EV3Robotics Camp Guide

FLATE Best Practices Guide
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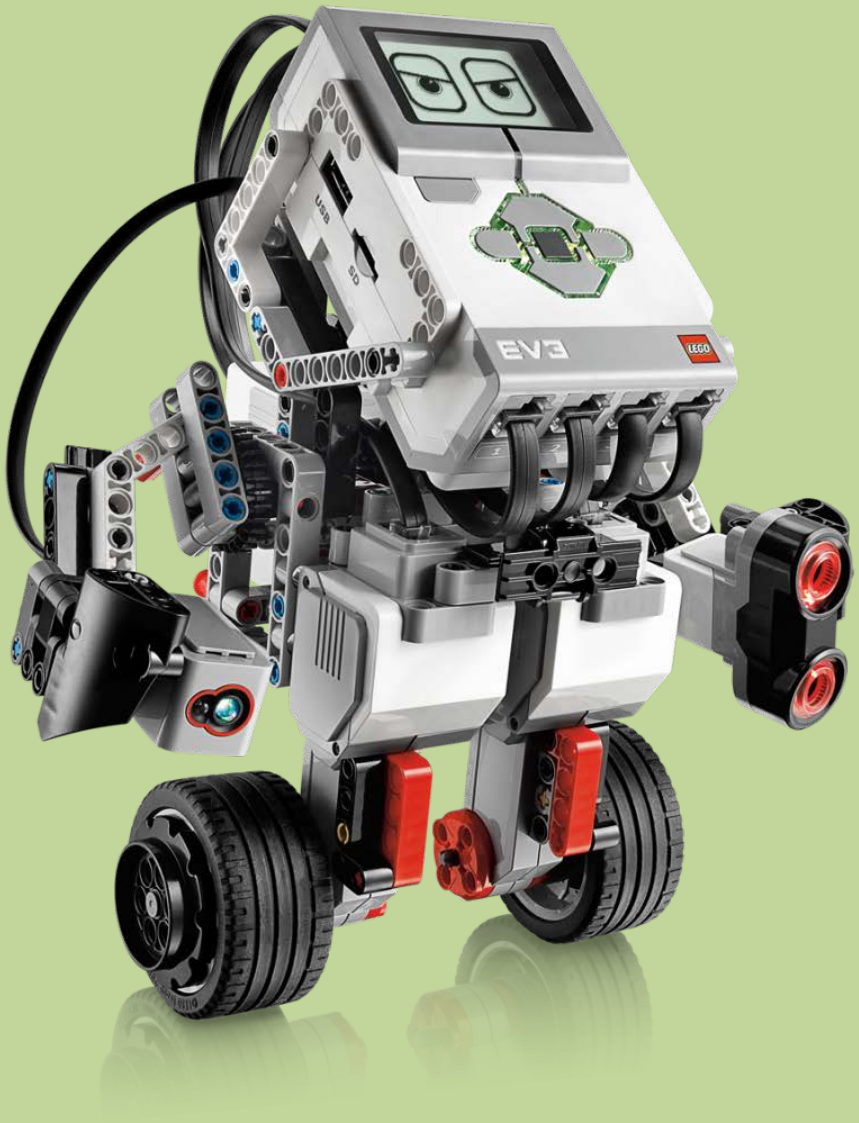

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Introduction

Interested in creating and implementing a secondary level summer robotics camp?

The EV3 *Robotics Camp Guide* will provide the necessary tools to maximize the success of a summer robotics camp. This little booklet is packed full of sample materials to make the creation of a robotics camp easy, minimizing the time spent on a lengthy developmental process.

Since 2006, we at FLATE have evolved from co-sponsoring a camp experience to providing the total package. FLATE does not claim to have all of the answers, but if what FLATE has learned helps another organization successfully create and implement a summer robotics camp then FLATE is successful too.

The purpose of this guide is to assist in the creation of a summer camp; FLATE's focus is on robotics. Using the concepts presented in this guide, we have helped a number of organizations to start and grow FLATE robotics camps at other locations. If your organization is interested in starting a FLATE robotics camp, this booklet will help you get started. Logistics and support vary at each location.

Our materials can be applied to camps offering science, technology, engineering and mathematics (STEM) or other curriculum. This material may also help educators choose between "wants vs. needs," and provide useful ideas. We hope the EV3 *Robotics Camp Guide* provides instruction which will be a successful and inspiring part of your camp experience.

Learn more about us at: **www.fl-ate.org** or **www.madeinflorida.org**

We welcome your feedback and ideas about the materials, your experience using them, and suggestions to include new topics.

Please contact us at: 813.259.6577, or barger@fl-ate.org

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PROGRAM GOALS AND OBJECTIVES

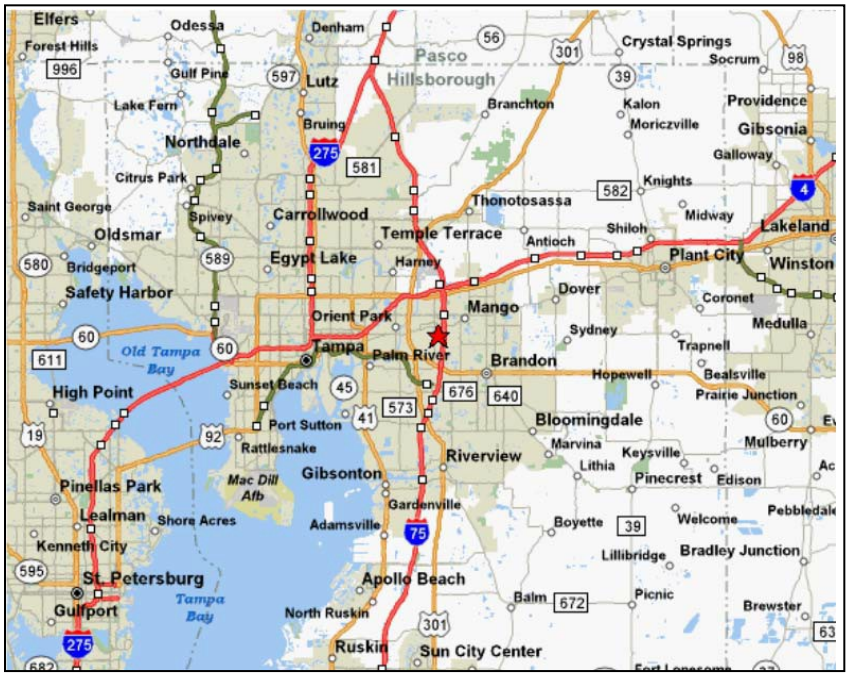
This program is designed to introduce campers to the fascinating and technical world of robotics. It will help them better understand the science, technology, engineering, and mathematics, (STEM) concepts used in modern manufacturing. The camps expose campers to programming robotics through the use of software. In addition to the technological information the campers receive, the program enables them to learn and practice lessons in leadership skills, communication, and teamwork. Each summer camp is designed to be five days in length and involves classroom exercises, team experiences, field trips, and fun!

Our Introductory and Intermediate camps are primarily geared toward secondary students in middle school, grades 5 through 8 and incoming 9th. Due to popular demand, FLATE has expanded its basic camp model to several other Florida locations in partnership with other organizations and institutions; in addition to more remote locations, more camp offerings, camps for special groups and underrepresented. We've also added new topics including 3D Printing, Industrial Robotics, Engineering, and Alternative Energy.

Our high school robotics / engineering camps are also evolving. This camp is primarily meant for rising 9th and 10th graders who have some "robotics" experience, students work on open ended design problems with Lego™ Mindstorms EV3, but also learn more about CAD and produce designed prototypes. Additional robotics programming platforms are also introduced along with 3D Printing.

How to get there?

EXAMPLE MAP

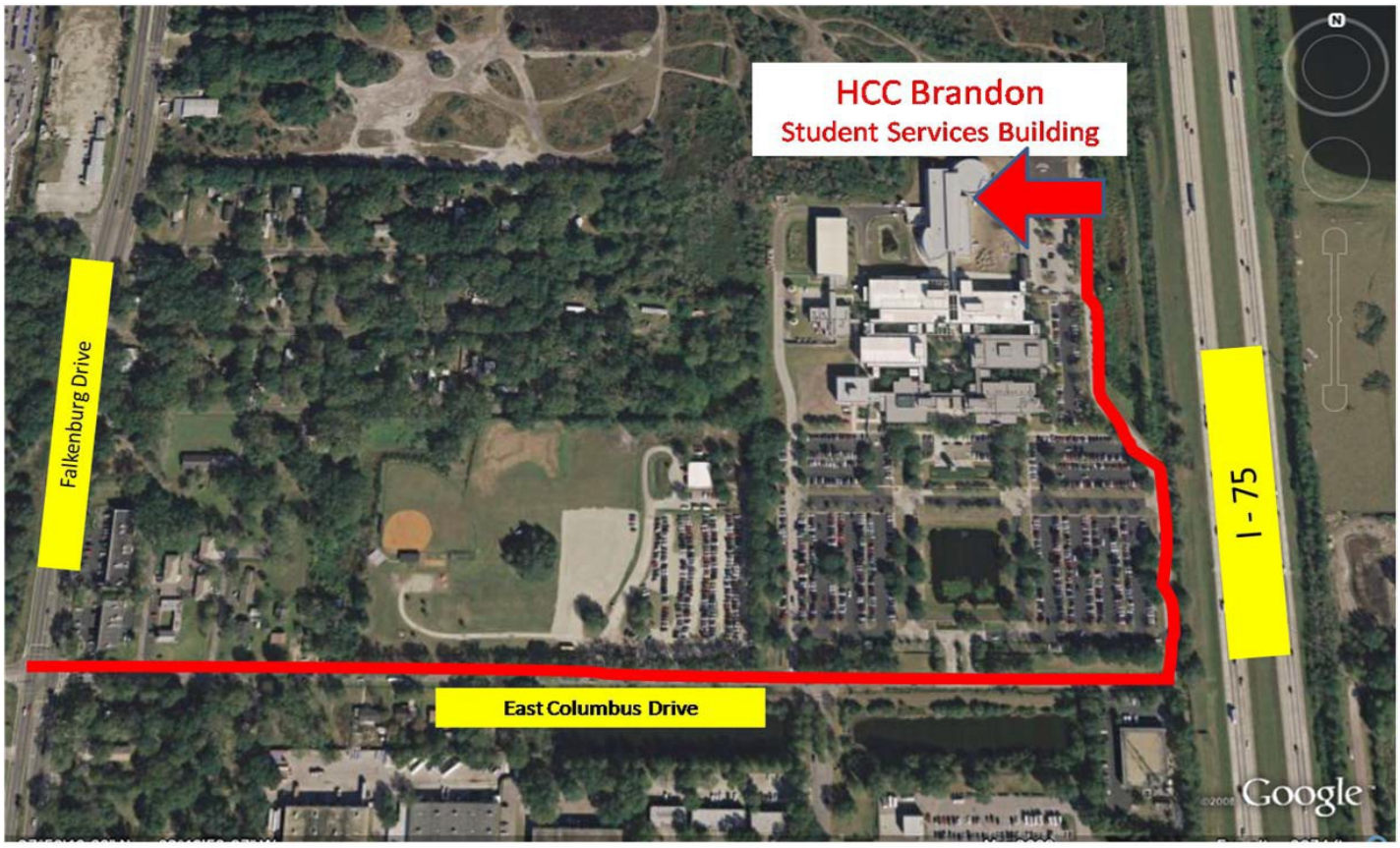


From North (*Ocala*):
I-75/Tampa (south) Exit at SR 574/Mango/Martin Luther King Jr Blvd Right onto Martin Luther King Jr Blvd. (west)Left onto Falkenburg Rd (south at first traffic light)Left onto E. Columbus Dr East (east)

From South (*Sarasota*):
I-75/Tampa (north)Exit at SR-60/Brandon/Tampa Left onto SR-60 (west) Right onto Falkenburg. (North at the first light)Right onto E. Columbus Dr. East (east)

From East (*Orlando*):
I-4/Tampa (west)Exit at I-75/Naples (south)Exit on SR 574/Mango/Martin Luther King Jr Blvd Right on Martin Luther King Jr Blvd (west)Left onto Falkenburg Rd (south)Left onto E. Columbus Dr. (east)

From West (*St. Petersburg*):
I-275/Tampa (east) Exit on I-4/Orlando Exit at SR-574/Martin Luther King Jr Blvd East Right onto Martin Luther King Jr Blvd. (east)Right onto Falkenburg Rd (south)Left onto E. Columbus Dr. (east)



Funding?

FUNDING

- Camp organizers must first decide whether the robotic programs will be a revenue, or non-revenue generating initiative. Revenue generating types of camps require different planning and budgeting.
- Camp organizers can pursue several areas of funding to assist in financing the programs: outside funding and internal funding. Outside funding can be secured through industry sponsors, private, and/or local organizations, individual contributions, and grants. Materials for the camps may be secured through donations versus being purchased by the camp or campers. Inside funding can come from sources such as school, or organization contributions.
- Organizers can also consider whether they will pursue scholarships, or grants to assist campers with paying for camp registration rather than allowing the campers to self-pay.
- For example, each of our 1 week camps cost about $250/camper on average. This does not include the investment of robots. To be as inclusive as possible, we charge $175/camper and have 20-24 enrollments per week. We solicit sponsors to offset some of the overall costs. The remainder is supported by FLATE and our host institution, Hillsborough Community College.

EXPENSES

There are different costs, which may be incurred for the camp: one-time expenses and recurring expenses.

Recurring Expenses	One Time Expenses
Facility charges and equipment costs	The computers and software that are required for the camps will be reused during various sessions
* Robot Kits if given as "take aways"	* Robot kits and spare part kits
Camp instructors - The use of volunteer instructors will greatly reduce the overall expense	
Beverages – Recommended: bottled water only. Snacks and even lunches are all optional items to be considered	
Miscellaneous supplies: paper for printing certificates and lessons, markers, extra batteries, rulers, name tags, pencils, replacement robot parts, etc	
Bus charters (if you don't have access to school buses) will typically run $500 for ½ day tour	

* The structure of the camp can determine whether a cost occurs once or several times.

Facilities

THE BUILDING

The cost of a facility is something to take into consideration when planning your camp. Organizers can search for options that can be procured free of charge through local organizations such as a school, Boys and Girls Club, etc., or you may elect to rent a facility.

It is beneficial to choose a location which is easily accessible for staff, campers, parents, and accommodates any special needs. The facility should have adequate parking for staff and a drop-off area for children. It should also be equipped with desks and chairs and have adequate restrooms that can accommodate staff and campers.

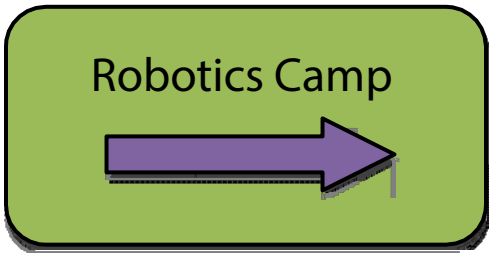
CAMP ROOM(S)

Aside from the usual classroom layout with desks and chairs, layout for the robot challenges requires a minimum 20' square of clear space, level flooring, or carpet (a square space, 20 feet on each side), and a roll of painters tape (the blue kind) to lay out the course the robots will follow.

Classrooms equipped with computers and a LCD or Elmo type projector is also recommended for the camps. We use one computer per two students. It's also helpful if instructors have internet access within the teaching area. Internet access can allow instructors to show campers online videos and demonstrations which will complement the camp. An example of one such website is Stanford University's "How Everyday Things Are Made" (http://manufacturing.stanford.edu/).

Finally, be sure to point the way to the classroom with a colorful sign:

EXAMPLE – SIGNS



Materials

HARDWARE/SOFTWARE

In our programs, middle or high school, each team of two campers has a laptop and a LEGO™ EV3 MINDSTORMS education base set along with appropriate software to run the programming. This student to equipment ratio is not mandatory, but we found it ideal for maximizing the overall learning experience. The EV3 education set is key, as there are major software, hardware, part and sensor differences between the home and education sets. Visit the Lego Education site at www.legoeducation.us to purchase your EV3 Kits

MATERIALS LIST

MATERIALS	PURPOSE
Laptop or computers	Load programming software, research and design
Measuring devices: Meter sticks, rulers, and tape measures (teams could share).	Some activities require campers to do some simple measuring.
Install the EV3 programming software on each	Campers will be working with both robots and software daily.
Calculators: 1 per 2 campers (or use calculators on computers)	Campers are required to make calculations for distance, averages, etc.
Certificates/prizes for winners	For each team challenge we need to be able to reward winning teams with small prizes/certificates. This could include candy, pencils/pens, etc.
Folders: 1 per team or 1 per 2 campers	Folders to be used as team portfolios. All worksheets, reflection journals and team challenge material will be kept in these portfolios.
Name Badges	This is a great idea, just in case campers and teachers forget each other's names or wander off.
Blue painter tape	Campers will be using the tape when experimenting with the color sensor on their robots. Instructor will make course outline out of tape.
4 cases of water bottles (full)	Water bottles will be used as points of reference and obstacles for the robots. This water is for the course ONLY-not for drinking.
Batteries for robots (check robots for size and type)	Make sure you check on the type and amount needed per robot. This is only a backup measure should a rechargeable fail.
Power Strips	For charging robots using their rechargeable battery, plug in after each day.
Spare Lego parts or extra kits	Have at least one extra kit and a box of spare parts
Colored Duct Tape & construction paper	For color sensor challenge
Pencils and markers	For completing worksheets and decorating team flag
Empty cardboard boxes	For ultrasonic sensor challenge
Other Lego pieces or obstacles	Create additional Lego pieces or random obstacle for challenges

Communication

CAMP COORDINATOR ROLE

Coordinators/camp directors are responsible for several areas in the creation and management of the camps. They assist in marketing, scheduling and camper registration, as well as coordinating logistics during the challenges/events.

BEFORE

Marketing:

- Place ads in local newspapers
- Place ads online with local news stations – for example www.myfoxtampabay.com
- Advertise on "camp" websites (www.summercamps.com)
- Hang posters (as many places as you can)
- Hand out flyers (at local events)
- Email flyers to past campers (parents) and/or perspective campers (parents)
- Arrange for online payments if possible
- Utilize social media to post flyer on Facebook site, twitter, etc.
- Contact local schools or district personnel to email flyer to teachers and parents

Tip: To ensure that camp reaches maximum registration capacity, coordinators/camp directors should utilize local media and newspapers.

Registration:

- Email confirmation letters with camp information, directions, permission slips such as for field trips, video/photo release forms, etc.
- Email reminders the week before camp
- Ensure you have all registration forms and payments for each camper
- Provide detailed location information

**If the coordinator/camp director plans to have press coverage of the camps, it's necessary to contact the media in advance. News stations can be difficult to "book," therefore, the more notice they have, the better. Also, contact television stations that are interested in community events as you may be able to advertise on such stations at no charge.*

DURING

- Email regarding the weeks activities and special events, such as field trips
- Email parents/campers the camp survey

AFTER

- Email a "thank you" to campers and parents
- Email camp survey reminder (for those who haven't completed the survey)
- Email link to online photos from the camps

Best Practices

PURPOSE

The "Made in Florida" summer robotics camps capture the interest of campers of all ages. Our camps include secondary students, which also includes home-schooled campers of the same age and grade level. The curriculum is a mixture of Lego ™ educational materials, STEM subjects and modern manufacturing information conducted in an environment of fun, team work and competitive problem solving.

PREPARATION

Preparation for a robotics camp program is imperative and since it is important – do it yourself.
Coordinators/instructors: Take the time to conduct a pre-robotics camp simulation and determine the answers to the following:

- Can I put a robot together from its component parts?
- Are all of the robots the same and are they all functional?
- Are there enough computers available for programming the robots (if needed)?
- Can I program a robot to perform each of the tasks to be asked of the campers?
- Are all of the support supplies in place and properly stored and labeled?
- Is the camp space adequate in size, comfortable, and safe for middle school campers?
- Has the competition course been tested with your current robots?
- Are there adequate power outlets to avoid a "spaghetti" effect of extension cords, and to avoid fire/safety hazards?
- Is there adequate table space for each team to work by themselves on their robots?
- Is there space and seating capacity for family and friends during the last day of competition? Is there adequate help for the camp? We r*ecommend one instructor and one coordinator/helper for a camp of 20 or more campers (10 teams of 2). Both should be familiar with the robot challenges/lesson of the camp contact FLATE for some examples).*
- Is there a daily schedule that includes a variety of lessons and activities?
- Be as prepared as possible; allowing flexibility for the unexpected during the camp is important.

PARENTAL PARTICIPATION

Getting the parents involved is a multiple step process.
First, understand that:

- Parents plan summer activities around work, vacations, day care, and other activities well in advance.
- Parents feel more confident when they have the opportunity to speak to someone who is not only knowledgeable, but who will actually be present at the camp.

Second, in order to overcome perpetual parental uncertainty, nothing takes the place of one-on-one contact.

As all the details will never fit into a flyer, take the extra time to cover the following using a memory guide that covers:

- Benefits of the camp
- Camper drop-off and pickup policy (include time window)
- Assurance that activities are supervised by camp staff
- The camp's lunch, snack, and food allergies policy
- The camp fee payment schedule and options

Third, follow up every registration with a personalized thank you note, indication of your anticipation of working with their child this summer, and again at the conclusion of the camp with resource information.

Best Practices

PRACTICAL PRACTICES

- Provide a flyer that emphasizes the "Who says fun and learning cannot happen together" theme. Include camp related photos and cover the basic logistics and amenities included in the camp infrastructure.
- Provide detailed location information
- Post all policies related to camp activities and camper behavior expectations on your website.
- Provide the web address for this information in all camp flyers.
- Notify employees at your institution of the camp as a great opportunity for their children.
- Notify your campus leadership and public affairs office to help develop press and T.V. coverage for camp.
- Start promotion and registration activities in February and continue through opening day.
- Provide a minimum of 90 days to plan and prepare for your summer camp.
- Build a database of parents of participants as well as serious inquiries that did not result in a camp registration last year.
- Support your camp instructors' interest and enthusiasm for camp innovations.
- Provide tangible products to campers related to the educational aspects of camp that encourage further learning.
- Cultivate camper leadership and promote teamwork, critical thinking, and problem solving.
- Establish a non-refundable fee structure that commits parents to delivering campers to camp each day.
- Establish a "late pick up" fee to encourage prompt retrieval of campers at the end of the day.
- Select instructors based on their knowledge and enthusiasm who connects well with campers.
- Provide instructors with a good honorarium, but don't hire an instructor just because they want the money.

FOLLOW UP

- A great follow up activity is to have a "Parents' Night" or "Open House" where you talk about all the different technical school programs in your area (have a representative from your school district), include Q&A and offer an enticing door prize.
- Hold an "open house" at a partner college and include campers and their parents on the invitation list.
- Take that opportunity to present the importance of STEM subjects in the school curriculum, promote next year's camp, and of course, another opportunity to take pictures!

PERFORMANCE

- Measure your impact - Learn how you can improve your next camp by using a simple paper survey handed out to campers on the last day of the camp. Additional feedback from parents and instructors can be tracked by using an online survey, such as Survey Monkey.

FLATE has resources for camp planning and curriculum ready to share with your team – sample documents can be found in this guide.

Camp Instruction Support

FLORDIA STANDARDS ADDRESSED

Math	Science	Technology	Communication & Writing
• Diameter • Circumference • Angles • Graphs and tables • Linear relationships • Scaling and models • Ratios & proportions • Unit conversions • Averages • Boolean logic • Spatial reasoning • Patterns	• Hypothesis & evidence • Experimental design • Observations & predictions • Data analysis & acquisition • Measurement • Error analysis • Amplitude and frequency • Light and reflectivity • Color and perception • Spatial graph model • Ultrasonic waves • Speed, distance & power	• Purpose of technology • Technology relationships • Systems • Design tradeoffs • Troubleshooting • Sensors • Performance • Boundaries • Mechanical elements • Controls • Computer Programming	• Brainstorming solutions • Reasoning with evidence • Explanatory composition • Documenting processes

DAILY TEACHING FORMAT

Background information: PowerPoint presented by the instructor.

Student learning activity: Designed to provide students with all necessary skills to be competitive in the challenge. This typically includes students working through step by step instructions and completing the student worksheet. We suggest using a test out activity at the end of this stage to determine mastery of the skills.

Challenge introduction: Present challenge rules and allow students time for focused brainstorming.

Solution development stage: Students work to build and program their robots to complete the challenge. Students should be encouraged to complete revisions and keep a record of problems and solutions.

Challenge Trials: Most challenges involve a number of trials. Groups are typically awarded the points/time for their best trial. We normally use 3 trials but allow for adjustments depending on available time.

CLASSROOM MANAGEMENT AND TEACHING STRATEGIES

Below we've listed some recommendations to consider based on our experience running robotics camps.

- Establish camp rules before students arrive. You don't need a long list of rules, just some basic rules concerning safety and appropriate interactions with other students, the adults that are in charge and the technology and resources they are borrowing. We include these as part of our welcome the first morning of camp.

- Having a plan for the organization of the classroom or lab can go a long way in ensuring that everyone has a positive camp experience. Consider having numbers at each group station that correlate to the number on the robot kit and computer that each group is assigned. If funds permit give each student a camp folder with all the documents they will need. This will serve as an engineering portfolio during the week to document their work and progress. Classroom management still applies! Students who are distracted by others during lesson instruction will miss valuable information they will need later for the challenge. As an instructor you will not have time to repeat information when the challenge heats up.

- Determining which students to pair up can be tricky. We always recommend using pairs. A group of three may be used in special situations but should be avoided if at all possible. Start with allowing any students who signed up together to work together. From there try to pair students close in age/grade level. If you must make changes avoid doing so after the morning of day 2 unless it's a very special circumstance. Encourage teams who have problems after day 1 to work through difficulties. Don't hesitate to have quick conferences with parents each evening when they come to pick up their children, but try to keep things positive. It's a robotics camp!

- Encourage your students to persevere. Things will go wrong. Some of it will be out of their hands. Remind them that engineers face obstacles on a daily basis and must troubleshoot for solutions.

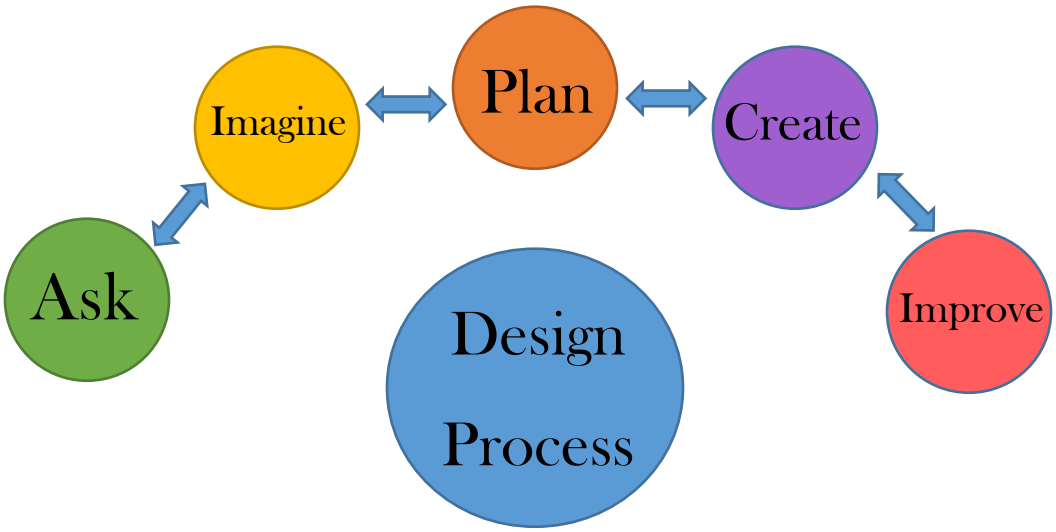
- Consider taking the facilitator approach as opposed to being the person with all the answers. This is especially important when students are developing solutions to the challenges. You will need to continue encouraging students to persevere and find their own solutions to the various problems they will encounter. If you attempt to fix every problem that arises, the students will become dependent on you, and you will quickly find yourself overwhelmed. The camp structure is designed to give students the background they need to be successful in the challenges so use the challenges as a carrot to dangle and get the students to complete the worksheets. You can also give points for teams that fully complete their work.

RECOMMENDED CAMP RULES

- *There is no **I** in **TEAM**.* You will be working with the same partner each day. Continuously reflect on what it means to cooperate with your partner.
- Inform an adult when you are leaving the classroom/lab to use the restroom and always go with a buddy. (Important if you are on an open campus such as a college).
- No personal electronics (phones, games, etc.) except during official break times and lunch.
- Everyone should have equal time with robots and programming. Switch roles often.
- No food or drinks around the robots and computers.
- No running in the classroom/lab (Important to remind students of this when the challenges heat up).

TEACHING ENGINEERING

In this camp students will learn through the use of Science Technology Engineering and Mathematics – STEM concepts. Teaching STEM doesn't include a set of concrete ideas attached to a test but rather a set of benchmarks that students should be able to accomplish. The structure of this camp is to build concreate ideas based in math and science, allow students to investigate those ideas using technology, and finally using engineering and the design process to solve challenges.



TEACHING ENGINEERING CONTINUED……

This camp is a hands on, minds on experience. Students learn by doing activities, testing out if their ideas are correct and then apply their new knowledge to a challenge. For students to be successful students must be allowed to do the following:

- Work collaboratively
- Think critically
- Explore ideas freely
- Make mistakes and be encouraged to continue investigating
- Ask questions and provided with guidance not given the answer
- Design solutions outside of the expressed rules (this is how and why each camp will be slightly different)

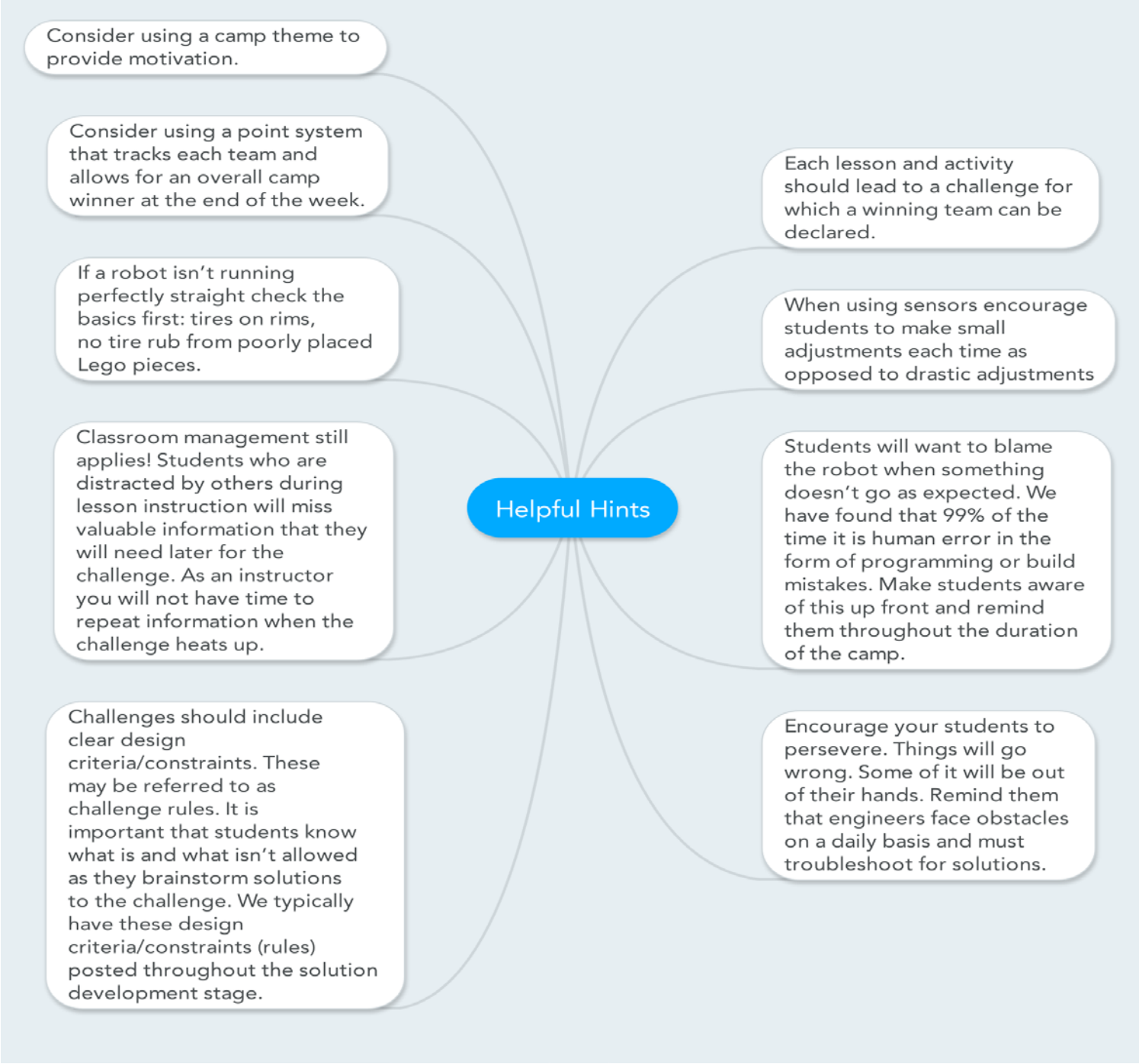
If you allow these core ideas to flourish in your camp, all students will be successful and feel accomplished, no matter what the scoreboard says at the end. They know that they have gained knowledge, even when it feels that they are just having fun!

ENGINEERING DESIGN PROCESS

During each challenge students will go through this process. You should review this with the students if there is time. Introduce the concept of engineering and how they will be working as various types of engineers throughout the week.

Ask	**What is the main task that you are being asked to complete in this challenge or activity?** **What have I learned in camp already that will help me solve this challenge?** **Criteria: What are the design requirements?** **Constraints: What are your design limits?**
Imagine	**Brainstorm possible solutions to the problem/challenge.**
Plan	**Write pseudo code to describe the behaviors you want the robot to complete:**
Create	**Build your design and program following the plan you developed.**
Improve	**Test and Improve. Record some of the improvements you made to your robot and the program. You do not need to record every change that is made, just the major changes.**

HELPFUL HINTS FOR CAMP INSTRUCTIONS



Include a *Parent Experience* at the end of camp. Parents are notified at the beginning of camp so they may plan appropriately to attend. The parent experience should include the final challenge and an awards ceremony to honor the winners of the various challenges throughout the week.

MEDIA RESOURCES

Researching the Internet for "robots" will supply organizers with infinite amount of resources for industrial, medical, space exploration, or educational robotics. Below are some "key words" to help you begin your journey.

- FANUC / da Vinci surgery
- Sony robotics / Toyota robotics
- ASIMO / NASA robotics
- Aldebaran NAO
- LEGO Minstorms™/EV3

TAKE AWAYS

Pens, pencils, lanyards, T-shirts, nametags and team flags can all be used as take/give aways during the camp. Each child can/should be given a certificate of completion. Also, certificates will be given to the overall challenge winners, and other outstanding performances during the week. Be creative! Give certificates for special behaviors, like helping other teams etc…

TRIPS AND TOURS

Based on your particular camp genre and to stimulate interest in STEM, manufacturing careers and diverse robotic applications, make arrangements to take campers to visit local, modern manufacturers, or colleges with a robotics lab so that campers can see robotics in real-life applications. You can also take campers to the movies, or show movies that are related to of robotics. Have parents complete a field trip release form before taking campers off camp grounds. Your local school district or host institution can supply you with a release form which you may use for your camp. (*See appendix for sample forms.)*

CAMP FOOD AND LUNCH

Campers can bring their own snacks and lunches; this option avoids issues of campers with food allergies or food preferences and leaves the meal choice up to the family. To accommodate the campers' food, it is recommended that the camp's facility contain refrigerators or coolers. We have provided bottled water and non-sugar snacks twice during the day, but now have the campers bring their lunches and snacks. At FLATE camps campers take lunches to the campus cafeteria to eat away from the robots and computer equipment.

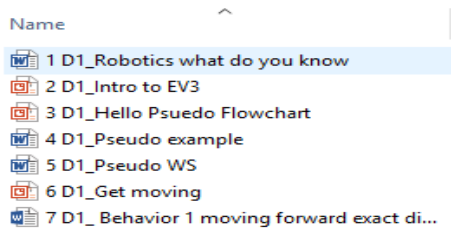
PRESENTATION OF LESSONS

This is the DAY 1 Lego™ Mindstorm Lesson/Challenge. It is simple and easy for most children to complete successfully. Day 1 is the most important day for setting the foundation of the remaining camp days. There is much more robot, hands on time to come in the following days but if the first day is skipped or reduced it will result in difficult days ahead with frustrated students who do not have the tools and knowledge to be successful.

Example Lesson Plans/Challenges additional lesson plans are included on the CD also on the FLATE Wiki site at
http://flate.pbworks.com/w/page/80454308/Summer%20Camp%20Resources

EXPLAINATION OF DOCUMENTS

The **teaching materials folder** contains all teacher resources; this should be reviewed *completely* prior to camp. It should be used to determine your camp organization and create marketing materials. **Challenges folder** contains the teacher explanation of challenges; *students should not see these documents*. **Day 1 – 5 folder** contains all student viewable work power points and worksheet. Worksheets are to be printed and power points to display as you teach the lessons. The power points contain the challenge details for the students. Each day is organized in chronological order of how it will be used and taught by listing the documents in order by number. For example in the day 1 folder all documents are listed 1 – 7 and will be used in that order. In the teacher lesson plan sequence starting on Page 9 you will see the explanation of when to use each document.



Teacher Sequence of Lessons - Teacher Sequence - *Day 1 of 5*

Prior to teaching this day: Review the following information – Camp Calendar, Daily Format, Classroom Management, Teaching Engineering, Recommended camp rules and Day 1 Folder. Determine how your camp site/classroom will be set up and organized. Determine a location that robots will be stored, where they can be plugged in after each day.

Est. Time (hours)	Teacher Actions	Student Actions	Notes
1	Present to the students an overview of what to expect during the 5 days of camp. Get them excited about what they are going to learn. Review the rules of camp, where bathrooms are located, and lunch procedures. Have students complete the, **1 D1_ robotics what do you know** worksheet.	Enter camp and get name badge. Sit at a computer station and complete the problem solving activity. Meet your partner for the week. Listen to the presentation about camp, rules and procedures. Complete the, ***what do you know about robotics*** worksheet and participate in the discussion.	Prepare name badges ahead of time. Give students a fun problem solving activity while they are waiting in the morning. Hand out worksheets as needed or create a camp folder for students that has all worksheets and camp calendar included.

2	Present a brief history of robotics to the students. Explore uses of robotics today both real and fictional. Allow time for discussion and questioning as you present this information.	Students should answer questions about the presentation and participate in the discussion.	**Create** this presentation in a format of your choice, power point is recommended with pictures and video clips embedded.
3	Have students get their assigned kits for the week. Present the **2 D1_Intro to EV3** power point. Plan for discussions during this presentation. Give students a set amount of time to determine their team name. Write down team names with student names.	Receive your **EV3 kit** for the week. Participate in the Intro to EV3 presentation with your partner. Familiarize yourself with the EV3 kit. Create a team name with your partner.	Label or number all kits prior to start of camp. Create a list of kits and which groups they are assigned
4	Present the 3 D1_Hello Pseudo Flowchart up to Robot behaviors. Have students take out robot brick and download cord. Allow students to complete the personality activity. Have students present their robot personality to the class.	Participate in the presentation and discussion. Get the robot and download cord. Explore the programming software. Create a personality for your robot.	
5	Continue to present the **3 D1_Hello Pseudo Flowchart** Power point and show the **4 D1_Psuedo Example** to the student and have them take out one copy of their **5 D1_Psuedo WS.** Explain that when they start programming they will use this worksheet to plan out their robot behaviors and coding actions.	Explore the use of Pseudo code and create a simple pseudo code.	
6	Have students build their robots. Last slide on the **4 D1_Hello Pseudo Flowchart** power point.	Build your robot according to the instructions.	Plan to have spare parts in case things go missing. Have a robot built for visual learners.
7	Present the **6 D1_Get Moving** power point and have students take out the **7 D1_Behavior 1** worksheet. Discuss the presentation with the students. Allow students to complete the activity.	Participate in the presentation and then complete the exploration activity. Complete the **Get Moving section of Behavior 1**. Review your observations with the class.	Remind students that these activities are important in being successful in challenges. These activities are building their foundation of knowledge to then apply what they have learned in the challenges.

Teacher Sequence to Present Lesson ***Day 1 of 5... Continued***

STUDENT WORKSHEET SAMPLE

FLATE Robotics Summer Camp – Behavior #1

Robot Behavior – Moving forward an exact distance

Team Name: **Robot Name:**

Using your programming software and your robot answer the following questions. Hover your mouse over an object to show the name.

Get Moving

Click action tab (green)

Select move tank and drag it to the programming screen

Connect it to the play icon

1. What does 1 rotation mean on the robot?
2. What motor ports does this block receive power from?
3. Label each motor right or left:
   - B –
   - C –
4. What does the power setting control?
5. What happens if you change the power to negative 50 on each motor?
6. If you need the robot to go farther forward, what do you do?
7. What happens when the motor power is positive 50 but the rotations are negative?

How far, How fast

Measure the Diameter of the wheel in inches and cm

Diameter = _____ (inches) , _____ (cm)

Calculate the Circumference of the wheel

Circumference = Diameter x ∏

(Diameter) _____ x 3.14 (inches) =

FLATE 2016 Robotics and Engineering Summer Camps

MIDDLE SCHOOL
Robotics Camps

mindstorms EV3

&

ARDUINO

SolidWorks

Made in FLORIDA

HIGH SCHOOL
Engineering & Technology Camp

Jun 20-24	Intro EV3 Robotics Camp – Middle School - GIRLS ONLY
Jun 27-Jul 1	Intro EV3 Robotics Camp – Middle School - All
Jul 11-15	Intermediate* EV3 Robotics Camp
Jul 25-29	Engineering Technology Camp - High School ONLY

FLATE Robotics Camp Location:
BSSB (Brandon Student Services Bldg) 218
Hillsborough Community College - Brandon Campus
10414 E. Columbus Drive; Tampa, FL 33619

Camp Details:
Monday – Friday 8:30am – 4pm
Costs: $175 per week for EV3 Camps
$200 per week for High School

For More Information Contact FLATE:
Email: camps@fl-ate.org
Phone: (813) 259.6578
Web: www.fl-ate.org/projects/camps.html

The Summer Robotics Camps are being conducted through a partnership between the Florida Advanced Technological Education Center and Hillsborough Community College.

Summer Camp Sponsors:

NSF FLATE HCC CAMP

Camp Scholarship Sponsors:

Suncoast Credit Union FOUNDATION

Hillsborough County Florida

INTRO CAMP
no experience required

INTERMEDIATE* Robotics Camp
requires experience

- Build and program the all-new Lego® EV3 Mindstorms® Robot system
- Participate in team challenges
- Tour an advanced manufacturing facility
- Learn about the science, technology, engineering & math used in today's high-tech industries

HIGH SCHOOL ENGINEERING TECHNOLOGY CAMP
no experience required

- Use Solidworks and CAD to design a functional robotic arm
- Engage in 3D printing process using additive manufacturing techniques
- Students keep the Arduino microprocessors and servo motors
- Tour an advanced manufacturing facility

Distribution of this information does not imply endorsement of this activity or event by Hillsborough County Public Schools.

Appendix

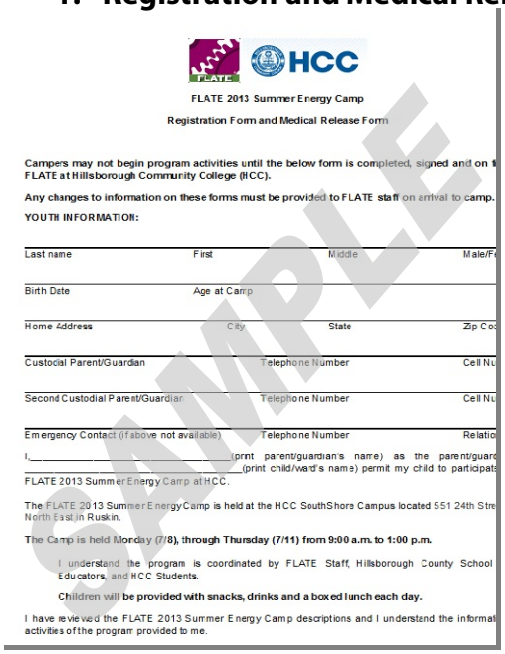
Parental Consent Forms

Parental consent forms will vary by institution. Be sure to consult with your legal department to determine what is required. The samples shown (CANNOT be used for any real camp registration) on this page are unique to our institution and are provided as an example only.

Forms Include:

1. Registration Form and Medical Release Form
2. Participant Release Form and Photo/Videography Release
3. Code of Conduct Agreement
4. Field Trip Form

1. Registration and Medical Release



FLATE 2013 Summer Energy Camp

Registration Form and Medical Release Form

Campers may not begin program activities until the below form is completed, signed and on f
FLATE at Hillsborough Community College (HCC).

Any changes to information on these forms must be provided to FLATE staff on arrival to camp.

YOUTH INFORMATION:

Last name First Middle Male/Fe

Birth Date Age at Camp

Home Address City State Zip Cod

Custodial Parent/Guardian Telephone Number Cell Nu

Second Custodial Parent/Guardian Telephone Number Cell Nu

Emergency Contact (if above not available) Telephone Number Relatio

I,_____(print parent/guardian's name) as the parent/guard
_____(print child/ward's name) permit my child to participat
FLATE 2013 Summer Energy Camp at HCC.

The FLATE 2013 Summer Energy Camp is held at the HCC SouthShore Campus located 551 24th Stre
North East in Ruskin.

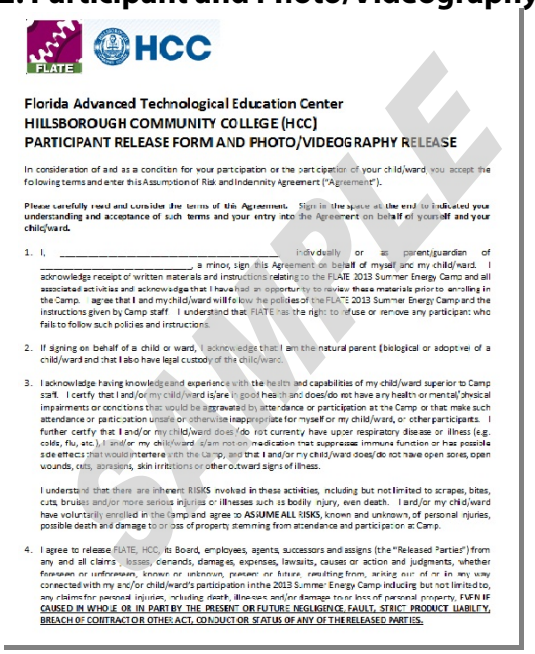
The Camp is held Monday (7/8), through Thursday (7/11) from 9:00 a.m. to 1:00 p.m.

I understand the program is coordinated by FLATE Staff, Hillsborough County School
Educators, and HCC Students.

Children will be provided with snacks, drinks and a boxed lunch each day.

I have reviewed the FLATE 2013 Summer Energy Camp descriptions and I understand the informat
activities of the program provided to me.

2. Participant and Photo/Videography Release



Florida Advanced Technological Education Center
HILLSBOROUGH COMMUNITY COLLEGE (HCC)
PARTICIPANT RELEASE FORM AND PHOTO/VIDEOGRAPHY RELEASE

In consideration of and as a conditi for your participation or the participation of your child/ward you accept the following terms and enter this Assumption of Risk and Indemnity Agreement ("Agreement").

Please carefully read and consider the terms of this Agreement. Sign in the space at the end to indicate your understanding and acceptance of such terms and your entry into the Agreement on behalf of yourself and your child/ward.

1. I, _____, individually or as parent/guardian of _____, a minor, sign this Agreement on behalf of myself and my child/ward. I acknowledge receipt of written materials and instructions relating to the FLATE 2013 Summer Energy Camp and all associated activities and acknowledge that I have had an opportunity to review these materials prior to enrolling in the Camp. I agree that I and my child/ward will follow the policies of the FLATE 2013 Summer Energy Camp and the instructions given by Camp staff. I understand that FLATE has the right to refuse or remove any participant who fails to follow such policies and instructions.

2. If signing on behalf of a child or ward, I acknowledge that I am the natural parent (biological or adoptive) of a child/ward and that I also have legal custody of the child/ward.

3. I acknowledge having knowledge and experience with the health and capabilities of my child/ward superior to Camp staff. I certify that I and/or my child/ward is/are in good health and does/do not have any health or mental/physical impairments or conditions that would be aggravated by attendance or participation at the Camp or that make such attendance or participation unsafe or otherwise inappropriate for myself or my child/ward, or other participants. I further certify that I and/or my child/ward does/do not currently have upper respiratory disease or illness (e.g. colds, flu, etc.). I and/or my child/ward is/am not on medication that suppresses immune function or has possible side effects that would interfere with the Camp, and that I and/or my child/ward does/do not have open sores, open wounds, cuts, abrasions, skin irritations or other outward signs of illness.

I understand that there are inherent RISKS involved in these activities, including but not limited to scrapes, bites, cuts, bruises and/or more serious injuries or illnesses such as bodily injury, even death. I and/or my child/ward have voluntarily enrolled in the Camp and agree to ASSUME ALL RISKS, known and unknown, of personal injuries, possible death and damage to or loss of property stemming from attendance and participation at Camp.

4. I agree to release FLATE, HCC, its Board, employees, agents, successors and assigns (the "Released Parties") from any and all claims, losses, demands, damages, expenses, lawsuits, causes of action and judgments, whether foreseen or unforeseen, known or unknown, present or future, resulting from, arising out of or in any way connected with my or/or child/ward's participation in the 2013 Summer Energy Camp including but not limited to, any claims for personal injuries, including death, illnesses and/or damage to or loss of personal property, EVEN IF CAUSED IN WHOLE OR IN PART BY THE PRESENT OR FUTURE NEGLIGENCE, FAULT, STRICT PRODUCT LIABILITY, BREACH OF CONTRACT OR OTHER ACT, CONDUCT OR STATUS OF ANY OF THE RELEASED PARTIES.

3. Code of Conduct

FLATE and HILLSBOROUGH COMMUNITY COLLEGE
CODE OF CONDUCT AGREEMENT for SUMMER CAMP PROGRAMS
[To be COMPLETED BY CAMPER AND PARENT/GUARDIAN]

This statement, when signed by both camper and parent, serves as an Agreement with FLATE and Hillsb
Community College (HCC).

Due to the nature of FLATE's programs, all participants are expected to act in a responsible and co
manner at all times. Upon arrival to the program, FLATE staff will review examples of acceptal
unacceptable behavior. Participants are expected to adhere to the guidelines set forth by FLATE sta
behavior problem arises, FLATE staff will first discuss the problem with the individual. If the p
continues, the participant may forfeit participation in future program activities. If the problems are
the parent/guardian will be contacted to discuss the problem. Finally, if the problem is not rectifi
student will be asked not to return for the remaining duration of the Camp.

Examples of behavior that may result in a participant leaving a program include, but are not lim
consumption or possession of alcohol; use or possession of tobacco products or illegal narcotics; posse
a weapon; destruction of property; and stealing.

Participant: I have read and understand the above statement. By signing this agreement, I agree to
responsible and courteous manner at all times. If I do not follow the guidelines set forth by FLATE
understand that I may forfeit my participation in the program activities.

Print Participant's Name _____

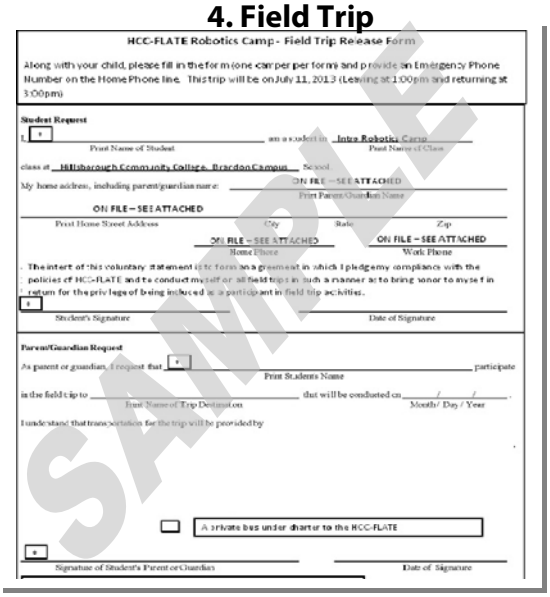
Signature of Participant _____ Date_____

Parent/Guardian: I have read and understand the above statement. By signing this statement, I a
arrange and pay for transportation if my child must leave the program early.

Print Name of Parent/Guardian: _____

Signature of Parent/Guardian: _____Date_____

4. Field Trip



HCC-FLATE Robotics Camp - Field Trip Release Form

Along with your child, please fill in the form one camper per form and provide an Emergency Phone Number on the Home Phone line. This trip will be on July 11, 2013 (Leaving at 1:00pm and returning at 3:00pm)

Student Request

I, [ ] Print Name of Student am a student in Intro Robotics Camp Print Name of Class

class at Hillsborough Community College, Brandon Campus School

My home address, including parent/guardian name: ON FILE – SEE ATTACHED Print Parent/Guardian Name

ON FILE – SEE ATTACHED
Print Home Street Address City State Zip

ON FILE – SEE ATTACHED Home Phone ON FILE – SEE ATTACHED Work Phone

The intent of this voluntary statement is to form an agreement in which I pledge my compliance with the policies of HCC-FLATE and to conduct myself or all field trips in such a manner as to bring honor to myself in return for the privilege of being inducted as a participant in field trip activities.

[ ] Student's Signature Date of Signature

Parent/Guardian Request

As parent or guardian, I request that [ ] Print Students Name participate

in the field trip to Print Name of Trip Destination that will be conducted on Month/ Day / Year.

I understand that transportation for the trip will be provided by

☐ A private bus under charter to the HCC-FLATE

[ ] Signature of Student's Parent or Guardian Date of Signature

Example Sponsor Thank You

Dear Sponsor,

We are still excited about the success of the 2015 Summer Robotics Camps, and I want to personally express how important your support has been. Camp information via mass e-mail, school and media resources, and other contacts helped create a growing awareness about optional summer educational opportunities for middle school campers throughout Hillsborough County. This year we held eight camps which provided us with 200 participants and a definite increase in parental interest as well over 100 parents and relatives attended the three Friday afternoon "Final Challenges."

The 2011 summer plans are already in the works. Additional "Advanced Robotics for Middle School Campers" more "Girls Only" camps, and educational outreach to underserved areas is planned.

Again, thank you very much for your support of the program; we will obviously be seeking your support in the future, and we all hope you enjoy "showing off" the latest in robotic T-shirt wear!

Sincerely, Marilyn
Barger Executive
Director
Florida Advanced Technological Education Center of Excellence

Parent/Guardian:

Example Check Return Letter

Dear Parent,

Enclosed is the registration check that was sent for the Robotics Camp. This year's camp is a much greater success than we had anticipated and we will schedule several more camps next summer.

Your application will go in our "first contact" file for next year's mail out, and you will be notified as soon as we schedule classes.

Thank you for your support of the program and the interest you are taking in your child's education. We hope to see you next summer!

Lourdes Fleurima
Sr. Staff Assistant
FLATE, Florida Advanced Technological Education Center of Excellence
HCC, Brandon Campus fleurima@fl-ate.org www.madeinflorida.org

Example Weekly Schedule

Intro Robotics Camp Calendar

Day		8 to 9	9 to 10	10 to 11	11 to 12	Lunch	1 to 2	2 to 3	3 to 4
1	M	Intro Orientation & Robotics: What Do You Know?	History of Robotics	Psuedo Code Activity	Introduction to Robotics		Using the Programming Software & Robot Personality Activity	Building Robots	Full Speed Ahead Lesson – Robot Move Forward
2	T	Wheels and Distance. Introduction to Challenge #1 Bottle Touch	Challenge #1 Bottle Touch- *Practice*	Challenge#1 Bottle Touch- *Round 1*	Challenge#1 Bottle Touch- *Round 2&3*		Turning Your Robot	Introduce Obstacle Course Challenge #2	Practice Challenge #2 Obstacle Course
3	W	Practice Challenge #2 Obstacle Course	Obstacle Course *Round 1*	Obstacle Course *Round 2*	Obstacle Course Round 3		Using loops and switches in programming. Attach Color sensor.	Introduce Line Follower Challenge #3	Practice Challenge #3 Line Follower
4	Th	Line Follower Round 1	Line Follower Round 2 & 3	Ultrasonic Sensor Lesson and activity	Challenge Practice		Round 1	Round 2 & 3	Introduce Final Challenge
5	F	Practice for Final Challenge	Practice for Final Challenge	Practice for Final Challenge	Round 1 of final challenge		Post Camp Survey / The Final Challenge / Take Robots apart and put kits back together / Final Clean Up / Take home Portfolios / Camp Awards		

Appendix

Example Camper Survey

Instructions: Read the questions carefully. Circle one best answer for each question.					
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Questions
5	4	3	2	1	Please rate your familiarity with science, technology, engineering /robotics, and mathematics (STEM) courses needed in middle and high school in order to prepare for careers in engineering and advanced technology college programs.
5	4	3	2	1	How likely are you to take a course in engineering, technology, or robotics in school next year?
5	4	3	2	1	The camp helped me to better understand how science, technology, engineering and mathematics (STEM) are used in industry.
5	4	3	2	1	The field trip helped me make the connection between the camp activities and real world applications.
5	4	3	2	1	Programming the robot helped me to see how automated systems are programmed and controlled.
5	4	3	2	1	Learning to program the robot by thinking logically will help me when solving other problems in science, technology, engineering, and mathematics (STEM) subjects in school.
5	4	3	2	1	The camp provided opportunities for teamwork and collaboration with others.
What did you like best about the camp?					
What did you like least about the camp?					
What would you change about the camp?					

Example Parent Survey

Please talk to your student about the camp and answer the following questions.

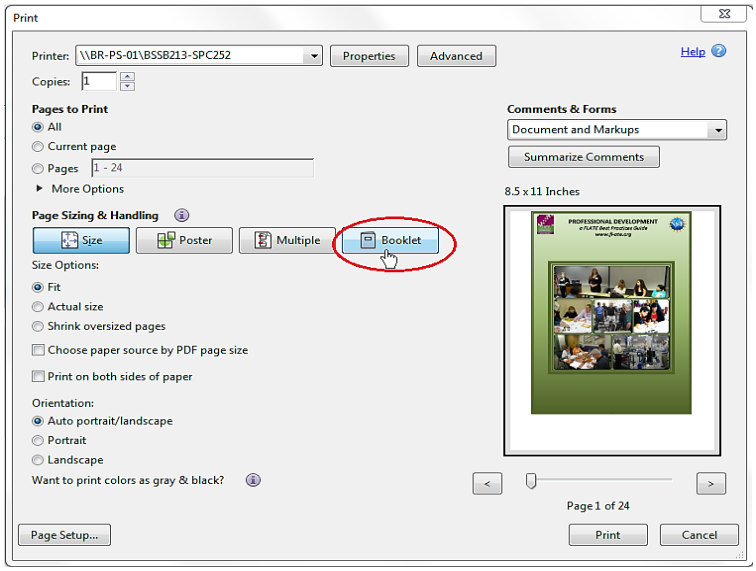
1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

1. The location used for the robotics camp was convenient.	1	2	3	4	5
2. The facilities used for the camp were accommodating.	1	2	3	4	5
3. The robotics lessons were challenging.	1	2	3	4	5
4. The robotics lessons were enjoyable.	1	2	3	4	5
5. There was enough time allowed to program the robots and complete the various challenges.	1	2	3	4	5
6. The *Made in Florida* presentations helped relate middle and high school science, technology, engineering/robotics, and mathematics (STEM) courses to college programs and career choices in engineering and advanced technology programs using real examples from Florida advanced manufacturing industries.	1	2	3	4	5
7. The *Advanced Manufacturing Industry Tour* helped relate the robots and activities experienced during the camp to the real world of Advanced Manufacturing in Florida.	1	2	3	4	5
8. The robotics instructors were knowledgeable and helpful.	1	2	3	4	5
9. The robotics camp provided a positive experience.	1	2	3	4	5
10. As a parent, I would recommend this camp to others.	1	2	3	4	5

How to Print this Guide

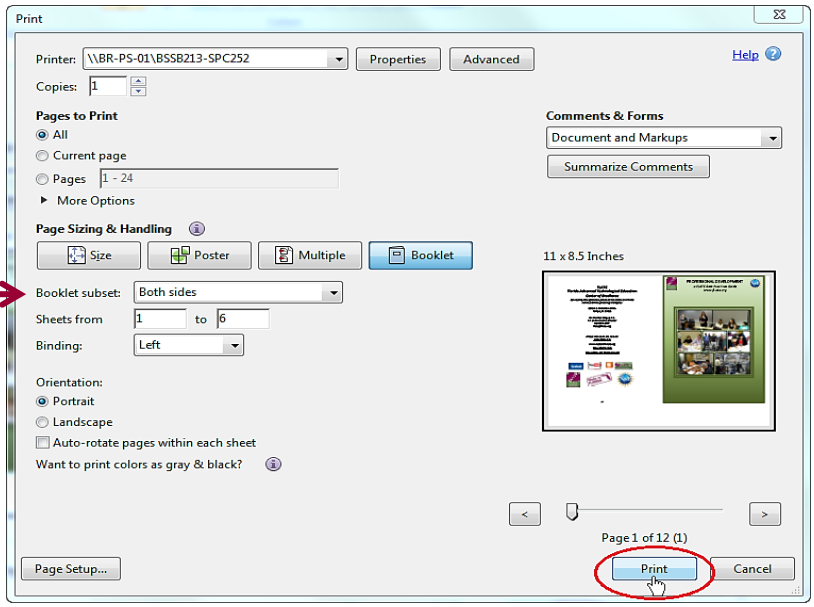
If you would like to print your guide in a "booklet" format (from the original PDF file), please use the following steps, you will need a printer that can print double sided documents:

Step 1 – select Booklet under Page Sizing and Handling *(please make sure you are using a printer that prints double sided documents).*
Step 2 – make sure booklet subset is for Both Sides
Step 3 – select Print



Select Booklet

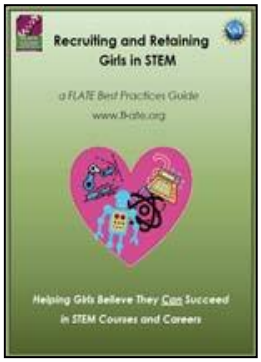
Before selecting Print, make sure that the Booklet subset is for Both Sides.



FLATE Best Practice Guides

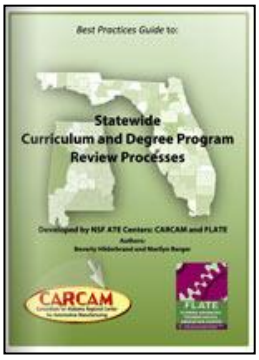
All FLATE Best Practice Guides are available as online resources, or for download at fl-ate.org/best-practices

ET High-Tech Camps for High School Students

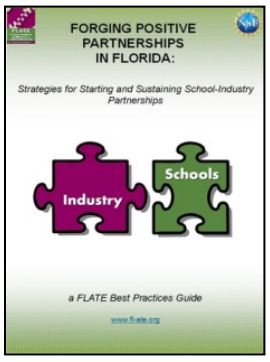


Recruiting & Retaining Girls in STEM

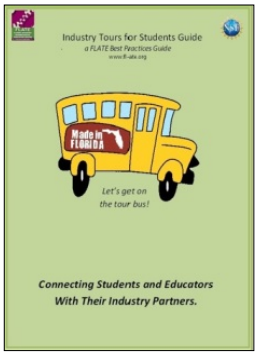
Professional Development



Curriculum Review Processes

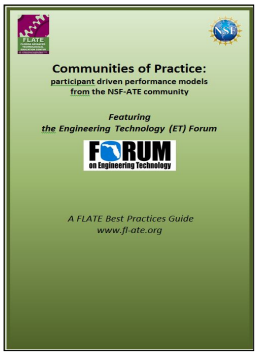


Forging Positive Partnerships in Florida

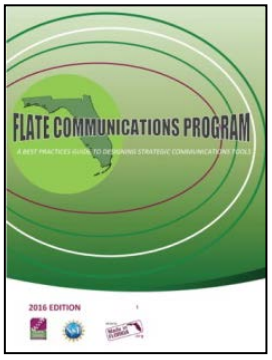


Industry Tours for Students Guide

Curriculum Alignment Credentials Guide



Communities of Practice Guide



Curriculum Alignment Credentials Guide

Contact us

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Dr. Marilyn Barger
P.I. and Executive Director
813 259 6577

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