BUILD A HOVERCRAFT

SUPPLIES:

- BALLOON (12-INCH, ROUND)
- PLASTIC PLATE (9-11 INCHES) (AN OLD OR USED CD COULD SUBSTITUTE FOR PLATE)
- FILM CANISTER 35 mm (SIMILAR OBJECTS: PLASTIC BOTTLE CAP, OLD PRESCRIPTION BOTTLE)
- FLORAL CLAY (CLAY, PUTTY, SUPER GLUE OR HOT GLUE. FLORAL CLAY ADHERES & SEALS BEST)
- BALLPOINT PEN (ANYTHING POINTY & SHARP TO POKE HOLE IN PLATE & CANISTER)
- BALLOON PUMP IS RECOMMENDED FOR SANITARY REUSE OF BALLOON ON HOVERCRAFT.

ASSEMBLY INSTRUCTIONS:

1. Poke a tiny hole in the center of the plate using a ballpoint pen or scissors.
2. Remove lid from film canister. Poke a tiny hole on the bottom center of the canister using a ballpoint pen or scissors.
3. Adhere the film canister (bottom of canister faces up) to the center of the plate using floral clay around canister rim. Try to align the hole in canister with the hole in the plate.
4. Be sure to fill any crevices between plate and canister rim with the clay (or glue) so that air can only escape through the poked holes in canister and plate.
5. Inflate balloon. Twist (don't tie) and pinch the end of balloon to hold it shut. Stretch the excess end of balloon around the bottom of film canister.
6. Place the assembled hovercraft on a smooth surface and let go of the balloon.
7. Tap the side of the plate to discover what happens next!

EXPERIMENT WITH DESIGN: HOW DOES IT AFFECT THE HOVERCRAFT?

- Increase the size of the hole in canister and/or plate.
- Use a plate made of styrofoam or paper instead of plastic.
- Use an old CD or DVD instead of a plate.
- Replace the clay with glue, putty, or tape.
- Replace the canister with a drinking straw.
- Increase the size of the balloon or use more than one.

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100 E. 4TH STREET, MICHIGAN CITY, IN 46360
219-873-3045 www.mclib.org

BUILD A HOVERCRAFT

EXPLORE MORE:

http://www.discoverhover.org
http://pbskids.org/dragonflytv/show/hovercraft.html
http://www.learninggamesforkids.com/motion-games/friction-ramp.html

EDUCATORS (K-8)

"BUILD A HOVERCRAFT" MEETS THE FOLLOWING INDIANA ACADEMIC SCIENCE STANDARDS:

K.1.1 Use all senses as appropriate to observe, sort and describe objects according to their composition and physical properties, such as size, color and shape. Explain these choices to others and generate questions about the objects.
K.1.2 Identify and explain possible uses for an object based on its properties and compare these uses with other students' ideas.

1.1.1 Use all senses as appropriate to identify the component parts of objects and the materials from which they are made.

2.1.4 Observe, sketch, demonstrate and compare how objects can move in different ways (e.g., straight, zig-zag, back-and-forth, rolling, fast and slow).
2.1.5 Describe the position or motion of an object relative to a point of reference (e.g., background, another object).
2.1.6 Observe, demonstrate, sketch and compare how applied force (i.e., push or pull) changes the motion of objects.
2.4.2 Identify technologies developed by humans to meet human needs. Investigate the limitations of technologies and how they have improved quality of life.

3.4.2 Define the uses and types of simple machines and utilize simple machines in the solution to a real world problem.

4.4.1 Investigate transportation systems and devices that operate on or in land, water, air and space and recognize the forces (lift, drag, friction, thrust and gravity) that affect their motion.
4.4.2 Make appropriate measurements to compare the speeds of objects in terms of the distance traveled in a given amount of time or the time required to travel a given distance.
4.4.3 Investigate how changes in speed or direction are caused by forces: the greater the force exerted on an object, the greater the change.
4.4.4 Define a problem in the context of motion and transportation. Propose a solution to this problem by evaluating, reevaluating and testing the design. Gather evidence about how well the design meets the needs of the problem. Document the design so that it can be easily replicated.

5.1.2 Describe the difference between weight and mass. Understand that weight is dependent on gravity and mass is the amount of matter in a given substance or material.
5.1.3 Demonstrate that regardless of how parts of an object are assembled the weight of the whole object is identical to the sum of the weight of the parts; however, the volume can differ from the sum of the volumes.
5.4.2 Investigate the purpose of prototypes and models when designing a solution to a problem and how limitations in cost and design features might affect their construction.

6.1.6 Compare and contrast potential and kinetic energy and how they can be transformed from one form to another.
6.4.1 Understand how to apply potential or kinetic energy to power a simple device.

7.1.5 Describe and investigate how forces between objects—such as magnetic, electrical or gravitational forces—can act at a distance or by means of direct contact between objects.
7.1.6 Explain that forces have magnitude and direction and those forces can be added to determine the net force acting on an object.
7.1.7 Demonstrate and describe how an object's speed or direction of motion changes when a force acts upon it. Demonstrate and describe that an object's speed and direction of motion remain unchanged if the net force acting upon it is zero.

8.4.1 Understand how the strength of attractive forces among particles in a material helps to explain many physical properties of the material, such as why different materials exist as gases, liquids or solids at a given temperature.

If you are an educator and would like to schedule a class visit to the library for this program or a S.T.E.A.M. project, contact Dave or Lori in Youth Services at 219-873-3045.