

Sting Fish – Lesson Plan #1 (Getting to know the parts)

***Instructors MUST fill out the attendance sheet.**

1. Wooden plate coloring

- Create an organized coloring area with paper tablecloths and plastic plates for the colors!
- Make sure students to not dirty the classroom!!! Thus, spread the tablecloths precisely and stress that no student is allowed to color their plate outside of the coloring area!
- **Coloring will only take place in the designated area! All students must color their plates! (Students who miss this lesson will not be able to color their robot!)**
- It is recommended to color the robot in one color, and not mix several colors. Every robot can have a different color.
- Hand out wooden plates to kids, and explain to them that the coloring process is very important.
 1. The paint adds another layer to the parts, which allows them to connect to each other better.
 2. The paint prevents future damage to the wood.
- Hand out a sponge to each student. Explain that they must dip the sponge in the paint, squeeze it and only then use the sponge to apply the paint on the wooden plate.
- After the students are done painting one side of the plate, they must use toilet paper to soak all liquid that's on the wood. **The wooden plate must be as dry as possible!**
- Only after one side is dry, students may turn over the plate and go through the same process – painting and drying.
- Once the students finish painting, put all the wooden plates aside to dry and tell each student to write their name on their plate.
- All plates and sponges will be washed by the instructors after class.
- Fold up the tablecloth and return it to your instructor's case until the next time you need to use it.
DO NOT throw away the tablecloth nor any sponges and plates!

Explanation about work tools, parts, screws, screwdrivers, motors and controllers using photos (20 mins)

- **Controller** – A fully functional computer system, which is composed of just one electronic component. Thus, one can find all the common components of a computer such as a processing unit and memory card. The controller's job is to send orders to all motors and, in this manner, control the robot's movements, and record and memorize the movements programmed by the computer. Therefore, a computer doesn't always have to be used to operate the robot. Due to this, the controller is the "brain" and one of the most important parts in the entire robot!
- **Servo** – An electric engine is a machine that transforms electromagnetic energy into mechanic energy. An electric engine works based on the electromagnetic principle, which can create an electromagnetic field by transporting an electric current through a copper coil. The engine moves in a circular motion to the right and to the left and, using several engines that move to different directions in a programmed timing, the robot can imitate every movement.
- **Wooden plate** – This is our primary work pallet, which we will use to begin building the robot. Each robot first comes as a wooden plate that looks like a puzzle. We will disassemble and assemble the parts in accordance with the instructor's instructions.

- **Paper/glass filer** – This tool helps us make sure that the wooden parts are fit to use for building. After disassembling the wooden plate, students will file each part until it is in the proper size and quality to build a robot.
- **Acrylic paint** – Non-toxic paint based on water which we will use to paint our robots.
- **Adhesive** – A glue which we will use to glue fixed parts to one another.
- **Driller screw** – A screw that has a sharp edge so that it can be inserted into hard surfaces.
- **Standard screw** – A screw that does not have a sharp edge. Its’ goal is to hold together parts that do not require making holes in them. We have 3 different sizes: 10 screw, 15 screw an, 30 screw
- **Bug screw** – A small brown screw. It is called “bug” because of the way it looks. This screw is meant to connect parts to the servo so that they don’t fall off the engine (servo) when the robot is operating.
- **Phillips screwdriver** – A screwdriver with a tip shaped like an X that is fit to use with all screws mentioned above. It is a magnetic screwdriver. Therefore, when using it, we first magnetize the screw, and only then enter the screw.
- **Standard locknut** – A metal connecting part in shape of a hexagon. This part is meant to promise that the screw remains in its place. Therefore, we place the locknut on the side where the screw comes out. This locknut connects to most of the screws that hold the engine in every robot, so you can connect and disconnect the engine easily. We do not use a locknut to lock a driller, but only when using a standard screw.
- **Nylock locknut** – A locknut that cannot be taken out after applying. This ohm is connected on the side the standard screw comes out, and creates a strong locking. Therefore, we only place a **nylock** locknut where we will never have to disassemble the parts.
- **Wrench** – Similar to a screwdriver, but has a hexagon-shaped tip used to apply, strengthen or loosen locknuts.
- **Servo head/connector** – Exists in 2 shapes: a cross and a circle. We use this servo head to screw parts onto the motor, which lets the parts move in accordance to the servo’s movement.
- **Metal rod** – Designed in a curved shape in order to enable a wider movement of the parts. The motor is connected with a metal rod to farther away parts/motors and not in a direct connection.

3. Disassembly of body parts only (no legs) and filing – only if there’s time left and the wooden plate is dry!!!! (15 mins)

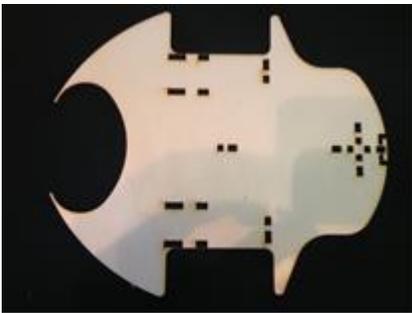
See photo below

- Present how to disassemble the parts correctly – in circular movement and not by pushing the parts straight out. We do this in order to prevent the parts from breaking. (Put an emphasis on slowly pushing the small wooden poles and only then beginning the circular movement)
- Everyone takes out the body parts (DO NOT take out legs)
- File the parts and eliminate unnecessary wood pieces left when disassembling the plate.

4. Collect and check parts (5 mins)

- Call each student's name, and write the kid's name on each plate.
- If they had time to file the body parts, put the kid's name on one of their parts and place that kid's parts in a bag. It is better if you can write the student's name on the bag, so he can use this bag throughout the building process of this robot.

Time in minutes	Name of activity	Additional comments
25	Painting and drying	Make sure to follow directions
20	Explain work tools	You may present the parts themselves or use drawings to show each part
15	Disassembly and filing	Emphasize correct disassembly
5	Collect part	Store in safe place, hand out bags if needed
Total : 65 minutes		



Disassembly of body parts only (no legs) and filing – only if there's time left and the wooden plate is dry!!!!