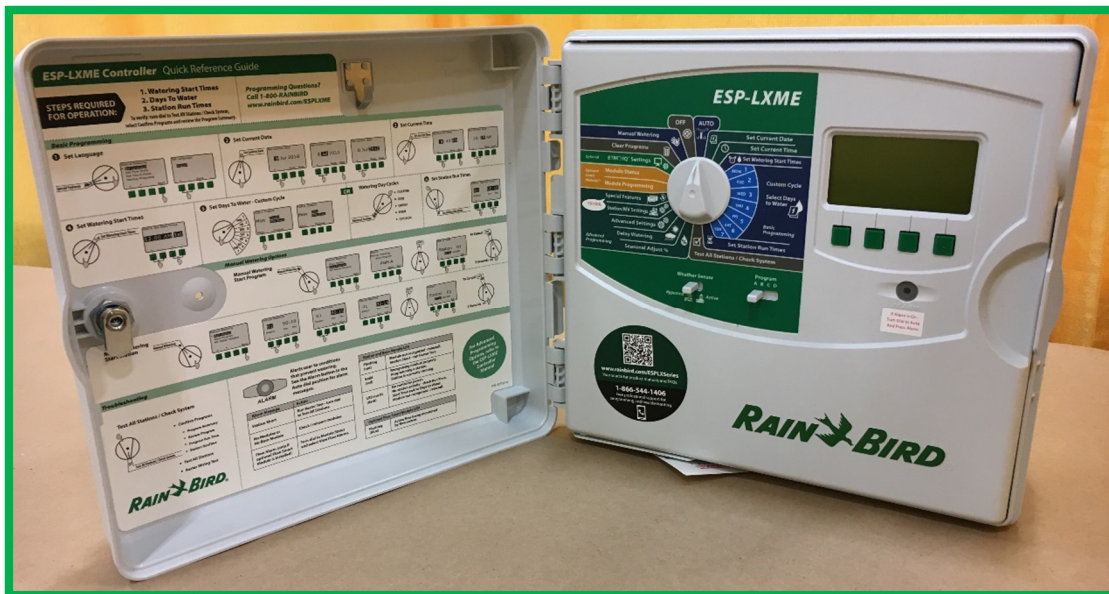


ALL TEAM MEMBERS WILL WEAR APPROVED SAFETY GLASSES DURING THE TEAM ACTIVITY

**NATIONAL FFA ORGANIZATION
AGRICULTURAL TECHNOLOGY & MECHANICAL
SYSTEMS
CAREER DEVELOPMENT EVENT
2017
TEAM ACTIVITY INSTRUCTIONS**



2017 Team Activity Supporter

Event Description

Your team has been tasked to develop and test an irrigation system with two inline electronic valves wired to an electronic irrigation controller. One valve will control a line leading to a mushroom bubbler. The second valve will provide water for a dripline system.

Tasks

1. Divide up the tasks among your team members.
2. Check the inventory of your components and supplies.
3. Measure and cut your PVC pipe to correct lengths (refer to *Project Cutting List*)
4. Assemble your manifold.
5. Assemble your drip irrigation line.
6. Test your completed manifold for leaks by connecting to a hose with a pressurized hose.
7. Wire your valves to the Rain-Bird Irrigation Controller at your station.
8. Set the timer to control your set of two valves. Be sure to note which two stations you wired your valves to.
9. Complete your typed Project Report
10. Save your typed Project Report to your yellow flash drive with the file name “[STATE] Project Report”.
11. When you have completed your tasks, notify the CDE Staff and wait for further instructions.

What to Submit at Completion of Event

- A completed Irrigation Assembly – labeled with a piece of tape and your State Name printed on it
- Printed Report – with your State Name on the Front Page
- Flash drive returned to CDE Staff

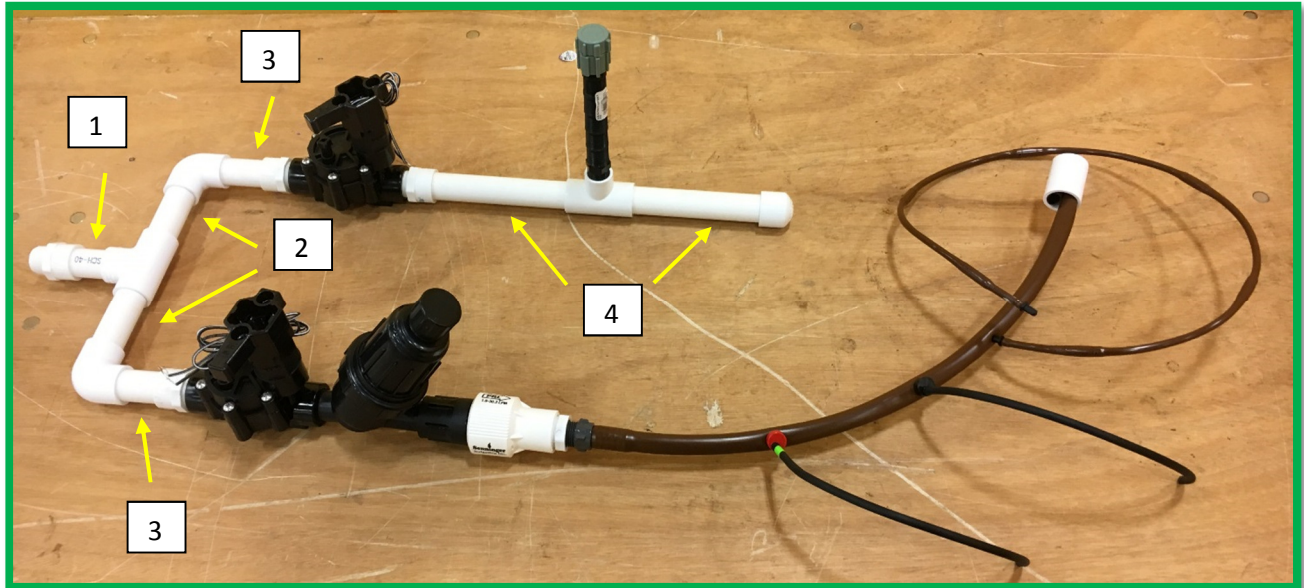


Figure 2. PVC Cutting Information

Typed Written Report Details

- Each team will prepare and submit a typed report.
- The report format will be double-spaced, using 12-size font (Arial, Calibri, or Times New Roman).
- Left justify your paragraphs.
- Single-space between paragraphs.
- Use correct grammar and punctuation.
- Write in complete sentences.
- Use the following section headings:
 - *Introduction*
 - *Delegation of tasks*
 - *Description of the Project*
 - *Steps to Assembly*
 - *Management Plan for Care and Maintenance of the Irrigation System*
 - *Discussion / Success or Challenges*
 - *Safety Practices followed by Team Members*
 - *Conclusion*
- The report will have a cover sheet with the following information:
 - *State Name*
 - *Name of Team Members*
 - *2017 National FFA Agricultural Technology & Mechanical Systems Career Development Event Team Activity*
- Each page will be numbered in the lower right hand corner.
- A hardcopy of the report will printed out and turned in as part of the completed project.
- A digital copy of the report will be saved to the flash drive and returned to the CDE Staff at the completion of the event.

Irrigation Project Cutting List

Use the tools provided to safely and accurately cut your PVC to the specified dimensions.

Part #	Item	Dimensions	No. Pieces
1	PVC Pipe	2.0 inches	1
2	PVC Pipe	3.0 inches	2
3	PVC Pipe	2.0 inches	2
4	PVC Pipe	6.0 inches	2

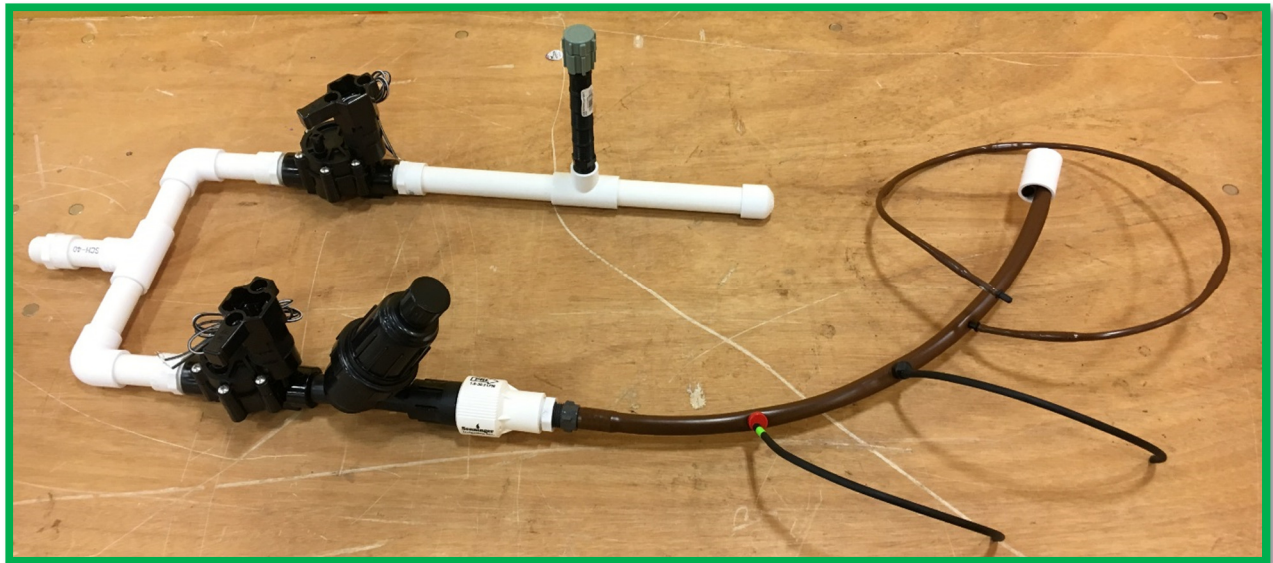


Figure 1.0 Finished Irrigation Project

List of Materials

	Description	Dimensions	No.
A	Schedule 40 PVC Pipe	¾-inch x 2-feet	1
B	Schedule 40 PVC Male Adapter	¾-inch	4
C	Schedule 40 PVC Reducer Bushing	¾-inch x ½-inch	1
D	Schedule 40 PVC Tee (SxSxS)	¾-inch	1
E	Schedule 40 PVC Tee (SxSxT)	¾-inch x ½-inch	1
F	Schedule 40 PVC Slip Cap	¾-inch	1
G	Schedule 40 PVC 90-degree Slip Elbow	¾-inch	2
H	Schedule 40 PVC Connector Slip	¾-inch	1
I	Inline Electronic Irrigation Valve	¾-inch	2
J	Plastic Screen Filter	¾-inch	1
K	Pressure Reducer	¾-inch	1
L	Poly Cut-off Riser	½-inch x 6-inches	1
M	Mushroom Bubbler	½-inch	1
N	Polypipe Drip Distribution Tube	½-inch x 2-feet	1
O	Polypipe Drip Distribution Tube (Spaghetti Tube)	¼-inch x 1-foot	2
P	Polypipe Drip Distribution Tube W/ Integrated Emitter	¼-inch x 3-feet	1
Q	Barb Connector	¼-Inch	1
R	Barbed Goof Plug	¼-Inch	1
S	Red Drip Emitter	2.0 GPH	1
T	Black Drip Emitter	0.5 GPH	1
U	Black Controller Wire	7 strand wire	1
V	Wire Nuts	Valve wire	2
W	*Poly Barb x Male Pipe Thread	¾- inch x ½- inch	1

NOTE: Check your ½-inch polypipe drip distribution tube. It may or may not have a barb fitting already installed.

Project Cutting List

Use the tools provided to safely and accurately cut your PVC to the specified dimensions.

Part #	Item	Dimensions	No. Pieces
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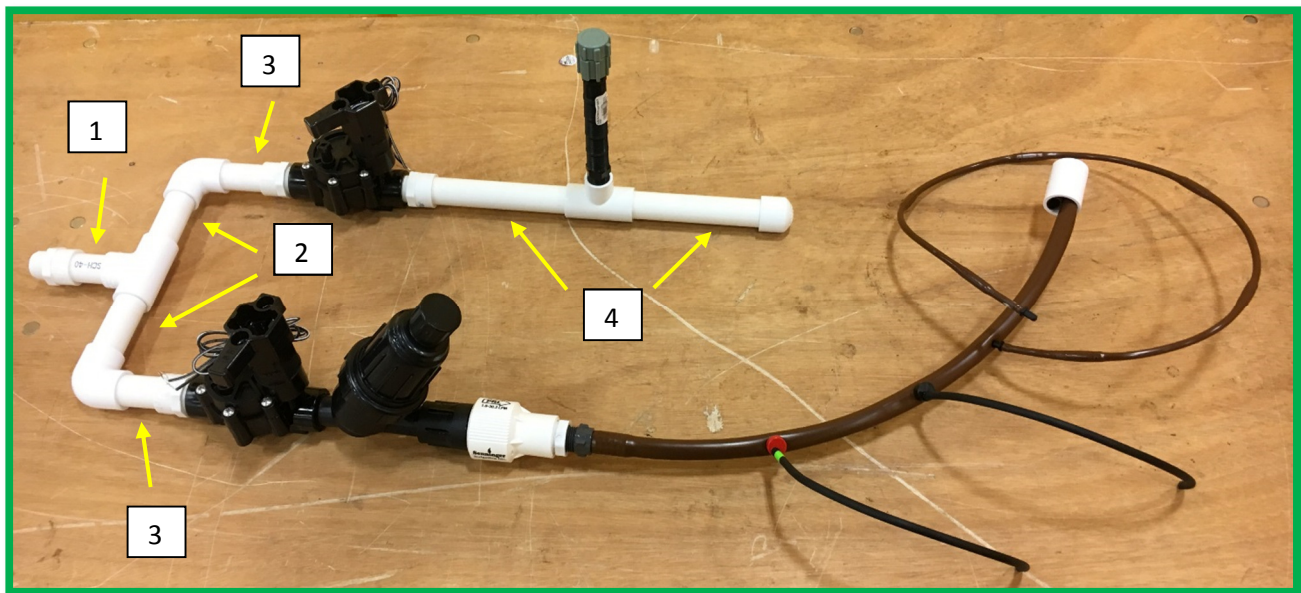


Figure 3. PVC Cutting Information

PVC Assembly Instructions

1. Begin with assembling your PVC lines.
2. Measure, cut, and assemble the PVC pipe and fittings.
 - On all PVC and irrigation components with threads, use Teflon tape.
 - On all slip PVC slip fittings, use primer & cement

DO NOT USE PVC PRIMER OR CEMENT ON THREADED COMPONENTS

Inline Electronic Valve Installation

After assembling your PVC pipe and fittings:

- Install inline electronic valve #1 with a male PVC adapter and install the mushroom bubbler line
- Install inline electronic valve #2 with a male PVC adapter and connect the screen filter and pressure reducer
- Make sure to install each component in the correct direction (flow →)

Mushroom Bubbler Emitter Installation

After Valve #1 install the following component:

- Mushroom bubbler on cutoff riser
- Install cutoff riser into PVC tee

Polypipe Drip Distribution Line Assembly

After Valve #2, install the following components:

- Sand filter
- Pressure reducer
- Reducer bushing
- Polypipe drip distribution line (1/2-inch)
- Locate the end of the 1/2-inch polypipe drip distribution line
- Using the punch tool, carefully install the 1/4-inch 2.0 GPH emitter
- Install one length of 1/4-inch x 12-inch polypipe drip distribution line
- Using the punch tool, carefully install the 1/4-inch 0.50 GPH emitter
- Install one length of 1/4-inch x 12-inch polypipe drip distribution line
- Install a 1/4-inch barb fitting using punch tool
- Install 1/4-inch x 3-foot polypipe drip distribution tube w/ integrated emitters
- Install a 1/4-inch goof plug into end of polypipe drip distribution tube w/ integrated emitters
- To seal end of 1/2-inch polypipe, fold over four inches of tubing and insert into PVC coupler

Wiring Valves to Rain-Bird Irrigation Controller

- Refer to **page 105** in the pdf of the ***Rain-Bird ESP-LXME Controller Installation, Programming & Operation Guide*** file on your flash drive.
- Look at the section titled: *Connect Field Wiring*.
- Each team will have their own black controller wire for connecting their valves to the timer.
- Two teams in adjoining booths sharing a table will each wire their **two valves** to the **same Rain-Bird Irrigation controller**.
 - One team is **TEAM A**
 - One team is **TEAM D**
- Select any color combination of wires to connect your valves to the controller.
- **Team A** will connect to **Controller Stations 1 and 2**.
- **Team D** will connect to **Controller Stations 3 and 4**.
- **Team A** will use **Program A**
- **Team D** will use **Program D**
- If you are uncertain, ask a CDE Staff member if your team is an “A” or “D”.
- Each electronic valve will have two wires.
- Be sure each set of wires on your controllers are connected properly.

Setting the Timer to Operate the Valves

1. Set the electronic valve on the drip station for one hour run time. Operating 3x week – Mon, Wed, and Fri. Starting at 8:00 AM.
2. Set the electronic valve on the bubbler station for 5 minutes of run time. Operating 2x week – Tue and Thu. Starting at 9:00 AM.

Testing Irrigation System

Each team will test their completed project for leaks and operation:

- When your system is ready to be tested, notify the CDE Staff.
- Connect the brass hose coupler on the garden hose to the PVC male adapter on your project (there are multiple testers).



Figure 4. Connecting your irrigation system to a water source

- CDE staff will turn on the irrigation controllers.
- If your system should experience a leak, go back and make the necessary adjustments and bring it back for testing.
- Once your system has been tested with the timer and controller, be sure to document your results in your report and begin cleaning up your workspace.