

**WEEK TWO**  
**Basic Engineering**  
**Motors, Wheels, and Gears**

**Lesson Goals**

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1. Team members should continue to learn how to work together as a team.

**Technical Learning Goals**

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1. Team members should understand the importance of a strong structure.
2. Team members should be familiar with different methods of strengthening a structure.
3. Team members should be familiar with gearing.
4. Team members should gain an understanding of the tradeoff between speed and torque (power).

**Coach Preparation**

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Background Reading

- FLL Coaches Manual Section 3 : Gearing Up For the Challenge
- The Art of Lego Design by Fred Martin
- LEGO Mindstorms Gears 101 web page  
<http://mindstorms.lego.com/tipstricks/build/workshop/index.asp>
- LEGO Mindstorms Differentials web page  
<http://mindstorms.lego.com/tipstricks/build/master/differential.asp>

*Preparation Time* : 1.5 hours

Lesson Preparation

- Carefully review the technical learning lesson. This lesson will require forethought as to how to teach the kids about these topics and how to break up the activities so that all kids have an opportunity to learn and explore.

*Preparation Time* : 1.5 hours

Equipment Preparation

- Verify batteries are good in RCX.
- Make sure transmitter is hooked up to the PC.

**Equipment Requirements**

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At least one FLL Challenge Kit (2 RCX bricks would come in handy).

A PC with the RCX software installed and the transmitter attached.

Space to run the robot around.

Optional: A fishing reel.

**Documents**

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Team Building Exercise: Interviewing Team Members.

Technical Learning : Basic Engineering. Motors, Wheels and Gears.