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# Water Wand Project

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Description:**

Use basic plumbing skills and common plumbing materials to create a watering wand.

**Materials:**

- (1) ½" x ¾" PVC hose adapter
- (1) ½" PVC 45° SS Elbow
- (1) Shower head
- (1) ½" PVC male adapter
- ½" PVC pipe, Suggest Schedule 40 or Class 315
- Optional: Spray paint
- Teflon tape
- PVC primer and glue

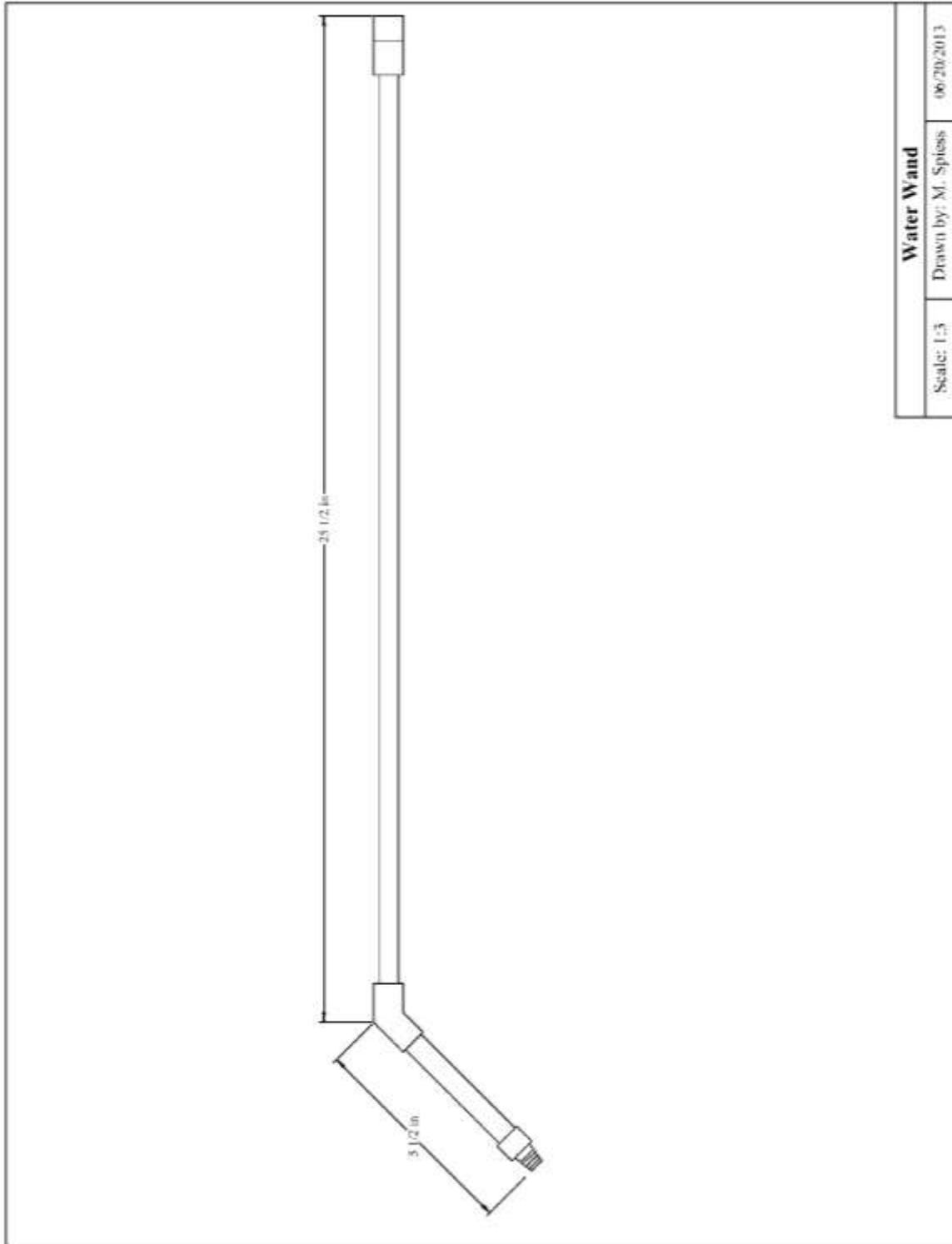
**Tools:**

- PVC Cutter
- Hacksaw
- Adjustable Wrench/Water Pump Pliers

**Procedure:**

1. Determine length of pipe sections by calculating fitting allowances and overall length of project.
2. Write the pipe lengths on your plan
3. Cut all pieces of pipe to length.
4. Layout pipe sections with the fittings. Do NOT assemble tightly in to PVC fittings as they will get stuck. Check your measurements.
5. Assemble the PVC pipe and fittings using PVC primer and cement.
  - a. Carefully coat the pipe end and fitting with primer. Note that primer is normally used on pipe 1" and larger, but this step will give you practice using primer. Primer is thin and runs easily apply it carefully.
  - b. Coat the fittings and the pipe with a thin coat of cement, twist the pipe 90 degrees as you assemble it, and hold the joint together for 30 seconds.
6. Pressures test your assembly.
7. Optional: paint your project.
8. Attach the shower head using Teflon tape.

**Photo/Drawing:**







## Water Wand Project Worksheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. How do you calculate the length of the pieces of pipe?

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2. What are the actual lengths of the PVC pipe pieces?

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3. Name the two ways to cut PVC pipe.

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4. What are the advantages/disadvantages of each?

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5. Why is important to twist and hold pipe when you glue it?

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6. What is the purpose of primer?

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7. What are the attributes of the PVC glue you are using?

Color: \_\_\_\_\_ Body: \_\_\_\_\_ Set: \_\_\_\_\_

8. Why is important to wrap pipe threads in Teflon tape?

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**Grading Rubric:**

| <u>CRITERIA</u>                           | <u>POSSIBLE</u> | <u>SCORE</u> |
|---|-----------------|--------------|
| Length main pipe                          | 5               |              |
| Length short pipe                         | 5               |              |
| Workmanship (no excess primer, or cement) | 5               |              |
| Fitting Test (no leaks)                   | 10              |              |
| TOTAL                                     | 25              |              |

## Water Wand Project Teacher's Notes:

Pressure testing of the project can be done with an air supply and a flat plastic storage container. Make a tester with a pressure regulator, a ball valve, and a ¾" male hose adapter. The tester is attached to the project at the hose fitting and the shower head is replaced with a threaded PVC cap. Then the project is dunked in the tray. Bubbles are bad.....

### Agricultural Standards Met:

- 6.0 Health and Safety. Students understand health and safety policies, procedures, regulations, and practices, including the use of equipment and handling of hazardous materials:
  - 6.1 Know policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities.
  - 6.2 Understand critical elements of health and safety practices related to storing, cleaning, and maintaining tools, equipment, and supplies.
  - 6.4 Maintain safe and healthful working conditions.
  - 6.5 Use tools and machines safely and appropriately.
  - 6.6 Know how to both prevent and respond to accidents in the agricultural industry.
- B1.0 Students understand personal and group safety:
  - B1.1 Practice the rules for personal and group safety while working in an agricultural mechanics environment.
  - B1.2 Know the relationship between accepted shop management procedures and a safe working environment.
- B4.0 Students understand plumbing system practices commonly used in agriculture:
  - B4.1 Know basic plumbing fitting skills with a variety of materials, such as copper, PVC (polyvinyl chloride), steel, polyethylene, and ABS (acrylonitrile butadiene styrene).
  - B4.2 Understand the environmental influences on plumbing system choices (e.g., filter systems, water disposal).
  - B4.3 Know how various plumbing and irrigation systems are used in agriculture.
  - B4.4 Complete a plumbing project, including interpreting a plan, developing a bill of materials and cutting list, selecting materials, joining, and testing.

### Objectives:

By properly completing this project, students will be able to:

- Read a plan and determine layout dimensions.
- Demonstrate proper PVC plumbing techniques.

### Alternative Tools/Methods/Materials:

- A bubbler can be used instead of a shower head
- Students could make a head by drilling holes in PVC pipe or cap

### Safety Review:

- Basic shop safety
- PVC primer/glue fumes

**Project Time:**

|                |            |
|----------------|------------|
| Demonstration: | 20 minutes |
| Build:         | 1 hour     |

**Demonstration Notes**

1. To find overall length of a section, measure length of the fitting and use standard pipe allowance (~ 1/2") to determine how long to cut each piece of pipe. Pieces will be shorter than overall length of the section.
2. Primer is not normally used on pipe under 1" in diameter. However you can apply on the project to demonstrate its use.
3. Do not dry fit PVC fittings. Fittings are tapered and will bind. If you want to demonstrate a "dry fit" you can cut a slot in the ends of the pipe, but this is not acceptable for an actual project as it will weaken the joint.
4. When cementing PVC pieces, give the parts a half turn when joining, then hold in place for several seconds until it sets. This will insure the cement lines the entire fitting and that pipe does not back out of fitting.

**Bill of Materials:**

| Projects: |                  | 24         |             |           |       |           |  |
|-----------|------------------|------------|-------------|-----------|-------|-----------|--|
| Size      | Description      | Units      | Qty/Project | Cost/Unit | Order | Amount    |  |
| 1/2"      | PVC pipe         | 20' length | 0.2         | \$3.81    | 5     | \$ 19.05  |  |
| 1/2"      | PVC 45 SS El     | each       | 1           | \$0.24    | 24    | \$ 5.76   |  |
| 1/2"      | PVC hose adapter | each       | 1           | \$1.83    | 24    | \$ 43.92  |  |
| 1/2"      | Shower head      | each       | 1           | \$3.00    | 24    | \$ 72.00  |  |
|           |                  |            |             |           | TOTAL | \$ 140.73 |  |

Project from: Hilmar High School. Plan by Mike Spiess and Dick Piersma