

BIONIC / ROBOTIC HAND KIT®

2021 COMPETITION

17th Annual Expo at the Miami Dade District SECME Olympiad

New Virtual Format: Video submissions due February 6, 2021 • Winners announced February 13, 2021

Imagine the excitement of:



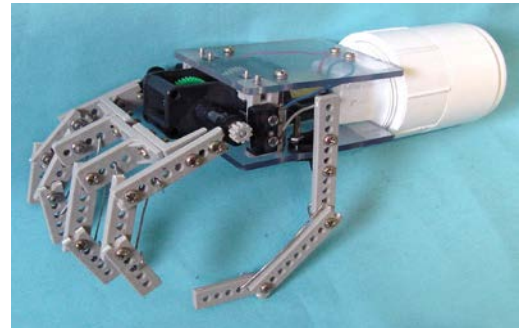
Working as biotech inventor and entrepreneur



Creating a functioning bionic hand prototype



Competing with other students for awards!



THE CHALLENGE – You will act as the founder of a new biomedical company that is pursuing a large U. S. Government prosthetics contract. To win the contract you must redesign the Mark I, an existing bionic hand. All parts, tools and instructions to build the Mark I will be provided. You must find ways of improving the function and appearance of this Hand without exceeding a fixed budget. To compete you must: (A) complete a functioning re-engineered hand prototype; and (B) create a video presentation which thoroughly explains and demonstrates your prototype.



THE COMPETITION – Your video will be viewed by a panel of judges. Prizes will be awarded to entrants who score the highest points overall in four judging categories.

ELIGIBILITY – Individual students can enter in the Middle School Division or Senior High Division. Only one student can represent a school; NO TEAM ENTRIES.

HOW TO ENTER – To receive the official Mark I Bionic/Robotic Hand Kit, complete the Entry Form and return with \$125 registration fee (credit card, Zelle or check only). For forms and additional information please contact *The Yaeger Foundation, Inc.* at: 305.751-4208; fax 305.691-3784; yaegerco@gmail.com.



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2021 BIONIC/ROBOTIC HAND KIT® COMPETITION

This Competition provides a hands-on STEM career exploration experience. Students will re-engineer a prosthesis and simulate presentations delivered by biotechnology entrepreneurs. The Bionic/Robotic Hand Kit Competition was created by Ivan Yaeger, Chief Executive Officer of The Yaeger Companies and inventor of the patented Yaeger Arm prosthesis.

Please read these rules carefully!

NEW VIRTUAL COMPETITION FORMAT

- You can compete only as an individual student.
- CAD drawings and photos can be included to illustrate engineering changes.
- You must create a presentation video (3 minutes maximum length) consisting of:
(1) Demonstration of the hand prototype; (2) Presentation of drawings/photos; (3) Explanation of all modifications, features and budget; and (4) Demonstration of prototype handling several objects.
- Handling of objects will replace the timed table challenge. This demonstration is included in your presentation and will not be a separately-timed challenge. You must show the prototype being used to: **(1) pick up and release a sheet of paper; (2) pick up and release a drinking cup (plastic, paper or Styrofoam) and (3) pick up a full 16.9 OZ (500ML) bottle of water and pour contents into the cup. You will supply these items.**
- Upload your presentation video to the SECME SharePoint site by February 6th for judging and public viewing.
- Winners will be announced on February 13, 2021.

DESIGN PARAMETERS

You will begin by building the Bionic/Robotic Hand Kit, which you will receive upon submission of the \$125.00 registration fee. Re-engineer the Hand to produce your own custom-designed prototype. The prototype must be designed to be a wearable prosthesis that can be used by a hand amputee. It must therefore be (1) lightweight; (2) powered by a portable, self-contained power source; (3) provide the ability to grip, manipulate and hold objects; and (4) be easily and safely operated by a physically challenged user. However, the hand can also have other industrial uses in robotics and other applications. You can incorporate virtually any material, mechanical system, power system and control system. Points will be awarded on technical innovation and creative use of improvised materials. Creativity and recycling of salvaged materials will generate greater points. You must spend no more than \$200 for additional materials and components. Expenses must be documented by submitting a detailed budget and copies of receipts.

JUDGING CATAGORIES

Total points awarded from the following will be tallied to determine First, Second and Third Place.

Innovative Engineering – Points are awarded for creative design and construction. Modifications to the original Hand Kit can include added and/or improved motion, functions and control systems.

Product Demonstration – The functionality your design is assessed by evaluating motion, control, dexterity and strength. You should be able to hold the prototype with one natural hand and use it to grasp, manipulate and release the objects listed above.

Most Realistic Prosthesis – Points are awarded for special attention applied to cosmetics and motion which produce the most aesthetically refined prosthetic hand prototype.

Effective Presentation -- Teams will explain their design modifications, unique features, materials used and budget of their prosthetic prototypes. Benefits provided to a patient must be explained.

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Sample Rubric Score Sheet

SCHOOL: _____ **NAME:** _____

Please evaluate the following with 5 to 1 as Strength (5) to Weakness (1). Comments will be evaluated in case of a tie.

Innovative Engineering	Points	Comments
1. Creative engineering that improves Mark 1 Hand		
2. Modified and/or additional functions and features		
3. Compliance with competition rules and parameters		
4. Innovative use of materials		
Product Demonstration	Points	Comments
1. Completion of object handling tasks		
2. Engineering changes are clearly displayed		
3. Operation of prosthesis using one natural hand		
Most Realistic Prosthesis	Points	Comments
1. Life-like appearance and size		
2. Can be easily operated by a physically-challenged user		
3. Movement closely mimics the human hand		
Effective Presentation	Points	Comments
1. Design modifications and unique features are thoroughly explained		
2. Detailed explanation of function and materials used		
3. Documentation of detailed budget		

Total Points: _____

BIONIC/ROBOTIC HAND KIT® COMPETITION

2021 MIAMI DADE ENTRY FORM

- You may purchase additional Bionic/Robotic Hand Kits for a class activity or spare parts.
- You may order kits for several students, but must select ONE student per division to submit a presentation video.
- All Kits will be shipped to school or student's home (please indicate preference below)

School: _____

Ship To Address: _____ City _____ Zip _____

Phone: _____ Fax: _____

E-Mail: _____

Teacher/Sponsor: _____

Number of Kits Needed _____

Is Ship To Address a home or school? _____

Student Name (if not yet selected write TBA):

Item	Price per Kit	Quantity	Total
HK-2 Bionic/Robotic Hand Kit w/Tool Set	\$ 125		\$
TOTAL			\$
Card type (debit, credit)		Exp. Date	
Card #		Security code	
Billing Name			
Billing Address			

Fax or mail this form with credit card information or check for \$125 per team to:

The Yaeger Foundation, Inc.

Attn: 2021 Competition

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Miami, FL 33150

Fax to: (305) 691-3784

Email to: yaegerco@gmail.com

Call us at (305) 751-4208 or (305) 342-3005 for other options (Zelle, CashApp, card by phone).