

2010

DESIGN SQUAD

Science, Technology, Engineering, Mathematics (STEM)
Life and Physical Science



36 30-min. Programs
Grades 6-8
Website
SOL Correlations Below

This reality competition series—with an accompanying outreach campaign and website—is designed to inspire a new generation of engineers. Under intense pressure, eight high schoolers learn to think smart, build fast, and contend with a wild array of engineering challenges—all for real-life clients. Targeted at 9 to 12-year-olds, DESIGN SQUAD is the fuel behind a national, multimedia initiative designed to attract kids to engineering. Working in groups of four, each team has just two days to get it done! What they do ranges from converting kiddie toys into dragsters, to building 20-foot bridge, to designing a low-cost peanut butter machine for a women's collective in Haiti. Heeding a few words of wisdom from DESIGN SQUAD's engineer host, contestants brainstorm, design, build, test and re-design. Keeping their eyes on the grand prize—a \$10,000 college scholarship—and their cool when things get hot, the contestants discover that engineering can make anything possible! Episodes may also be seen at www.pbs.org/designsquad.

TEACHER NOTE: Content and design process are recommended for upper elementary and middle school. Recommend previewing for upper elementary and for Math SOL. Math SOL include: 4.11, 4.13, 4.15, 5.8, 5.14, 6.10, 6.16, 7.9. Additional Math SOL may be found with episode descriptions.

101. The Need for Speed — A professional racecar builder challenges the Design Squad teams to convert kiddie toys—a red wagon and tricycle—into motorized dragsters.

D-Squad Pro File: Former oil engineer, Pete Bethune, goes green by designing the world's first high-speed powerboat-fueled entirely by biodiesel. Listen in as Pete lays out his plan to circumnavigate the globe in his clean, green machine-EarthRace.
Science: 4.2, 4.3, 6.2, PS.1, PS.6, PS.10, PS.11

102. Rock On — The teams compete to create original musical instruments—one stringed and one percussive—for Off White Noise, a local band. The instruments are put to the test when Off White Noise rocks out at the Middle East nightclub.

D-Squad Pro File: Hasbro toy engineer Amanda Bligh demonstrates how work can be play when you spend your day designing products like Nerf Hoops and Nerf Blaster.
Science: 5.2, PS.1, PS.8

103. Skunk'd — When a guy named Skunk comes looking for a bike bizarre enough to impress the members of SCUL (Subversive

Choppers Urban Legion), you give him what he wants. The rubber really hits the road when Design Squads parade their newly created choppers (bikes) on a SCUL mission.

Science: 4.2, PS.1, PS.10, PS.11

104. DS Unplugged — The teams take a crash course in pre-industrial building techniques, as they compete to build 20-foot bridges—without the aid of power tools, forklifts, or...flushable toilets. It's a show for the (Middle) Ages!

D-Squad Pro File: Jennifer Nakayama of SeaWorld puts to use her skills as an environmental and civil engineer to create a cool new habitat for warm weather Humboldt penguins.

Science: PS.1, PS.10

105. Got Game — Challenged to come up with a way to cover all the angles of a basketball game via remote-controlled cameras, the teams dive into action and compete to prove who's got (the whole) game!

D-Squad Pro File: Coming up with ways to map underwater terrain takes some deep thinking. Oceanographic engineer Amy

Kukulya dives right into the challenge by designing torpedo-shaped robots that chart the contours of the ocean's floor.

Science: 4.2, 4.3, 5.2, PS.1, PS.10, PS.11

106. A Collective Collaboration — The teams set their sights on designing the most durable, portable and low cost peanut butter making machines for a women's collective in Haiti. Powered by human hands and inspiring to the human heart, Design Squad shows that engineering really can change lives.

D-Squad Pro File: A mother of three, Debbie Theobald knows all about coming to the rescue. Watch how Debbie and a team of engineers bring to life BEAR, a robot designed to remove people from dangerous settings and situations.

D-Squad Pro File: Employing the same skills he uses in his work at NASA, Evan Thomas, a volunteer working with Engineers Without Borders, designs water recovery and purification systems for use in the arid country of Rwanda.

Science: 4.2, 4.3, 5.2, PS.1, PS.2, PS.10, PS.11



These programs are licensed through WVPT and may be obtained on DVD or videotape from your school or division media center. (Cont.)

DESIGN SQUAD (Continued)

107. Just for Kicks — The challenge: design a REVOLUTIONary device that automatically feeds a stream of balls to Michael Parkhurst, a professional soccer player with the New England Revolution. Here's one Design Squad episode that's sure to be a ball.

D-Squad Pro File: Burton snowboard gurus, Scott Keller and Chris Fidler, fill us in on how they design bindings that really click and boards that excel on any snowy terrain. It's a process of ups and down, leaps and landings as the Burton boys carve up the slopes.

Science: 4.2, 4.3, PS.1, PS.10, PS.11

108. Functional Fashion — It's a marriage of high tech and haute couture as the teams compete to see who can design the best dual-purpose clothing. Join Design Squads on the runway as the garments/gadgets make their fashion debut.

D-Squad Pro File: Medical science meets tissue engineering as Dr. Howard Pryor develops an implantable device designed to help people suffering from liver disease.

Science: PS.1

109. Batter Up — How to make a perfect pancake? The Design Squad teams seek the right ingredients for a machine that will cook, flip, and serve up delicious flapjacks at the flick of a switch. The winning machine is put to the (taste) test at a busy diner.

D-Squad Pro File: Working with the innovative ice cream recipes of Ben & Jerry's food scientists, mechanical engineer Pete Goselin creates specialized machinery to produce the perfect balance of Chunky and Monkey.

Science: 4.3, PS.1, PS.2, PS.6, PS.10, PS.11

110. Pumped — An 11-foot tall water slide will be a cool addition to the community pool...once there's a pump to deliver the water. See which invention makes the biggest splash with YMCA campers.

D-Squad Pro File: Mechanical engineer Sarah Grenier fulfills her need for speed by transforming her beat up VW into a sleek, slick racecar...and races it herself.

Science: 4.2, 4.3, 6.5, PS.1, PS.10, PS.11
Math: 8.7

111. Blowin' in the Wind — The teams tap into their inner artists as they compete to design and build wind-powered kinetic art from recycled materials. The winning sculpture is put on display at the DeCordova Museum and Sculpture Park in Lincoln, Massachusetts.

Science: 4.2, 6.2, 6.6, 6.9, PS.1, PS.6, PS.10

112. Bodies Electric — Design Squads take a shine to hip-hop artist Wyatt Jackson

when they try to create a sound and light show triggered by Jackson's moves and grooves. In a live performance, it's Design Squad's night at the Strand Theatre!

D-Squad Pro File: Electrical engineer Lt. Darrin Barber plumes the depths of sonar technology in his work on the U.S. Navy's newest-and most high-tech-submarine, the USS Texas.

Science: 4.2, 5.2, 5.3, PS.1, PS.8, PS.9, PS.10, PS.11

113. Winner Takes All — The season concludes when Continuum (a design consulting firm) asks the teams to develop and test a "summer sled" for retail giant L.L. Bean. It's a bumpy, downhill slide to the finish line!

Science: 4.2, PS.1, PS.10

201. Cardboard Furniture — Sit back and relax as the Design Squad teams create innovative, yet practical cardboard furniture for the home goods superstore IKEA. Furniture shoppers take a seat in the judges' chair to decide the season premiere's winning team.

D-Squad Pro File: Jennifer Chua is a packaging engineer who works at Method, a company in San Francisco that specializes in nontoxic, biodegradable products. Jennifer makes high-quality products that are both good-looking and good for the environment.

Science: PS.1, PS.10, PS.11

202. PVC Kayak — Jump on board as King Island Alaskan native Sean Gallagher challenges the Design Squad teams to build ten-foot kayaks using traditional design but with non-traditional materials.

D-Squad Pro File: Mechanical and design engineer Connie Yang is as extreme as the high-tech tents she designs for NEMO Equipment.

Science: 4.2, 6.5, PS.1, PS.10

203. Green Machines — The teams go green as they work with the Food Project, an organization that creates social change through sustainable agriculture. Two young Food Project volunteers challenge the teams to design a compost lifter for their urban farm.

D-Squad Pro File: Industrial engineer Erin Gately creates new, environmentally friendly products for Hewlett-Packard by ensuring that HP's computer products are made with fewer non-recyclable materials.

Science: 4.2, 4.3, 6.2, 6.3, PS.1, PS.10, PS.11

204. Gravity Bikes — Watch the Design Squad teams in a head-to-head competition as they build high-speed, gravity bikes for Gravity Sports International champion, Tom Whalen.

D-Squad Pro File: Gael Force Team 126 from Clinton, Massachusetts is one of more than 1,300 teams that compete each year at the annual FIRST (For Inspiration and Recognition of Science and Technology) Robotics competition. Teams had just six weeks to design, build, and test a robot that raced around a track to move a 40-inch inflatable ball.

Science: 4.2, 6.2, PS.1, PS.10

205. Water Dancing — Dancer and performance artist Lisa Bufano, a bilateral leg and finger amputee, challenges the teams to build specialized prostheses for an underwater performance.

D-Squad Pro File: Greg Jones applies his mechanical engineering skills in a broad range of artistic endeavors including "La Contessa," a replica of a 40-foot Spanish galleon built over a school bus.

Science: 4.2, 6.5, PS.1, PS.10

206. Backyard Thrill Ride — The teams bring the adrenaline rush of an amusement park ride to the backyard of 13-year-old Andreas Hoffman.

D-Squad Pro File: What is more fun than riding a roller coaster? Ask mechanical engineer Chris Gray and he'd say building one. At Greater Coaster International, Chris applies his creActivity and engineering know-how to build exhilarating roller coasters.

Science: 4.2, PS.6, PS.10

207. Big Bugs — Design Squad gets back to nature as the teams sculpt large-scale insects from found forest materials. The winning arthropod will be on display at the New England Wild Flower Society's Big Bugs exhibit.

D-Squad Pro File: Matt Sisul and William Cao are structural engineers who volunteer for Engineers without Borders to promote urban development in Africa and South America.

Science: LS.4, LS.5, LS.10, LS.13, LS.14

208. Aquatic Robotics — Super Duck Excursions, the Boston-based terra-amphibious touring company, challenges the teams to create underwater radio-controlled robots to spice up their narrated tours.

D-Squad Pro File: Anthony Westphal, a mechatronic engineer at the Marine Systems Engineering Laboratory at Northeastern University, combines both mechanical and electrical engineering while working on robots that mimic biological animals, including a lamprey-swimming robot.

Science: 4.2, 4.3, 5.2, 6.2, 6.5, PS.1, PS.8, PS.10, PS.11

209. Band Cam — There's nothing like the World Music rhythms of Zili Misik to send the Design Squad teams into an artistic

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DESIGN SQUAD (Continued)

groove. The eight-member all-female band challenges the teams to create remote-controlled aerial camera systems to cover their live performance.

D-Squad Pro File: Mark Caylao, Head Engineer for Airship Management Services in North Carolina, maintains and operates some of the world's largest blimps for everyone from presidential candidates to the military.

Science: 4.3, 5.2, PS.1, PS.8, PS.11

210. No Crying in Baseball — The teams must hit a home run for Del “The Dogman” Christman-local celebrity and hot dog vendor for the Lowell Spinners (a Class A affiliate of the Boston Red Sox)-who is in need of an onion dispenser to dress up his dogs.

D-Squad Pro File: Curtis Cruz and Becky O’Hara, engineers for Rawlings Sporting Goods, have a dream job that combines their passion for baseball with their love of math and science.

Science: 4.2, 4.3, PS.1, PS.10, PS.11

Math: 8.7

211. Hockey Net Target — Boston Bruins defenseman Matt Lashoff challenges the teams to build remote-controlled hockey net targets.

D-Squad Pro File: Leila Hasan combines creActivity with technology as the lead engineer for the GigaPan, a robotic device that takes high-resolution panoramic imagery for consumer use.

Science: 4.2, 4.3, PS.1, PS.8, PS.11

212. Off-Road Go-Karts, Part 1 — In this two-part season finale, the teams revamp gokarts in a high-speed off-road race. The fastest go-kart will be featured in MAKE Magazine, and the contestant who ends up with the most total points wins... a college scholarship provided by the Intel Foundation.

D-Squad Pro File: Arie and Griffen Ouimet, twin teenaged brothers, race go-karts at the SSC East racetrack in Braintree, Massachusetts. Arie prefers to be behind the wheel, while Griffen puts his engineering skills to work in the pits. The brothers are mentored by Dave Davidson, a mechanical engineer who developed the Freedom Wheel, a go-kart steering wheel that works without foot controls.

Science: 4.2, 4.3, 6.2, PS.1, PS.6, PS.10, PS.11

213. Off-Road Go-Karts, Part 2 — Continuation from program 212.

301. Moving Target — The Design Squad teams reach new heights by building indestructible, remote-controlled, flying football targets for Nerf toymaker Hasbro. Future football stars judge the designs for the kick-off episode of season three. Highlights: Electrical circuitry

Science: 4.1, 4.2, 5.1, 6.1, PS.1, PS.10

302. Crash-Test Rugby — U.S. Paralympic athlete and wheelchair rugby player Kerri Morgan asks the teams to track her every move on the court by building an automated wheelchair that simulates a defensive player on the attack.

Highlights: Light infrared signals motors circuitry

Science: 4.1, 4.2, PS.1, PS.10

303. Water Rescue Part 1 — The Design Squads builds remote-controlled, aquatic pet rescue vehicles for the New Orleans Fire Department.

Highlights: Electricity

Science: 4.1, 4.2, 5.1, 6.5, LS.10, PS.1, PS.10

304. Water Rescue Part 2 — Continuation from program 303.

305. Shooting for the Sun — It comes down to the buzzer when WNBA players Lindsay Whalen and Tamika Raymond challenge the Design Squads to build T-shirt shooters that reach their arena’s upper deck. The winning T-shirt shooter is announced live at a Connecticut Sun home game.

Science: 4.1, 4.2, 5.1, 6.1, PS.1, PS.10

306. sNOw Problem? Part 1 — Come along for the ride as the Design Squads build dry land dog sleds for Jamaican Dog Sled team members Damion Robb and Newton Marshall.

Science: 4.1, 4.2, 5.1, 6.1, PS.1, PS.10

307. sNOw Problem? Part 2 — Continuation from program 306.

Science: 4.1, 4.2, 5.1, 6.1, PS.1, PS.10

308. Tour de BBQ — The competition heats up when Redbones BBQ Restaurant owner, Rob Gregory, challenges the teams to build a bicycle-powered rotisserie.

Science: 4.1, 4.2, 5.1, 6.1, PS.1, PS.10

309. Escape from Misery Island Part 1 — In the final showdown, the teams test their sea legs by building sailboats to race across the open ocean. The captain of the winning team is awarded a \$10,000 college scholarship from the Intel Foundation.

Science: 4.1, 4.2, 4.6, 5.1, 5.6, 6.1, 6.5, PS.1, PS.10

310. Escape from Misery Island Part 2 — Continuation from program 309.

Science: 4.1, 4.2, 4.6, 5.1, 5.6, 6.1, 6.5, PS.1, PS.10

Additional Resource Information:

The website to support this series is found at <http://pbskids.org/designsquad>