



National Student Design Competition

Open to programs in biomedical engineering, industrial design, and others.

Programs receive up to \$2000 in reimbursement for design costs.

First prize: \$1000, Second prize: \$750, Third prize: \$500.

Also \$500 awards for registration/travel to present a related paper accepted at a major conference.

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Design teams are welcome to enter in any of three target design areas for the imaginary clients indicated:

Accessible Weight Scale

Aim: An innovative, convenient, low-cost weight scale that meets the needs of the clients below.

Specs: It must be able to measure weight reliably to the nearest ½ lb, be easy to use while in a wheelchair or sitting, weigh in 30 sec, provide output in alternative formats/transmission, and be convenient in home setting.

Clients: Bruce, Joan, Mary, Lloyd, Sophia, Dave, Wanda, Bob

Accessible Syringe Dosing

Aim: A reliable, low-cost, easy-to-use mechanism for enabling automated dosing of medications.

Specs: It must be able to dose reliably to the nearest 0.01 cc [using standard 1 cc syringes (¼" dia.) that are common for delivery of insulin, heparin], be able to gently mix before dosing, and be universally easy to use.

Clients: Lloyd, Sophia, Arnold, Dave, Wanda (and Bob)

Accessible Ergometer

Aim: A creative cycle ergometer that is usable by individuals with a diversity of abilities.

Specs: It must be easy to get into, feel stable, be easy to adjust even with low strength or flexibility, have an easy-to-view display, and be targeted for under \$1000 retail. (Can start with existing unit, if less than \$500 retail.)

Clients: Sophia, Lloyd, Sophia, Arnold, Wanda, Bob

Bruce. Bruce was born in 1960. He is an aerospace engineer and vehicle enthusiast who lives with his wife and one cat. In 1999, he was involved in a serious motorcycle accident which resulted in the paralysis of his legs. Due to renal failure in 2003 he now needs to weigh himself every day; he needs a convenient weight scale.

Joan. Born in 1919, Joan has raised 5 children and has many grandchildren and great-grandchildren. Now a widow and living in a convalescent home with heart failure, she is relatively sedentary and is fragile and weak.

Mary. Diagnosed with Multiple Sclerosis in 1994, Mary's condition has declined steadily over the past 10 years. Now age XX, she uses a walker and is able to stand without support for 1 minute. She also has poor eyesight.

Lloyd. Lloyd, a retired pharmacist, was born in 1926. Diagnosed with Type 2 Diabetes in 1989, Lloyd has poor eyesight and, due to poor diet and lack of exercise, is very overweight (400lbs).

Sophia. Sophia was born in 1920 and emigrated to the U.S. from Poland in 1937. In relatively good health, Sophia suffered a stroke in 2002. She had several small strokes in 2003, and now takes heparin as a precautionary measure. She has limited right arm function, walks using a cane, and needs an exercise bike that is more stable than her current one.

Arnold. Arnold was born in 1952 and works as a janitor in a large manufacturing company. He has diabetes and Parkinson's disease, and experiences slight to moderate tremors.

Dave. Retired from the Navy in 1989 after a serious heart attack, Dave was diagnosed with Type 2 diabetes in 2000. Dave has limited use of his right leg due to an injury sustained while serving in the Navy. He uses a cane.

Wanda. Born in 1994, Wanda is deaf and has diabetes. Wanda weighs 80 lbs. She is being encouraged to start administering insulin to herself, as her mother recently passed away and her father, Bob, is blind. She and her father would like to start an aerobic exercise routine together.

Bob. Born in 1956, Bob is blind and works as an accountant for the State of Connecticut. His weight fluctuates a lot, and he likes to stay fit by exercising on a cycle ergometer. With the recent death of his wife, Bob would prefer to exercise less at the local YMCA more with his daughter, Wanda, at home.