

## Development Labs

For three hours each day the LEGO Engineering Symposium participants will work in the development labs. Each participant can choose two development labs, one for each day of the symposium.

With inspiration from the presentations the **purpose** of the development labs is to evaluate and develop new ideas for LEGO Engineering Robotic activities while considering:

- What makes an activity “diverse”?
- What, specifically, makes an activity optimal for girls?
- What other factors implementing the activity can support its diversity and appeal to girls?

The **outcomes** from the development labs are:

- Ideas for the classroom (activities, learning sequences, curricula)
- Guiding principles for good activity/curriculum design
- Insights into learning, teaching, capabilities, and product development

**Guidelines** for development lab sessions:

- An initial driving question, need, or problem related to the symposium theme
- Exploration of the driving question through the design, creation, interaction, testing of LEGO MINDSTORMS and/or WeDo activities and ideas
- Collaboration amongst educators and CEEO personnel (“red shirts”)

The development lab will explore the “Diverse Learning Environment” theme from four different points of departure.

### **I: Data Logging Development Lab**

Mathematics is a subject that is often times difficult to make connections to daily life. It is typically presented in a way that is less compatible with many people's learning styles, especially girls. Anecdotally, girls seem to prefer material to be put into context - learning about concepts related (or connected) to the bigger picture. Often educators have difficulty finding a medium to teach mathematics that aligns with the contextual learning style preferred by girls. In this development lab, we'll explore how data logging might reverse this trend by connecting mathematical concepts to daily life. We will consider how data logging makes mathematics more approachable to girls by experimenting with LEGO robotics activities that transform abstract numbers into tangible - and relevant - values for a more diverse learning environment.

### **II: Story-making Development Lab**

The purpose of this development lab is to explore the role that story-making plays in building a diverse learning environment. Story-making allows students to make connections to the content of an activity in a meaningful way. While adults may not see story-making as an important component in the creative process, and therefore may over look it in designing activities, it is very important for younger students, especially girls. Participants in this development lab will discuss methods to integrate story-making into the classroom and outline activities that include story-making in the creative process.

### **III: Competitions Development Lab**

Do you feel lucky? Well, do you? In this development lab, we'll explore the idea of inclusive competitions: what aspects of contests support involvement of the group and what conditions foster the opposite. Additionally, we'll look at elements that can be incorporated to encourage cooperation, both within and between rivalry groups. Considering both large-scale (e.g. FIRST) and smaller (e.g. 1-hour) contests, we'll attempt to derive a guiding set of principles for designing, developing, and deploying inclusive tournaments. Through tinkering with the LEGO NXT and LEGO WeDo platforms, the goal will be to uncover collaboratively how features of these educational sets can be leveraged to engage all students in educational competitions.

### **IV: Collaborative Projects Development Lab**

We will explore the idea of large scale collaborative work i.e. collaboration that goes beyond small independent “group” assignments. We will discuss large-scale collaborations that require smaller teams to contribute to an overarching greater goal. In this type of collaboration, each project's success is dependent on each individual group's contribution. We'll attempt to derive a guiding set of principles for designing, developing, and deploying inclusive large scale collaborative challenges through the LEGO NXT and LEGO WeDo. Our goal will be to investigate how these platforms can enable authentic multi-group collaborative learning.