THE EDUCATION FUND
CELEBRATING 30 YEARS
2015-2016

ideas with IMPACT

idea packet

Sponsored by:

FPL

Ford Motor Company Fund

Re-Ro: Repurposed Robots

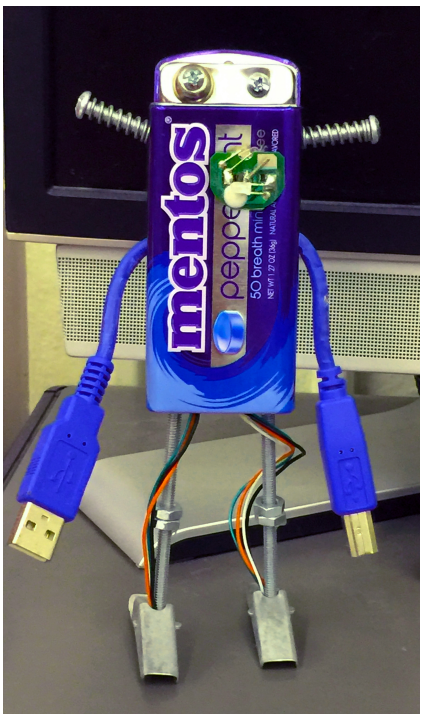
RE-ROS (REPURPOSED ROBOTS)

DISSEMINATOR: CHRISTIAN GALVEZ

CGALVEZ@DADESCHOOLS.NET, ENXOKO@MAC.COM

CAMPBELL DRIVE K-8 CENTER

SCHOOL MAIL CODE: 0651



FOR INFORMATION CONCERNING IMPACT II OPPORTUNITIES INCLUDING
ADAPTER AND DISSEMINATOR GRANTS, PLEASE CONTACT:
THE EDUCATION FUND
305-558-4544, EXT. 113
EMAIL: IMPACT@EDUCATIONFUND.ORG
WWW.EDUCATIONFUND.ORG

TABLE OF CONTENTS

Goals and Objectives:

Repurposing everyday materials to construct a functioning robot can make human lives easier and more pleasurable. As students gather discarded objects at home in order to assemble a robot at school that can aid in making classroom workload more enjoyable, they will discover mathematical and engineering principles that are integral in creating artificial intelligence.

Florida Standards:

Applied Robotics-

08.0 Describe the operation of basic electronic devices used in robotics.

09.0 Demonstrate an understanding of engineering principles.

11.0 Demonstrate the safe and proper use of electronic and other lab equipment, tools, and materials.

12.0 Build, program, and configure a robot to perform predefined tasks.

13.0 Solve problems using critical thinking skills, creativity and innovation.

16.0 Explain how electronic devices are used in the operation of a robotic assembly.

20.0 Describe the operation and use of various forms of electrical motors in robotic assemblies.

21.0 Solve problems using critical thinking skills, creativity and innovation.

23.0 Design, build, program, and configure a robot to perform predefined tasks.

Course Outline/ Overview-

I. Group discussion on Robotics/A.I. in history and pop culture.

A. Pre-assessment Robotics/A.I. quiz

B. Team brainstorming

II. Design Phase

A. Drawings and planning

B. Critiquing and Tweaking

III. Pre-production Phase

A. Gather Materials

B. Inventory Materials and Tools

IV. Engineering Phase

A. Assembling robots, break off into groups or work separately

V. Evaluation Phase

A. Analyze and correct designs issues

B. Check for craftsmanship, make adjustments

VI. Presentation Phase

A. Choose a theme song to present your robot with

B. Customize your own song with lyrics particular to your project

VII. Recording Phase

Using science or math journals, record successes and struggles throughout every phase, includes illustrations

VIII. Assessment Phase- Using a predetermined rubric, journals, teamwork, presentation, and final project will be assessed.

Materials:

Students will participate in acquiring materials 1 week prior to project commencement.

Teacher will also contribute with some of the following:

small metal spoons

metal cans with unique shapes (rectangular possibly)

buttons

old toys with LED lights

miniature flashlights

Teacher or Student smartphone (To be incorporated w/ project but not permanent)

old computer parts

old (working) cell phones

small metal or plastic boxes

robotic looking parts

wires or old computer cables, ethernet cables

remote control cars

gears

Box of machine screws and nuts

***Teacher will provide: pliers, adjustable wrench, utility knife, hot glue gun and sticks, drill and bits, measuring tape, pencils.

Vocabulary List:

craftsmanship, design, engineer, device, assemble, technical, technology, critique, constructive criticism, evaluate, assess

Steps for making a small Repurposed Robot or Re-Ro:

(Use student science journals for all designs, calculations, and observations.)

1. ***Design Phase:*** Work as a class or in small groups to come up with designs for your robot. Designs must take into consideration the materials gathered. If working as a class, all materials are available for design and use. If working in small groups, you are limited to what team members have brought in. Have a purpose or function in mind that is reasonable with the parts available. Make sure to include a compartment to hold the smartphone or device that will be the "Heart and Brain" of the robot (This means the electronic device will be encased in the robot structure, and serve as a functional part of the robot itself. Research will have to be done to see what apps can be utilized for this project, such as a vocal transformer that can make your human voice sound like a robot, or some other cutting edge app that would make classroom learning more fun). Each student can create 2-3 designs that are distinct in size and form. For example, one short and stout robot, as well as one tall slim one. Illustrations should include color, labeling, and front and back views. Labeling includes lines or arrows pointing to the different elements within the robot. State what material it is made out of, what is the function, or

some other idea or important fact that should be considered. Refer to technical drawings or artists' sketches found on the resources page of this packet when in the design phase.

2. ***Engineering Phase:*** students begin assembling parts together. Older students can work more independently, with adult supervision. Younger students will benefit from a whole group project, with one class robot being assembled with the help of every student. This is where the teacher will supervise older students to ensure all safety precautions are being followed. Make sure to review these safety precautions prior to engineering phase commencement. Extra caution should be used when drilling holes or cutting out pieces with a utility knife. Only the teacher should be cutting or drilling with the younger groups, while a permission form should be required when working with older students.

3. ***Evaluation Phase****:* Check for craftsmanship, aesthetic value, and ease of use. Are the design and robot matching? If there are any issues, they can be addressed in this phase. Make sure constructive criticism is modeled and adhered to. Give solutions to one another's problems, not insults or ridicule. This phase is important because it allows for corrective feedback that the team can take back into the project. Here is where changes in design, or selection of materials needs to happen. For example, if a material seems too flimsy, replace with a heavier, sturdier one. If something keeps coming apart, re-evaluate how it is attached. All of these details should be considered as teams will be evaluated on craftsmanship, not just the design. Craftsmanship is a key vocabulary word discussed prior to phase 1.

4.***Presentation Phase:*** Select or create a theme song in order to present your robot. Some songs are listed in the resource page of this packet. Embellish the song with a choreography that the group or class can dance to. Write a story that retells the creation of your robot, or create a book that places your robot in a futuristic setting, complete with an arch nemesis and a great plot. Combine your story, song, and dance to make a wonderful performance!

5.***Recording Phase:*** This phase should be ongoing for older students, or can be addressed at the end with younger ones. Have students document the projects' struggles and successes in their science journals. Refer to technical drawings and blueprints found in the resources page of this packet for ideas. Drawings should be labeled and colorful. The purpose is to document what the actual robot looks like, or what the materials used were. Writing should definitely be incorporated in this phase. Have students suggest statements or words describing difficulties or challenges, as well as positive words detailing triumphs. These phrases can then be written for the class (e.g. on a Promethean Board) to transfer onto their journals, or to simply jumpstart them on their own documentation process.

6. ***Assessment Phase:*** Teacher will assess journals, teamwork, and final product, using a pre-determined rubric. Re-Ro Test can also be used as a pre or post test. You will find the test below the assessment rubric in this packet.

Assessment Rubric-

*Total Score for Completed Project: 100%, A+(**E** for Kindergarten)*

Design- Labeled and Colored drawing showing what parts are and how they move, as well as what materials they are made out of. Include at least two angles so that the robot is seen from the front and back. **20 pts.**

Engineering- Will be assessed based on teamwork, use of time, care of tools and consideration of workspace and other engineers. **20 pts.**

Evaluation- Craftsmanship and accuracy will be looked at here. Are parts well put together? Is anything flimsy? How well did the idea match the final product? **20 pts.**

Presentation- How much effort and thought went into the presentation? Is it attention grabbing? Was there a choreographed dance? Was there a story included? **20 pts.**

Recording Observations- Science journals will be checked for detailed drawings and written documentation of ideas and troubleshooting. This includes the designs, but should also show evidence of problem solving and measurements, struggles, modifications, adjustments. It should be somewhat messy, not perfect and flawless drawings. **20 pts.**

RE-RO

PRE-TEST/POST TEST

CHRISTIAN GALVEZ 2015

1. ***Re-Ro*** *stands for*

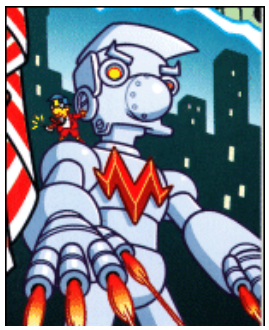
A. Relaxing Robot
B. Republican Robot
C. Repurposed Robot

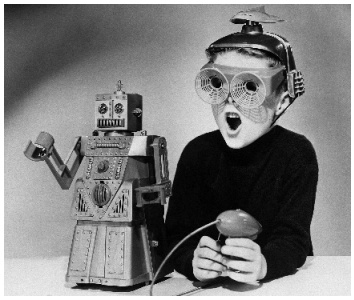
2. *What are the best steps for creating a* ***Re-Ro****?*

A. Play, create, draw
B. Draw, materials, create
C. Materials, play, build

3. *Choose the best reason* ***Re-Ros*** *are made for:*

A. B. C.



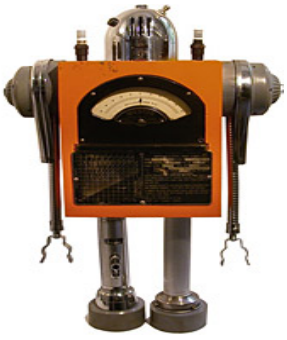


4. *True or False:*

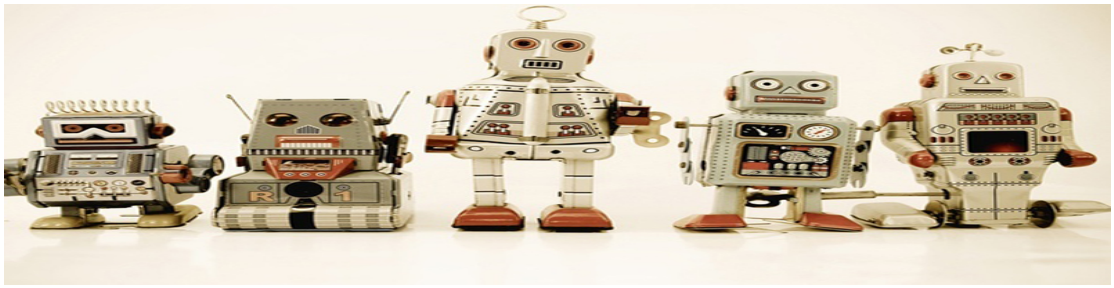
You need lots of money to build a **Re-Ro**.

5. *Choose the* ***Re-Ro*** *that is tallest:*

A. B. C. D.



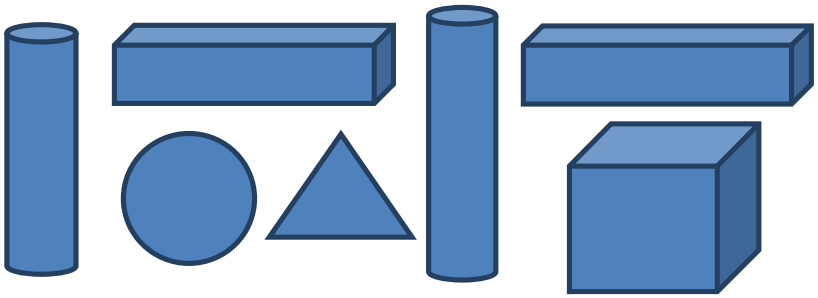
6. *If each* ***Re-Ro*** *has* ***2 legs****, then how many legs do these* ***Re-Ros*** *have in total?*



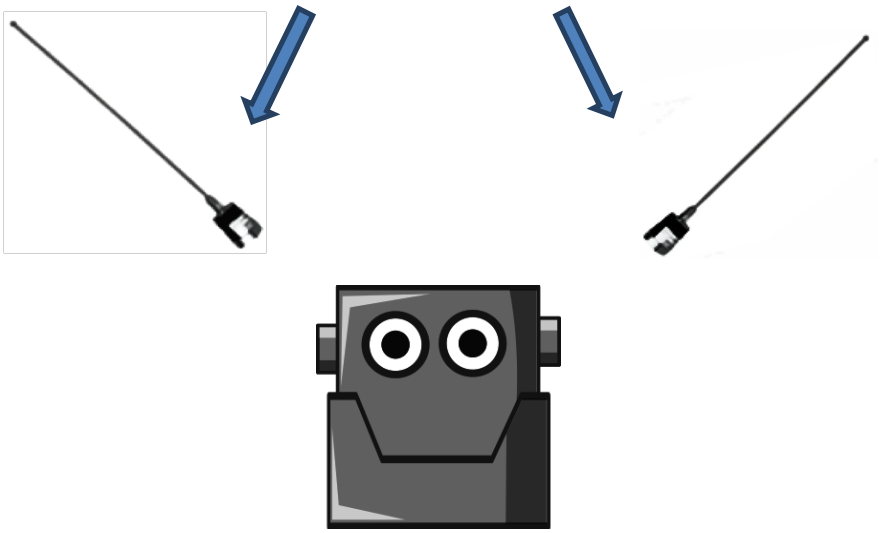
7. ***Re-Ro*** *is missing a leg. What would be the best material to make a leg with?*

A. Cotton Balls B. Cylinder C. Rubber Band

8. *In the space below, use the following shapes to create a* ***Re-Ro****:*



9. *What can these objects help* ***Re-Ro*** *do?:*



A. Clean B. Dance C. Communicate

10. *Besides helping the earth by reducing waste, Re-Ro can be fun to play with. In the space below, write a one word command for Re-Ro to follow, if you could make it do anything you wished. (No taking over the world or any funny business like that.)*

Resource list:

Field trips to the new Frost Museum of Science (opening in summer 2016), as well as the Perez Art Museum of Miami will be scheduled to view robotics on display. Students will observe various artworks related to technology and robotics integration. Several websites and videos can be visited to inspire and elicit creative ideas prior to the design phase, then also throughout the project to help refocus thoughts and give insight for troubleshooting. These videos and links can be accessed through the school media center or home internet. Links are as follows:

Robots- 2005 film http://www.imdb.com/title/tt0358082/

Wall-E- 2008 film http://www.imdb.com/title/tt0910970/?ref_=nv_sr_1

Iron Giant-1999 film http://www.imdb.com/title/tt0129167/?ref_=nv_sr_1

Voltron-1984 animated series

http://www.imdb.com/title/tt0086824/?ref_=nv_sr_1

Transformers-1984-87 animated series

http://www.imdb.com/title/tt0086817/?ref_=fn_al_tt_3

Tron-1982 film http://www.imdb.com/title/tt0084827/?ref_=fn_al_tt_1

Tron Legacy- 2010 film http://www.imdb.com/title/tt1104001/?ref_=nv_sr_1

Daft Punk- Music (Tron Legacy Soundtrack Playlist)

https://www.youtube.com/playlist?list=PL10BBAAAFC8626119

Mr. Roboto- Music https://www.youtube.com/watch?v=rcCS8AK6csg

Transformers Theme Song-

https://www.youtube.com/watch?v=J86x0yRn9Mo

Pinterest- https://www.pinterest.com/schoeneordnung/fobots-robots-and-others-recycling-vom-feinsten/

Technical Drawings-

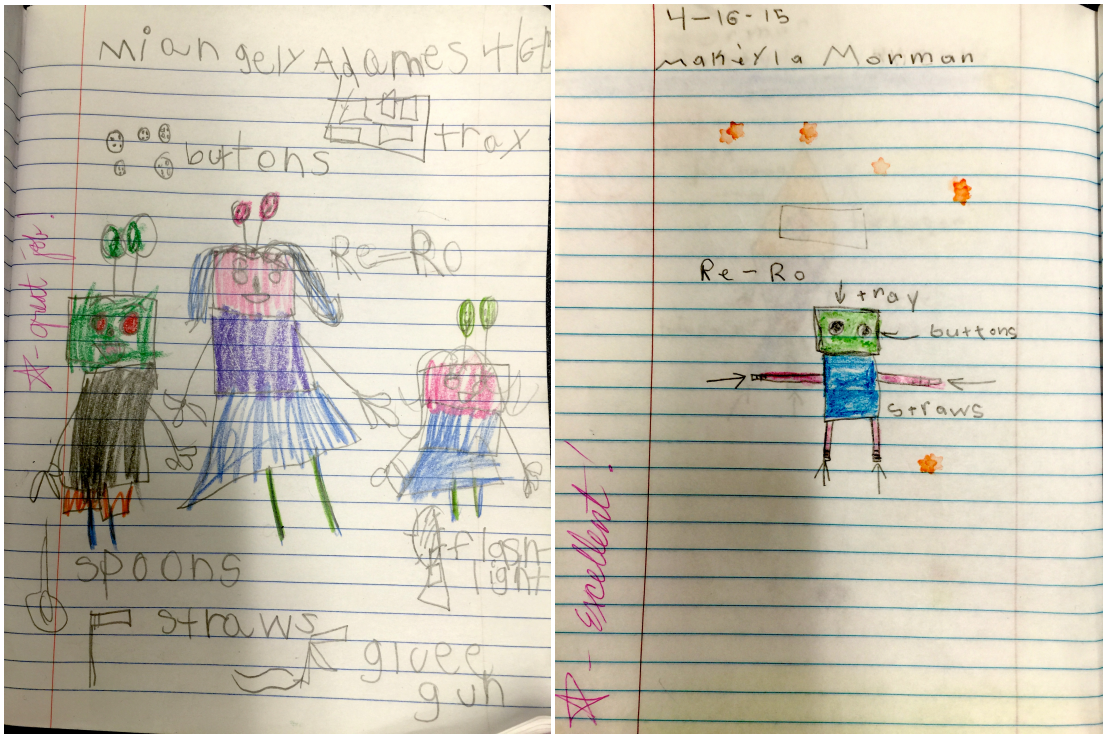
http://4.bp.blogspot.com/YJOZwv6j2D4/T1AuGzlyjoI/AAAAAAAAAhM/Tbw07Q8Y0Zw/s1600/robot_3_blueprint.jpg

Technical Drawings- http://www.coroflot.com/battlro/robot-interior

Technical Drawings- http://niittymaa.com/wpcontent/uploads/character_bigo_blueprint_w1000.jpg

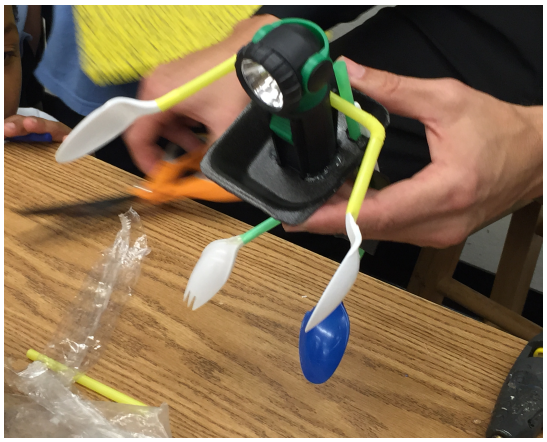
Transforming Robot- http://www.dailymail.co.uk/video/sciencetech /video-1129851/Real-life-Transformer-Japanese-robot -goes-car-humanoid.html

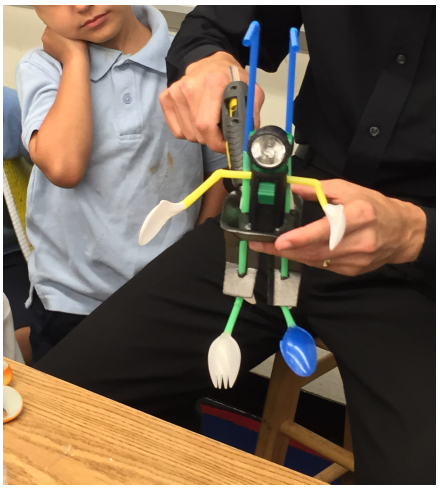
Engineering Art- https://www.ted.com/talks/theo_jansen_creates_new_creatures -t-_173071

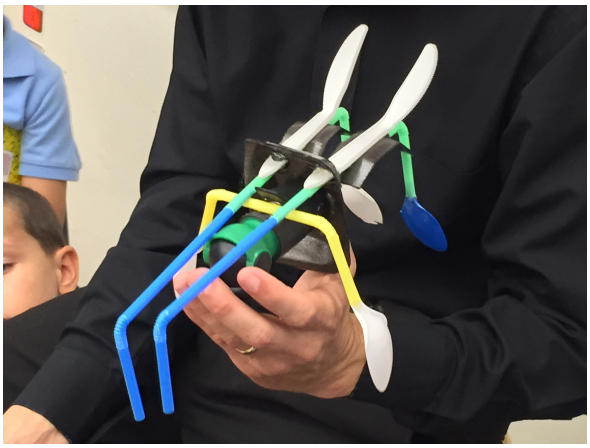


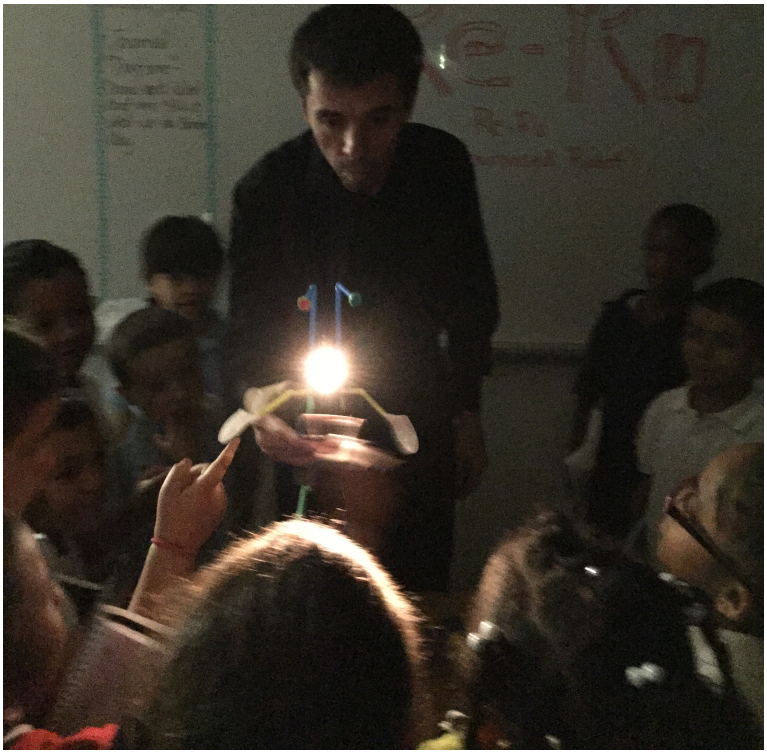
(Above) Examples of kindergarten design sketches, prior to assembly.

Students presenting designs and discussing what materials were needed.









THE EDUCATION FUND
CELEBRATING 30 YEARS

APPLY FOR AN IMPACT II ADAPTER GRANT!

M-DCPS teachers, media specialists, counselors or assistant principals may request funds to implement an IMPACT II idea, teaching strategy or project from the Idea EXPO workshops and/or curriculum ideas profiled annually in the ***Ideas with IMPACT*** catalogs from 1990 to the current year, 2015-16. Most catalogs can be viewed at The Education Fund website at www.educationfund.org under the heading, "Publications."

- Open to all K-12 M-DCPS teachers, counselors, media specialists
- Quick and easy reporting requirements
- Grants range from $150 - $400
- Grant recipients recognized at an Awards Reception

To apply, you must contact the teacher who developed the idea before submitting your application. Contact can be made by attending a workshop given by the disseminator, communicating via email or telephone, by visiting the disseminator in their classroom, or by having the disseminator visit your classroom.

Project funds are to be spent within the current school year or an extension may be requested. An expense report with receipts is required by May 2, 2016.

APPLICATION DEADLINE:
December 11, 2015

Apply online at www.educationfund.org

For more information, contact:
Edwina Lau, Program Director
305.558.4544, ext. 113
elau@educationfund.org

driving a brighter future IN SOUTH FLORIDA

Ford Motor Company Fund

Ford Motor Company Fund and Community Services builds communities through volunteerism and partnerships with nonprofit organizations that focus on education, preserving America's heritage, and automotive safety.

The Education Fund's IMPACT II program offers teachers new ways to engage South Florida students.

Ford salutes your efforts to create a stronger, more innovative future for your classroom.

www.community.ford.com

THE EDUCATION FUND
CELEBRATING 30 YEARS

Contributors with IMPACT

Platinum Star

FLORIDA MATCHING GRANTS PROGRAM

Gold Star

TD Bank
America's Most Convenient Bank®

Ford Motor Company Fund

Humana Foundation

verizon

ASSURANT®

P L Dodge Foundation

FPL

FLORIDA 123 ABH SUPPORT EDUCATION

Silver Star

PEREZ TRADING COMPANY

Rod and Lucy Petrey

Raj Rawal and Anne Marie Miller

Robert Russel Memorial Foundation

Bronze Star

original IMPRESSIONS℠
Your Marketing Communications Partner®
creative | e-business | print | fulfillment | signs

The Jack Chester Foundation

PNB

Boeing

Miami Sportfishing Tournament/ Gary M. Pappas