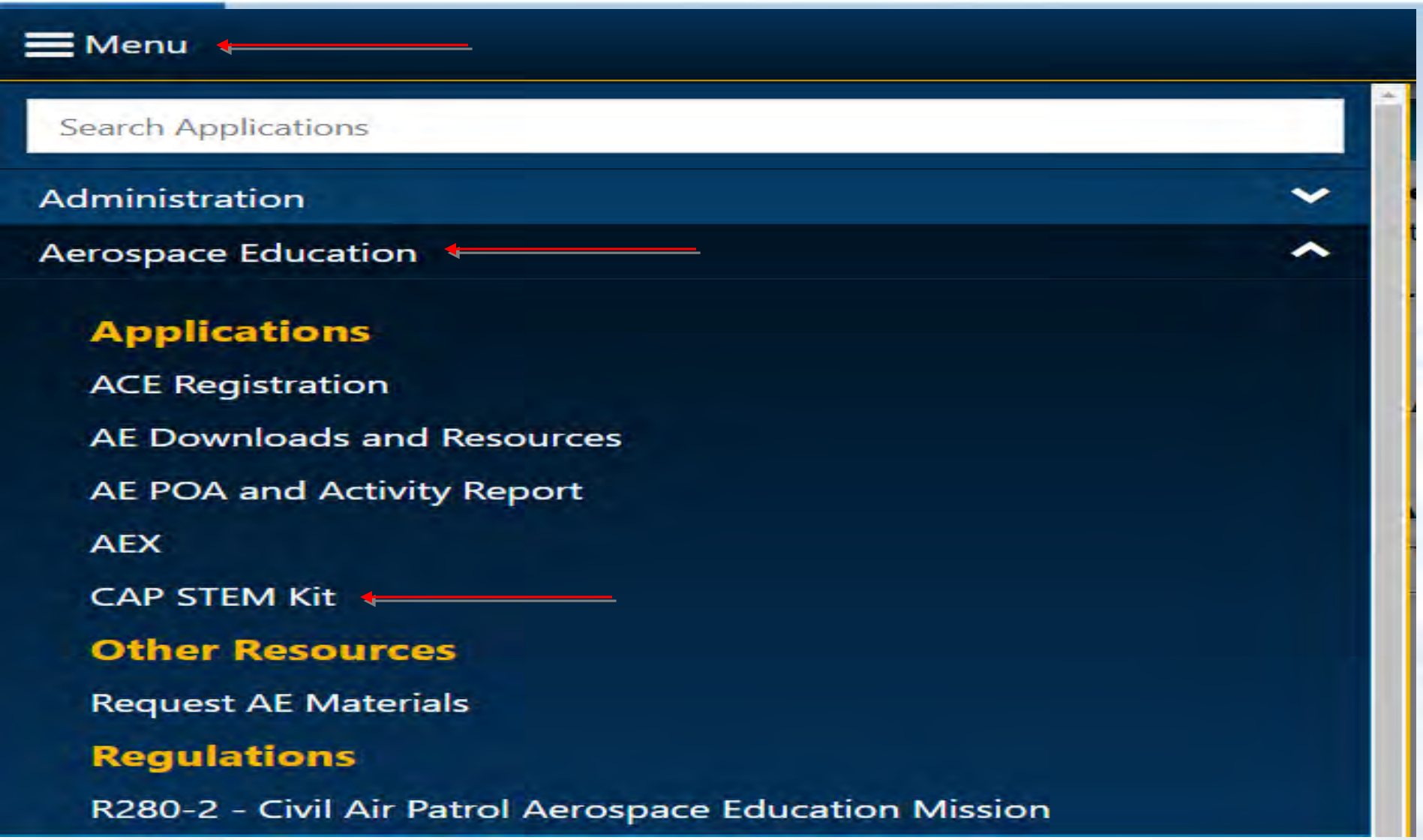
Desired STEM Kit Project Outcome
max. 0/1000 characters

Collaborative effort is encouraged. Name the groups, classes, or units participating with this kit.
max. 0/1000 characters

FINISH

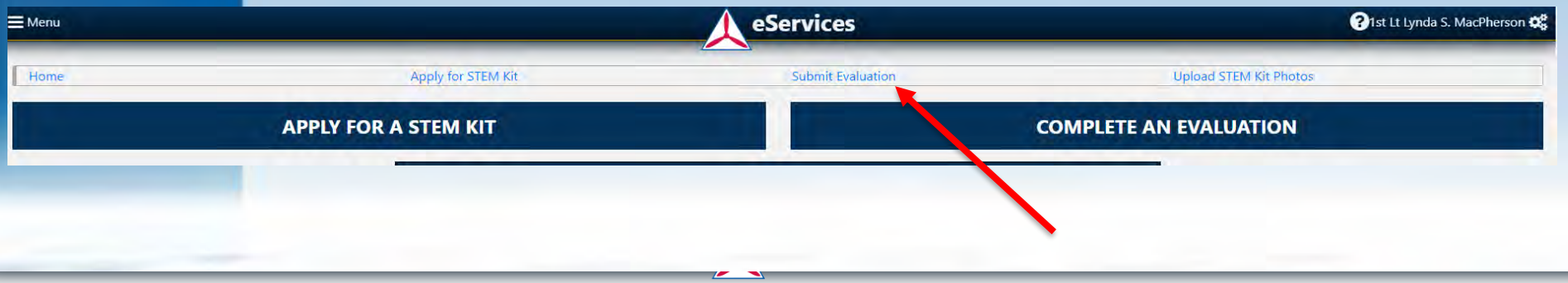
How do I submit my STEM kit evaluation?

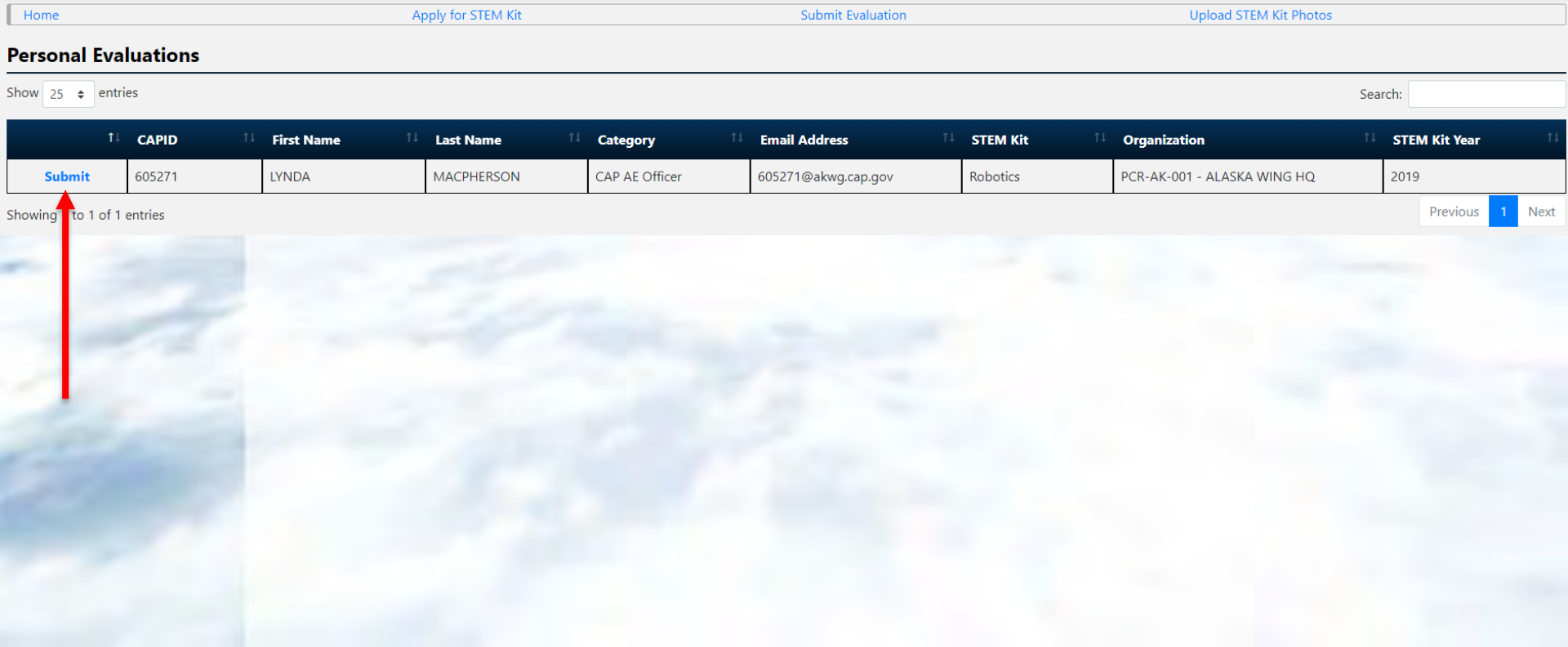
Main Menu select Aerospace Education then CAP STEM kit



Click Evaluation

*Your kit is already listed so just click Submit Evaluation to proceed





Complete the 10 question evaluation and submit.
You are ready to order your next STEM kit

Step: 1 of 3

Evaluation for PCR-AK-001 - ALASKA WING HQ (2019)

Rank	First Name	Last Name	CAPID
1st Lt	Lynda	MacPherson	605271

Email Address	Phone Number	Category
lynda.macpherson@akwg.cap.gov	(907) 240-7888	CAP AE Officer

STEM Kit	Year	Month Kit Received
Robotics	2019	--Select--

Step: 2 of 3

Provide a thorough response to each area below to describe kit implementation and benefits to promote STEM education and careers to students and any other collaborative group(s).

*1. Explain when, where, and how many hours the STEM Kit was used

max. 0/500 characters

*2. Give details of which youth actually used the STEM Kit (if a collaborative effort, include all groups)

max. 0/500 characters

*3. Explain exactly how the kit was used (as unit or class AE activity; as part of CAP's AEX program; as community outreach event, etc.)

*4. Describe the benefit(s) of the kit to the youth with whom you worked (specific examples,general observations, or both)

max. 0/500 characters

*5. Provide any unique experiences or observations that evolved from the kit usage.

max. 0/500 characters

*6. Provide one or more quotes from you and/or any youth or adult involved in the program to describe the STEM Kit experience. Please note to whom the quote is attributed.

max. 0/500 characters

*7. On a scale of 1-5, with 1 being the lowest & 5 being the highest, please rate the following:

a. Quality of the kit components & materials sent by the vendor(s)

b. Quality of additional educational materials provided by CAP

c. Alignment with CAP's AE program

d. Adequate # of lessons/activities to extend beyond 1-2 instructional sessions

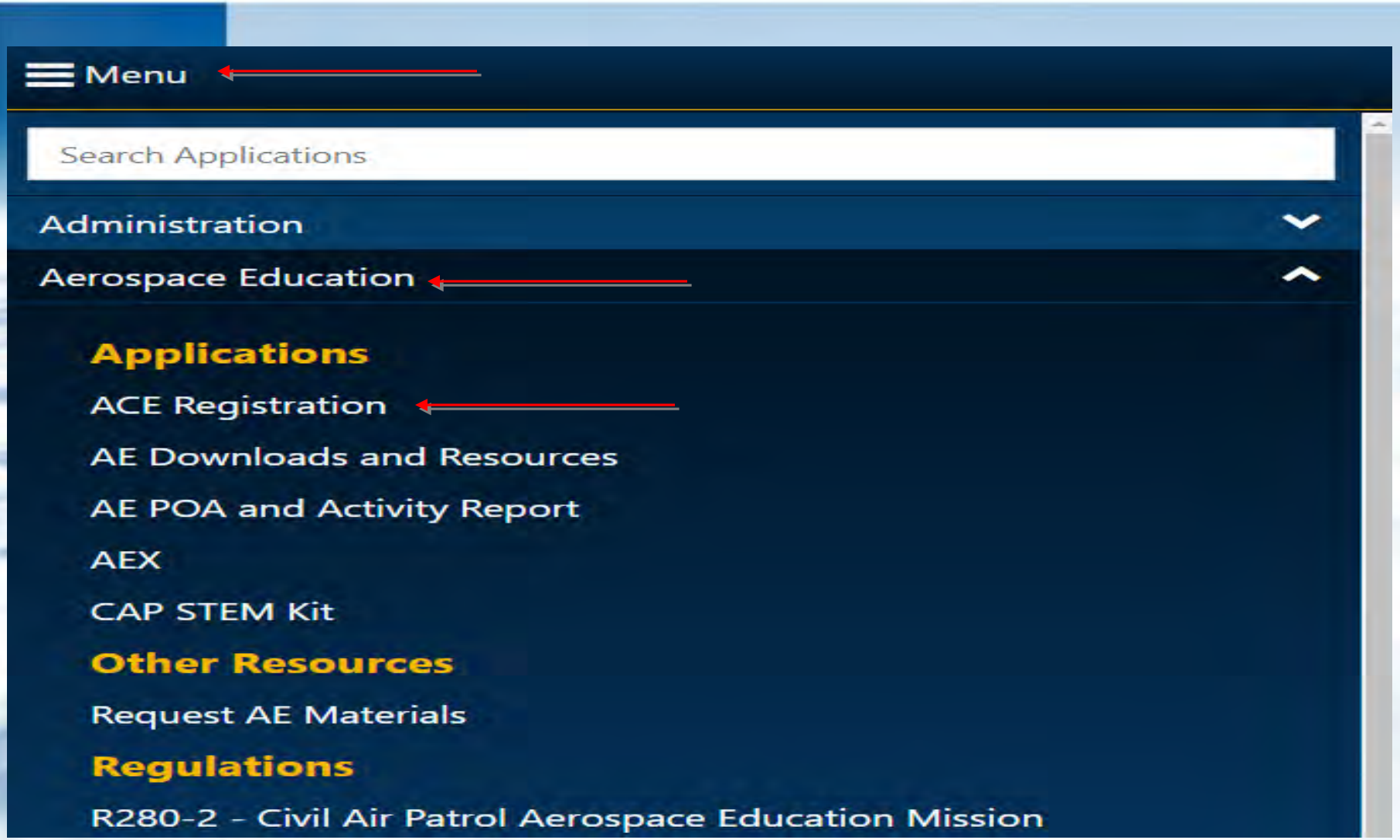
e. Opportunity to discuss STEM careers related to this particular kit subject area

Aerospace Connections in Education
ACE Program K-6

- Introduction to CAP/aviation
- In/after school program
- 30-45 minutes
- Registration opens August 1st!
- Open to any school
- 21 aerospace-themed lessons
  - 9 academic lessons
  - 6 character lessons
  - 6 physical fitness lessons
- 1 set manipulatives for every student
- ACE student & teacher certificates upon completion

ACE looks awesome! How do I enroll my class?

Click Menu then Aerospace Education then ACE Registration



Click on Registration and complete the form
Registration opens August 1

ACE Registration Main

eServices | Sign Out |

About ACE Registration

Overview

Modules

Registration Completion Form

Documentation

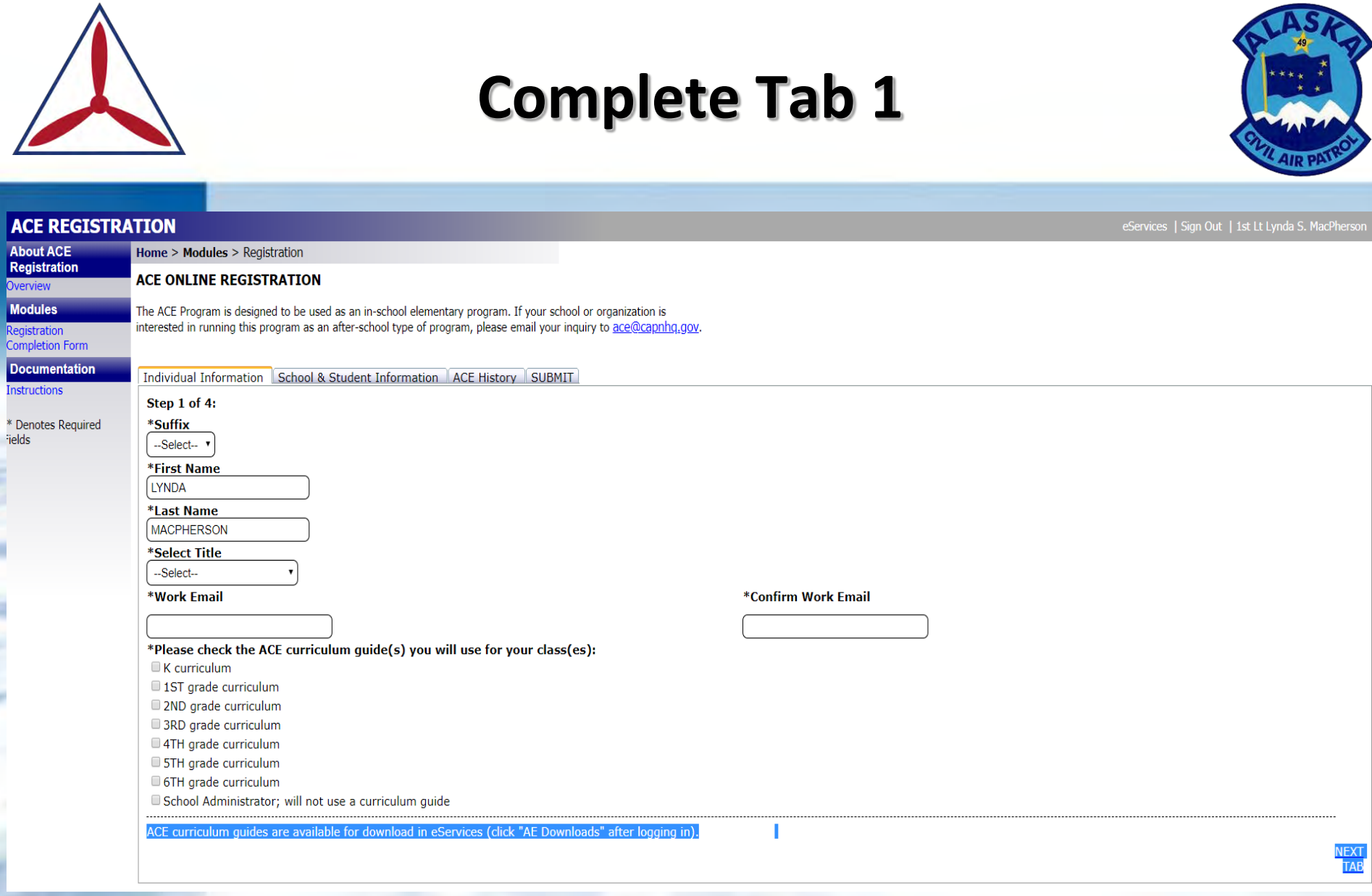
Instructions

* Denotes Required ields

Home

Welcome to ACE Registration Main Menu

Complete Tab 1



Complete Tab 2

ACE REGISTRATION

eServices | Sign Out | 1st Lt Lynda S. MacPherson

About ACE Registration
Overview

Modules
Registration
Completion Form

Documentation
Instructions

* Denotes Required Fields

Home > Modules > Registration

ACE ONLINE REGISTRATION

The ACE Program is designed to be used as an in-school elementary program. If your school or organization is interested in running this program as an after-school type of program, please email your inquiry to ace@capnhq.gov.

Individual Information | School & Student Information | ACE History | SUBMIT

Step 2 of 4:

Select State

--Select--

Select School

Select a state above, and then click your school's name under "Select School."
If your school's name does not appear in the drop down box, please select SCHOOL NOT LISTED and enter it below.

***School Name**

***Select School Type**

--Select--

School Mailing Address

***Address**

Address 2

***City**

***State**

--Select--

***Zip**

***School Phone Number**

***Last Student Month of School**

--Select--

***Last Student Day of School**

--Select--

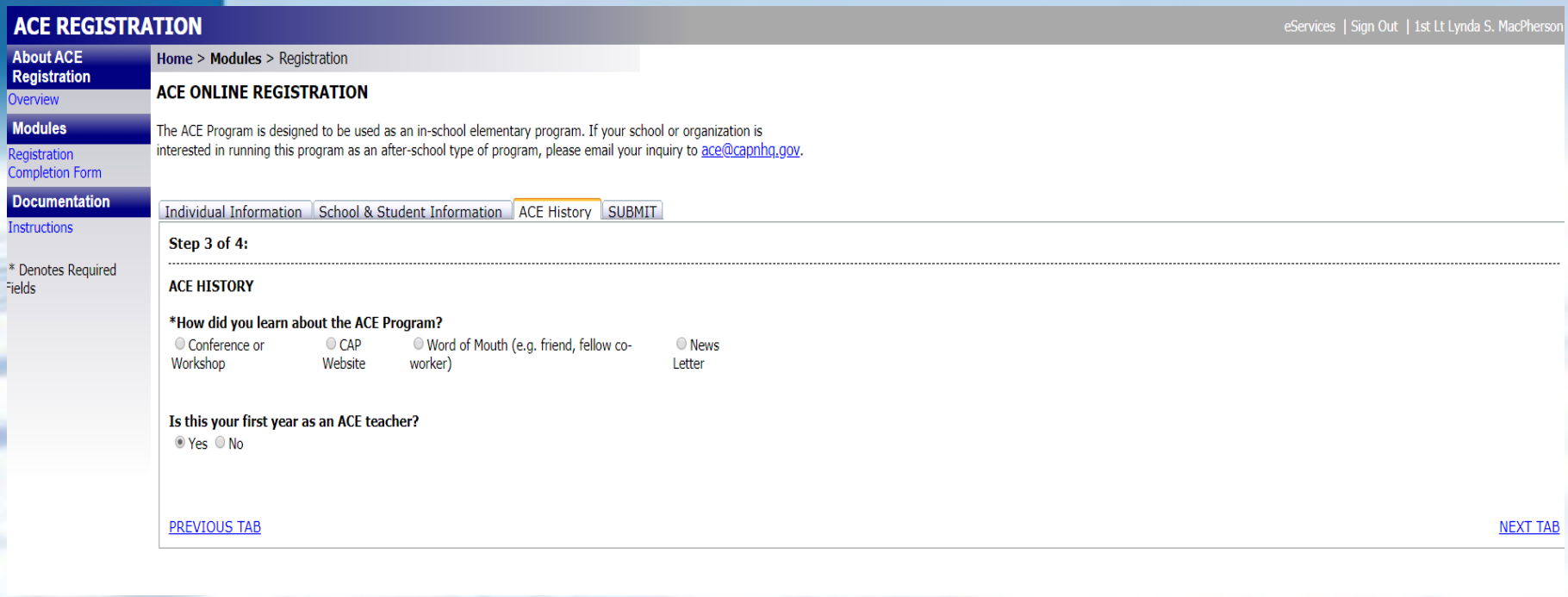
CAREFULLY read each of the school code descriptions below and check which school code correctly describes your school regarding the ACE Program.

- SCHOOL CODE A (All K-6 classes at my school are participating in the program.)
- SCHOOL CODE I (Not all of the K-6 classes are participating at my school.)
- SCHOOL CODE S (Specialist at my school participating in the program.)
- SCHOOL CODE H (My school is actually a home school.)

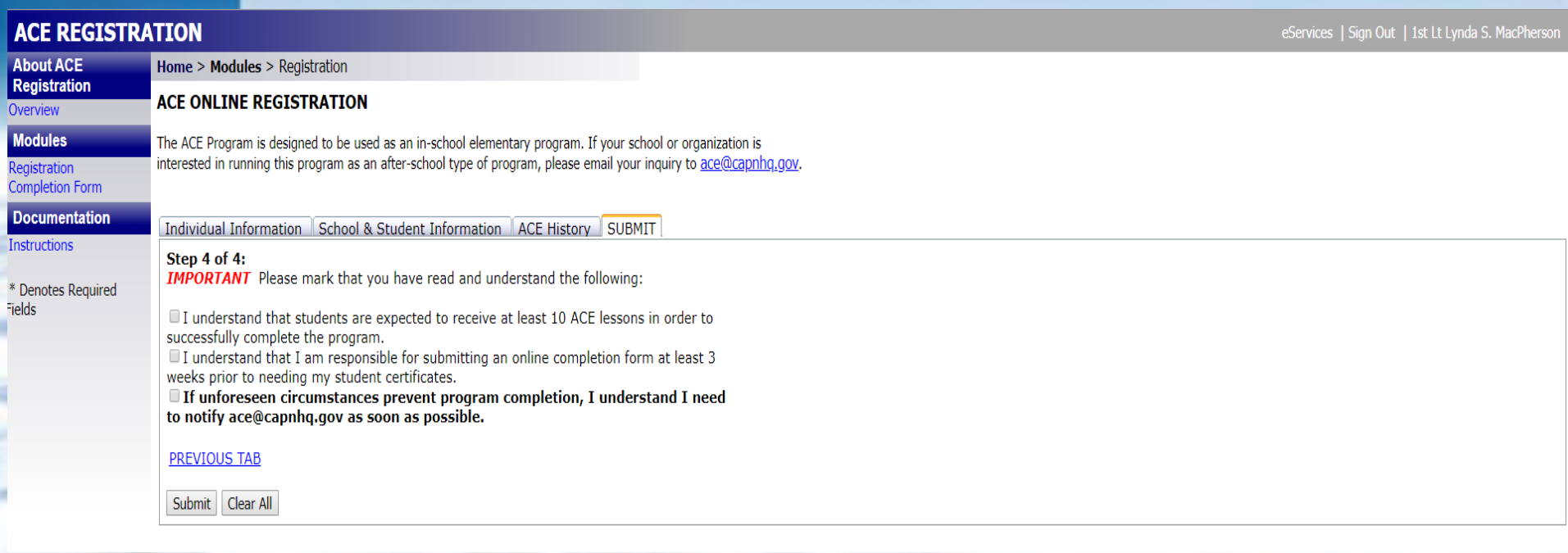
PREVIOUS TAB

NEXT TAB

Complete Tab 3



Complete Tab 4 and Submit

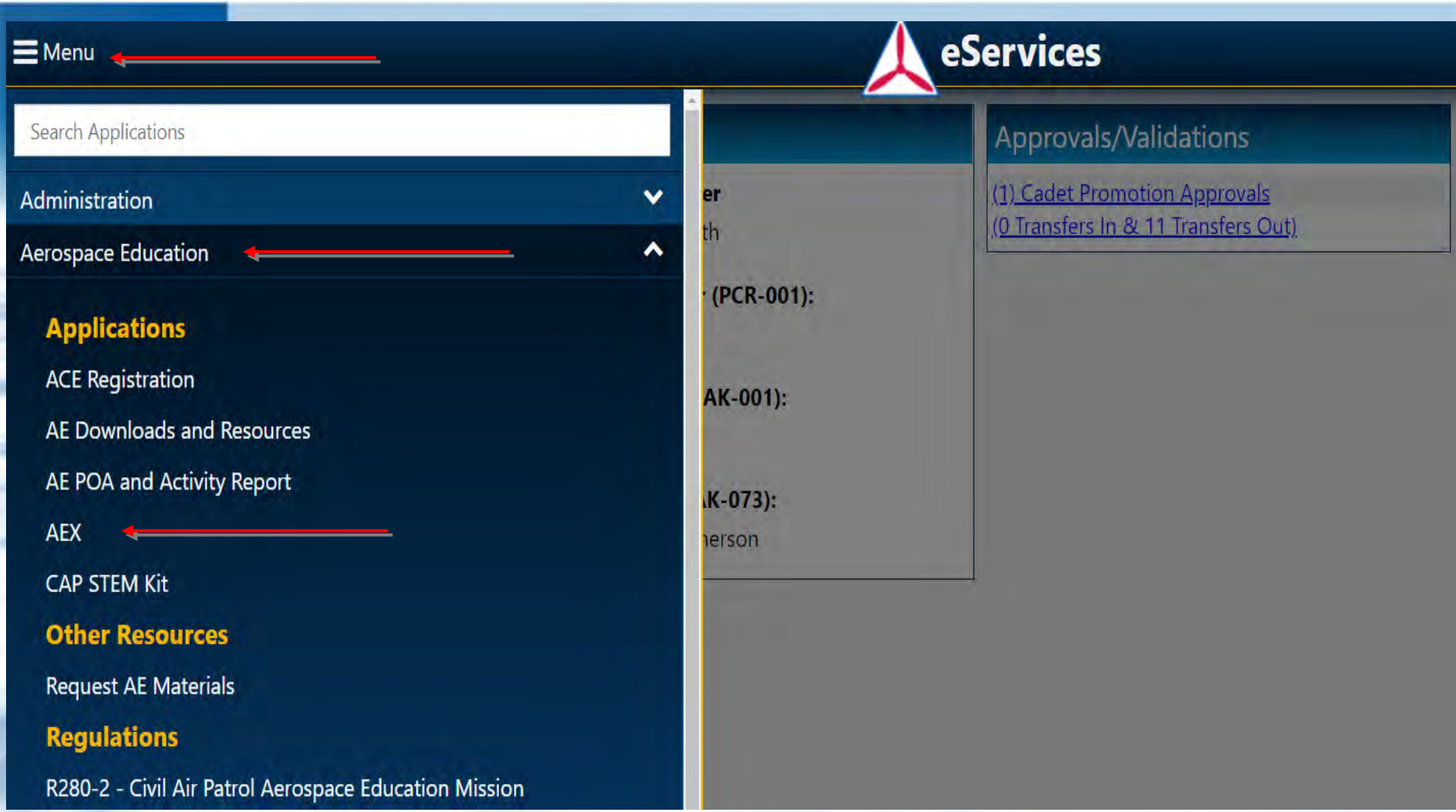


Aerospace Education Excellence – AEX Program

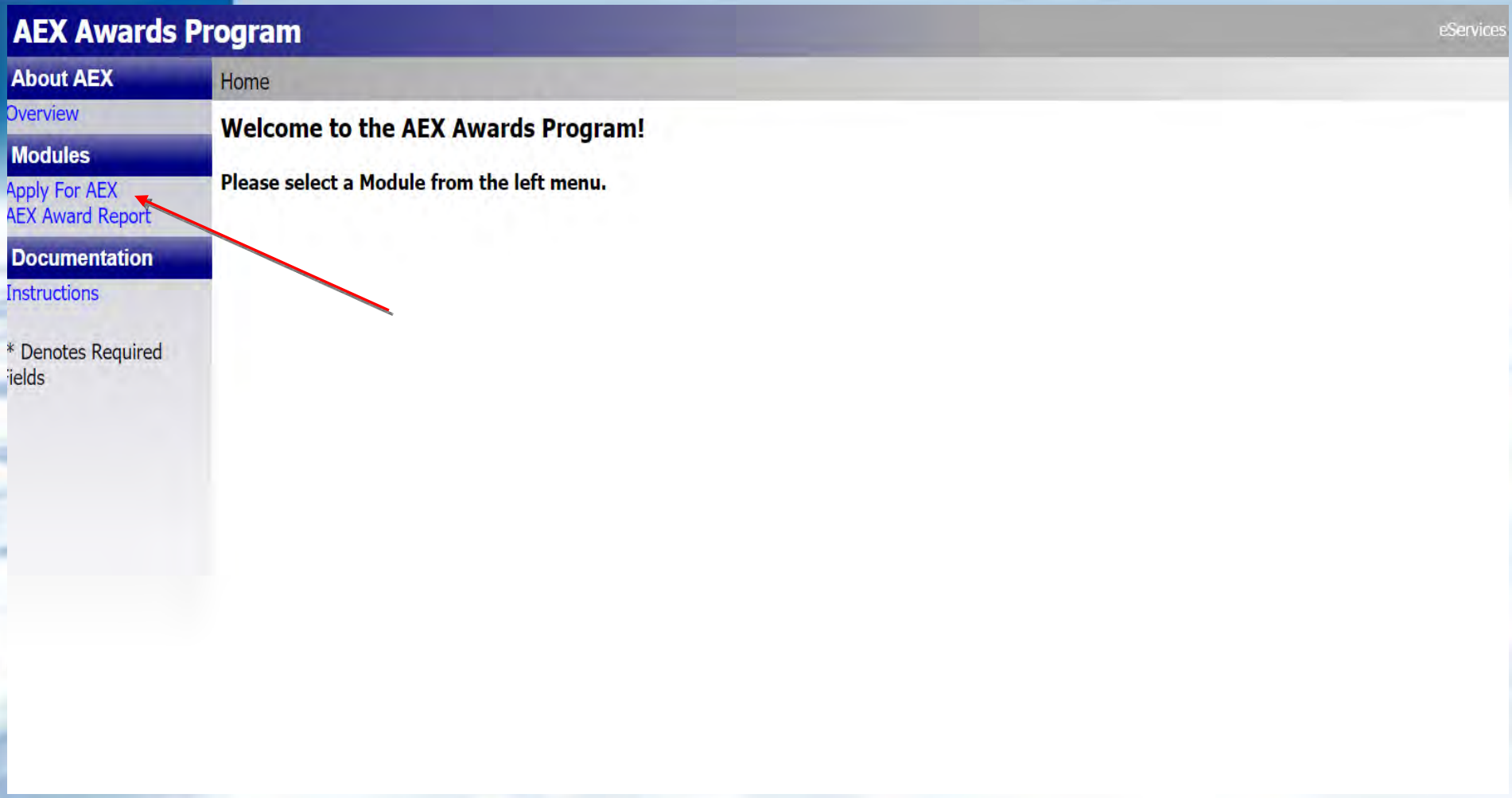
- Grades K-12 eligible
- AEX full-color books featuring aerospace/STEM activities.
- Requirements for full implementation
  - Complete six AEX/STEM activities
  - Complete a two-hour or longer field experience
    - Opens October 1

How do I register my students in AEX?

Main Menu then Aerospace Education and then AEX

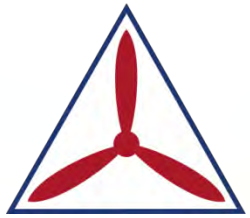


Select Apply for AEX



Select the AEX book you want

*All AEX books are available in PDF under AE downloads & resources



About AEX
Overview

Modules
Apply For AEX
AEX Award Report

Documentation
Instructions

* Denotes Required Fields

Home > **Modules** > Apply For AEX

AEX program activities should take place from Oct. 1 - Sep. 30 of each year.

If the following information below is not accurate or complete, please update each field as necessary:

CAPID
605271

Name
1st Lt Lynda S. MacPherson

Region-Wing-Unit
PCR-AK-001

***School Year**
--Select--

***Address**
1830 Circlewood Dr

***City**
Anchorage

***State**
AK

***Zip**
99516199 Numbers Only

***Email**
lynda.macpherson@akwg.cap.g

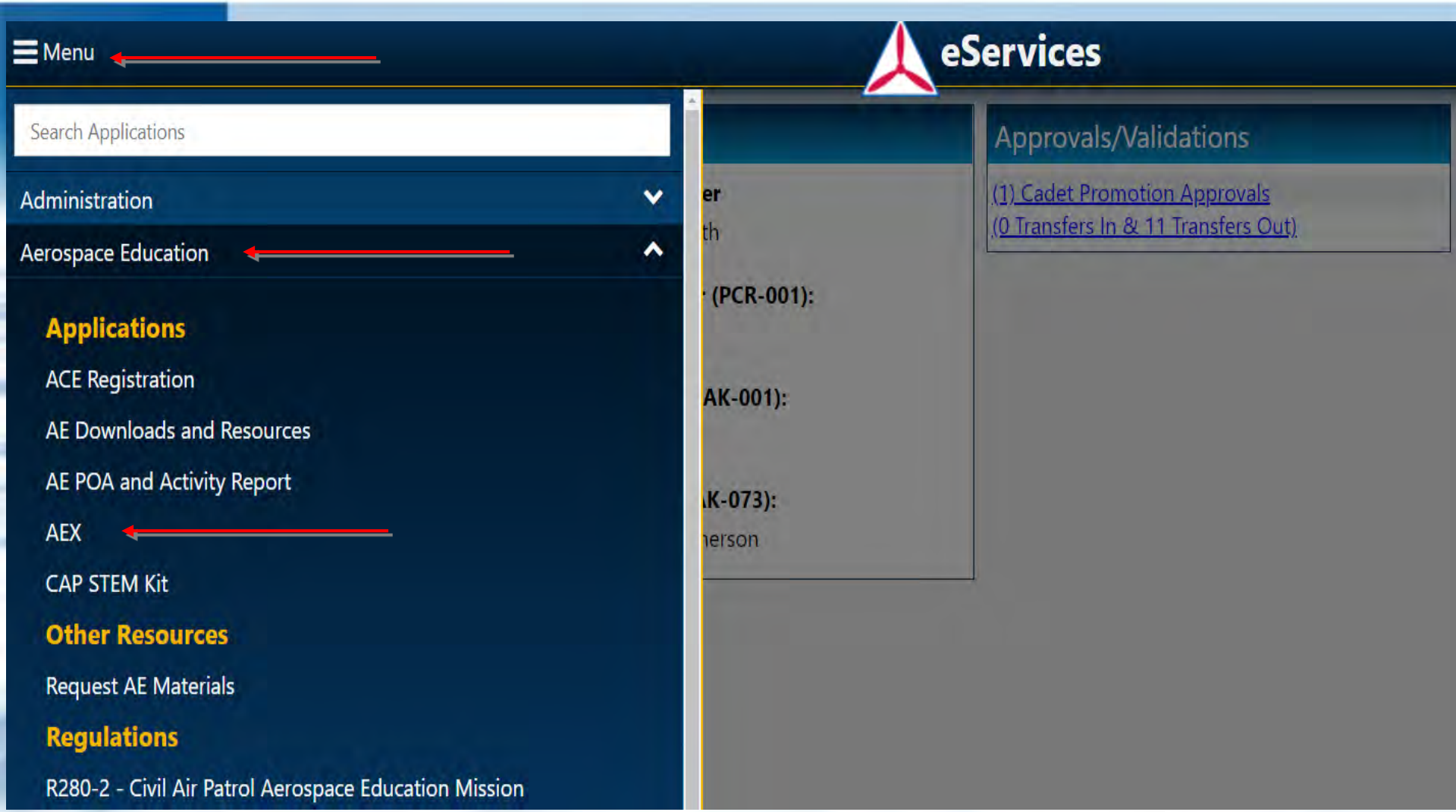
Select an option
(•) Unit ( ) School/Organization

Select the AEX Activity Book that you would like one copy of:

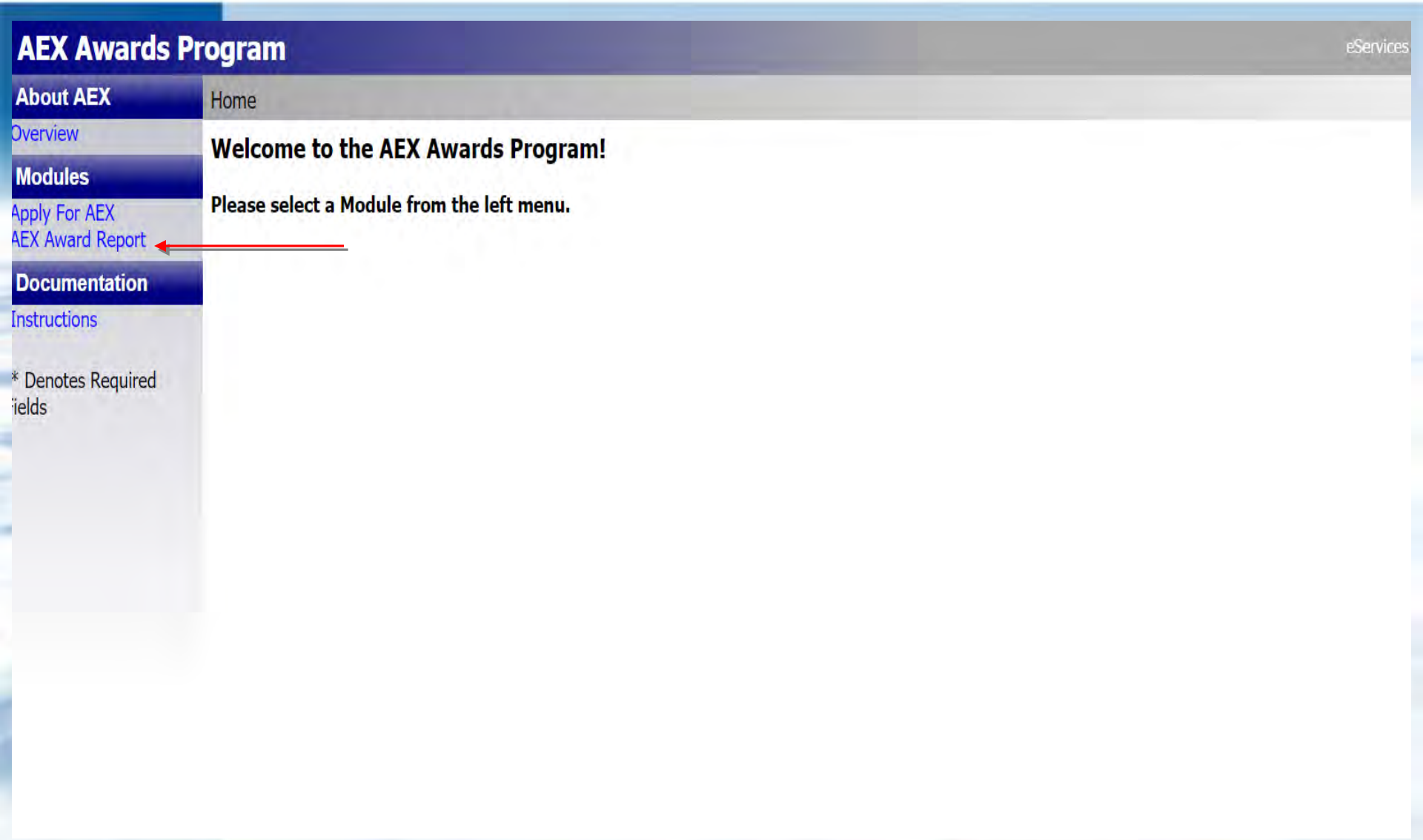
	Activity Book	Activity Book Description
☐	AEX I - Volume 2	Kindergarten to Grade 5: A hands-on activity book to supplement AEX I that includes: A Comet for the Littlest Astronomers, Sound Waves and How They Travel, Parachutes, Candy and the Great Uncle Wiggly
☐	AEX II - Volume 2	Grades 6-12: Fifteen hands-on, minds-on aerospace education activities for secondary educators that includes Scratch-Built Air Rocket, Building the International Space Station, Building the NASA Wind
☐	AEX for Senior Members	Senior Members 21 and older: Seventeen hands-on aerospace education activities for older students and adults including building a hovercraft, flying a sectional chart and building a radio-controlled M

I'm ready to submit my AEX report, now what?

Main Menu then Aerospace Education and then AEX



Select AEX Award Report



Enter your information and click submit

*You may also opt to save your information each time you complete an activity

* Denotes Required Fields

This module allows you to submit your AEX Award Report to CAP AE for completion of the AEX program. All activities must be completed and the following report submitted so your program can be processed. After CAP AE has approved your Award Report you will then receive your requested number of certificates in the mail. If you used a curriculum other than one that CAP supplied for you, complete the form below and either mail, fax or email your curriculum materials to CAP AE for final approval. You can find the contact information in the Instructions page found in the navigation menu to the left of your screen. Please complete the form below.

AEX program activities should take place from Oct. 1 - Sep. 30 of each year.

Upon submitting (not SAVE), please provide your Name Prefix and the Shipping Address of where you would like your certificates to be sent:

***Name Prefix**
.Mr .Ms .Mrs .Dr .None

CAPID
60

***School Year**
2018-2019

Name
1st Lt L

***Shipping Address (No P.O. Boxes)**
PO Box

Select an option
.Unit .School/Organization

School Or Organization
PCR-AK-073

***City**
Was

Award Report Date
24 ,

***State**
AK

***Zip**
99 Numbers Only

***Email**
lynda.m

***Phone**
Numbe

Enter each Activity and each Activity's details:

ACTIVITY 1:	ACTIVITY 2:	ACTIVITY 3:
***Title Of Activity**	***Title Of Activity**	***Title Of Activity**
***Number Of Participants** Numbers Only	***Number Of Participants** Numbers Only	***Number Of Participants** Numbers Only
***Date Of Activity**	***Date Of Activity**	***Date Of Activity**
ACTIVITY 4:	ACTIVITY 5:	ACTIVITY 6:
***Title Of Activity**	***Title Of Activity**	***Title Of Activity**
***Number Of Participants** Numbers Only	***Number Of Participants** Numbers Only	***Number Of Participants** Numbers Only
***Date Of Activity**	***Date Of Activity**	***Date Of Activity**

TWO-HOUR AEROSPACE EDUCATION ACTIVITY:

***Short Description Of Activity**

***Location**

***Number Of Participants**
Numbers Only

***Date Of Activity**

Due to budget constraints, wooden plaques are no longer available. We will still provide the squadron/class certificate and individual certificates for all participants upon completion of the AEX Program.

TOTAL CERTIFICATES:
***Provide the number of completion certificates needed:**
Numbers Only

Upon submitting (not SAVE), please provide your Name Prefix, Phone Number, and Shipping Address of where you would like your certificates to be sent:

Save Subr Clea

Teacher Orientation Program (TOP) Flights

- 45-minute ride (2 teachers per flight)
- Front seat flight (2 take-offs/landings)
- Fly annually
  - ★CAP Cessna airplane/glider
  - ★Pre-flight Briefing
  - ★Take photos
  - ★Handle the controls
  - ★Bring experience back to students

I'm ready to go flying!

To schedule your TOP flight in either a CAP glider or powered aircraft contact:

Lynda MacPherson

Lynda.macpherson@akwg.cap.gov

OR

907-240-7888

Follow us on Facebook for continuing STEM activities & ideas, upcoming events, and more

www.Facebook.com/AlaskaAEM

What Else Can CAP Offer?

Class field trips to local squadrons

AE/STEM classroom presentations

Pilot Visits

Teacher Workshops

AEM presentations to schools/groups

Cadet Squadron Within a School

We are here to assist you!

Aerospace Education Membership

- $35 one-time membership fee; free annual renewal
- PK-12 grade formal/informal educators eligible *(school educators, principals, home school parents, libraries, museums, youth organization leaders, etc.)*
- Enjoy all of the FREE AEM benefits
  - Free STEM kits
  - Free Curriculum
  - Free Annual TOP Flight
  - FREE SHIPPING
  - Free ACE & AEX programs
  - FREE in-school workshops
- **Why?**
  - **Help inspire youth toward STEM careers**

Alaska Civil Air Patrol