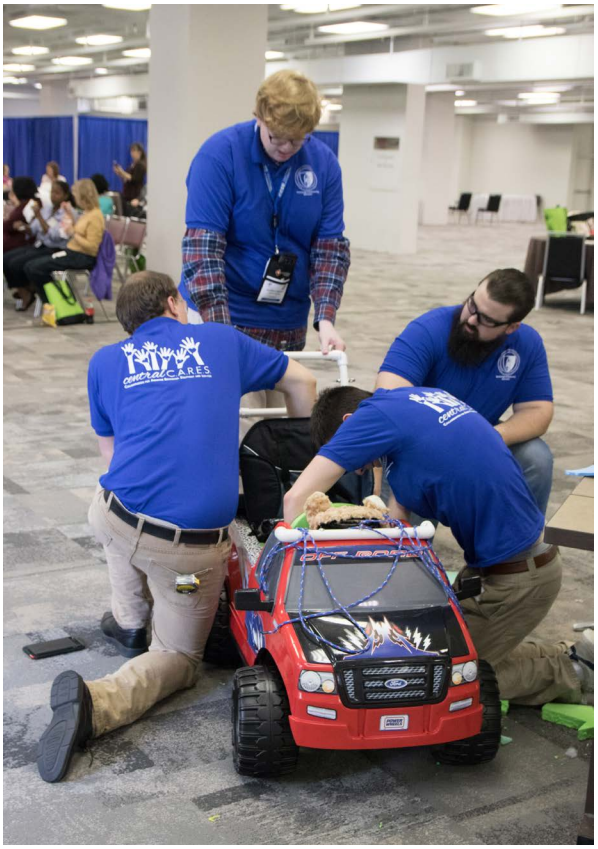
ITEEA Dream Ride. . . Go Baby Go Style: A Guide for Educators



Have you ever watched a toddler scramble across the room, crawling to nowhere in particular, but moving like lightning? Sometimes crawling and toddling are so much fun for children that they laugh out loud and squeal with delight. It's a universal human act to dance, tap our toes, or jump up and down in response to the stimuli around us.

Movement is a human instinct that enables us to engage deeply with our surroundings, demonstrate self-expression, make choices, and communicate. Unfortunately, many children experience delays in their abilities to move, which in turn affects their abilities to explore and learn about their world, interact and maintain social relationships, and identify as independent individuals. When participation in activities is limited from decreased mobility, assumptions are often made that the immobile individual has less to contribute.

Assistive technologies can make significant impacts in the quality of life for the millions of people with physical limitations. However, in 2019, a toddler unable to move independently may face a wait of up to two years for a power chair that can cost between $10,000 and $40,000. While waiting, many months of formative physical experiences are lost, and the child's development is significantly delayed.

Go Baby Go is an international grassroots open-source movement focused on real-time, real-world solutions for mobility. GBG looks at low-tech, low-cost solutions to increase independent movement experiences that provide children with opportunities for expression, play, socialization, and exploration leading to learning.

The intersection of GBG and Integrated STEM Education brings this real-world mobility challenge to teams of students and teachers uniquely positioned to create solutions. One popular low-tech intervention begins with the platform of a powered ride-on car intended for use by toddlers and preschool age children. Using light adaptations, these cars can be modified for use by children with mobility impairments. The adaptations include changes to the wiring and on/off switches to create individualized access matching the child's strengths, as well as alterations to the car's seating area to increase the seat's postural support.

This unique approach for mobility is a social justice mission that highlights the diversity of children with developmental delays and connects the school with the greater community.

The Go Baby Go movement began at the University of Delaware with Dr. Cole Galloway. The mission of GBG is centrally focused on the concept that mobility is a human right. The program thrives on disruptive innovation, academic research, and community outreach. Modified ride-on cars provide social mobility experiences, thereby creating opportunities for independence and self-expression.

The International Technology and Engineering Educators Association's STEM Center for Teaching and Learning™ has partnered with GBG to develop a course guide for teachers, higher education faculty, and Technology Student Association (TSA) advisors. The course makes it easy for teachers and advisors to plan, fund, and successfully execute their GBG events. Dr. Galloway and his colleagues provided recommendations to ITEEA for bringing modified ride-on cars into the Engineering byDesign™ Integrated STEM curriculum. Recommendations were gathered from sources within and outside of Go Baby Go chapters, representing years of experience within a growing community of experts eager to share what they've learned. The course package is the transformation of the "best of GBG" into a STEM project for middle and high school classrooms and clubs.

The Modified Ride-On Car is an enormously impactful project. Benefits extend beyond the boundaries of the technology and engineering laboratory, and beyond the walls of the school building to include the community, the medical industry, recreational spaces, and places of worship, bringing diversity awareness to a larger audience, and all while creating fun and rewarding experiences for students.

When considering modified ride-on cars for a classroom or TSA chapter, it is critical to think ahead about the full scope of the project: several kinds of ride-on cars can be built by students, beginning with a standard Level 1 car that can be kept at a daycare, library, or other shared space for children to use as needed on site. At this level, the electrical modifications involve replacing the standard drive mechanism (usually a small button on the steering wheel) with a large switch, making the car easier to activate for children with less accuracy in their movements. Projects featuring more complex cars, highly customized to a child's unique needs and abilities, and reliant on the participation of a local physical therapist, can follow. Course materials include a Car Use Safety Assessment, a Sample Liability Waiver, and a Parent Training Form template, helping to ensure that parents leaving with a new ride-on car have been shown how to properly plug and unplug the battery, use the on/off switch, and safely secure their child into the car.

Safety of the car:
A functional, safe modified ride-on car is one of the required outcomes prior to delivering a car to a family, hospital, or clinic. Most facilities serve many children with different ability levels. Included in the safety section of the curriculum are guides for safety testing the vehicle after the modifications are complete. Sign off by an engineer is required prior to delivering the car to any destination. Most groups find it helpful to provide a contact person in the event the car needs future repairs or replacement parts.

Safety of the driver:
It's important to ensure a good match between car and driver. Most Level 1 cars require the addition of a seat belt at the child's hips, an extended back/head support, and PVC side supports.

Level 1 cars require the following physical characteristics of the driver:
- able to sit on the floor without any additional supports
- between 1-2 years of age and of measurements appropriate for the Level 1 car
- does not require supplemental medical technology to be with them at all times that would need to be accommodated in the car (Tackle this in later, more advanced builds!)

A clinician such as a physical or occupational therapist from the community can be a huge asset to a team. A specific family/child will most likely already have a PT or OT and involving them in your group during the collaboration plan and fitting can increase comfort for all. If not designing a car for a facility, input from staff should be welcomed. Having a therapist on the team can be beneficial for students, offering the opportunity for them to learn about careers in PT and OT.

Engineering Oversight
Engineering oversight is required prior to delivering the project to a clinic, organization, or child and can be useful throughout the project. This oversight could come from an individual local to your school, or through a partnership with a local business, community member, or university engineering program. Engineering sign off is required at a minimum of two phases of the process: 1) participation in the signed agreement on user-centered design principles and 2) final sign off on electrical and structural safety.

ITEEA Dream Ride. . .Go Baby Go Style FAQs

- ***How long does it take to modify a car?***
  A Level 1 build can be completed by a team of 1-2 students in a single afternoon. It is recommended to run a GBG build event for a whole class or TSA chapter with multiple small teams (2-4 students per car) that build cars simultaneously. The event can culminate in a "test drive" celebration, bringing students, families, and the greater school community together.

- ***How much does it cost to modify a car?***
  $500 per car is recommended as a starting framework. This allows sufficient funds for the car, modifications, and a few mistakes along the way. Car and component prices fluctuate so this a healthy estimate to allow for these fluctuations. If this program is integrated year to year, costs may decrease as leftover resources are stockpiled and can be used for future builds.

  Integrate the community into the funding process: Fundraising projects such as car washes, bake sales, or contributions from a fundraising night at a local eatery can raise needed funds as well as create awareness of the project. In addition, consider more specific requests to individual businesses or organizations within and outside your district. See the attached funding template, which can be modified to fit a community's needs.

  Examples of organizations that have donated for partial or complete builds include: Lowes, Home Depot, Toyota, car dealerships, insurance agencies, and professional sports teams.

  Sponsorships from local businesses, families, or corporations can be recognized in many ways. Some organizations have created custom "license plates" for the cars, recognizing the donors while others create banners that are visible in media coverage of the build or driving event. Another idea is to create custom "title paperwork" for the car, which recognizes the donor's contribution. This creativity can come from the building students or can be a way to involve additional students not already involved in the mechanics of the build.

  High visibility of your program through social media as well as more traditional media channels can increase your funding sources for future builds!

- ***What tools or specialized equipment is needed for modifying a car for a child?***
  Basic tools are needed: a power drill, PVC cutter, and wire strippers.

- ***For what grade levels is GBG appropriate?***
  The project is recommended for students in middle and high school; upper elementary students are able to participate with increased supervision.

- ***How can I get access to the EbD™ course Guide for ITEEA Dream Ride . . . Go Baby Go Style?***
  The beta version of this course is currently available at no cost to teachers and TSA advisors. Request access at https://goo.gl/forms/Ue3dropxDJMT89EO2.

Additional resources:

- International Technology and Engineering Educators Association: www.iteea.org
- Engineering byDesign™: www.iteea.org/STEMCenter/EbD.aspx
- Go Baby Go on Facebook: www.facebook.com/UDGoBabyGo/
- TEDMed Talk with Dr. Cole Galloway: www.tedmed.com/talks/show?id=292991
- ITEEA Safety Resources: www.iteea.org/Resources1507/Safety.aspx?source=generalSearch
- ITEEA Go Baby Go Microsite: www.iteea.org/Resources1507/gobabygo.aspx