Product Safety	
Safety Parameter	Action
Students not to expose themselves to an electrical power source greater than 30 Vac or dc. Final product must be fully touch-safe to 30 V or less.	The circuit will use a max of 12V so will fall within guidelines.
All purchased electrical power sources must be touch-safe to 30 V or less, and must be CSA/ULC approved.	Currently undecided if using a purchased power source if we do it will be 12V max and be safety approved.
All circuits must include appropriately designed overcurrent protection where applicable.	This will be discussed with our technical advisor to see if it is necessary.
All circuit conductors must be suitably sized and rated in terms of ampacity, insulation voltage and temperature rise.	The wires that will be used will be more than sufficient for ampacity, insulation voltage and temperature rise.
All circuit components must be suitably rated based on design; maximum voltage, maximum current, maximum power dissipation, thermal derating, etc.	The components chosen are suitably rated for our design.
Electrical safety interlocks are used wherever required.	N/A
All mechanical hazards including pinch points must be suitably guarded.	N/A no mechanical hazards
Other hazards that must be suitably mitigated include, but are not limited to; compressed air or liquids, biohazards, lasers, chemical hazards, fire hazards, shock or arc-flash hazards.	The project uses sanitizer which is flammable and will be designed to be away from the circuitry.
Each project must be manufactured to all applicable codes and standards.	Manufacturing of our project will follow to all applicable codes and standards.

Manufacturing process safety	
Safety Parameter	Action
What parts of the project may have the potential to cause harm?	The pump is cheap and therefore has the potential to break easier than one of higher quality created possible projectiles if ran out of sanitizer. The sanitizer itself can be a hazard if ingested or if it gets in the eyes. Capacitor has the potential to explode if not installed properly.
Do I/we have the necessary training to ensure the safety of myself or others involved with the project? If not, where will I/we get the training required?	We will use the knowledge we have attained so far in this program. If we don't have proper training or aren't sure we will use the aid of our advisors.
What safety equipment will I/we need? Where will I/we get it?	Safety glasses are all we really need for our project which we should all have as they came in our kit and are used in our weekly labs. If new glasses are needed they can be bought at most big box stores.
Where is an appropriate location for working on this project? If the project is done at home, then each student must take care to work within his or her limits of expertise. If the project is done at a college laboratory, or equivalent, it is permissible to use equipment that is forbidden in a home environment. Supervision by a professional staff member of the institution is mandatory. The safety rules of the institution must be strictly observed.	The project can be worked on at the homework lab at the school or at home if the proper equipment is owned. For the programming portion, it would best be worked on using a personally owned computer.

1. Define entire manufacturing process by listing each task in sequence
    I. Safety glasses put on.
    II. Be in a ventilated work area.
    III. Put components into PCB one at a time soldering each component.
    IV. Solder wires between components (if not using custom PCB)
    V. For the microcontroller circuit solder components together using wires.
    VI. Connect the microcontroller to the PC and download the code.
    VII. Transfer circuits into the housing unit and secure them.
    VIII. Carefully add sanitizer to the holding tank.
    IX. Apply power source(s)

2. Review any and all potential hazards for each task
    - Projectiles wire cutting wires and component legs

- During soldering - solder splashing, toxic fumes
- Spilling of sanitizer
- Capacitor exploding when power is applied if not installed correctly

3. Use the hierarchy of controls as a means of determining how to best implement feasible and effective hazard control solutions for each identified hazard.

    a. **Elimination** (most effective) - physically remove the hazard
    - Not possible all components needed
    b. **Substitution** - replace the hazard
    - Not possible all components needed
    c. **Engineering controls** - isolate people from the hazard
    - Ventilation for fumes
    d. **Administrative controls** - change the way people work
    - Carefully handle sanitizer so as not to spill
    e. **PPE** (least effective) - protect the worker with personal protective equipment
    - Safety glasses must be worn
4. Specific safety precautions to be followed for each task
    - Have a clean work area
    - Ample space to move safely
    - Ventilation
5. PPE requirements for each task
    - Safety glasses should be always worn during manufacturing.
    - Safety glasses prevent any solder from getting in the eyes. A ventilated work area will keep us from breathing in toxic fumes.
6. Any other safety considerations
    - General work area cleanliness to prevent slips and trips