Family Involvement Model/Core Component #2: Home-Based Family Initiatives

Home-Based Family Initiatives provide hands-on, STEM-focused activities for families and children to work on together, within the home setting. These activities are usually given out as an immediate departure and extension to Family Nights, although home-based learning is encouraged at any other time of the year as well. Home-Based Family Initiatives are typically 1 to 3 hours in duration.

Provided for you in the following pages are three tried-and-true Home-Based Family Initiatives that have yielded tremendous participation and positive feedback. These activities were selected based upon their ability to be easily replicated within the NASA Explorer School environment.

Home-Based Family Initiative

Activity Title:	At Home With the Bubble-Powered Rockets!
Activity Topic:	To be used as a follow-up to the Family Night—Water + Rockets = Energy + Fun
Activity Objectives:	Each family will • Design, construct, and launch a bubble-powered rocket. • Modify their design to build a rocket that will reach the greatest height. • Realize how expanding gas can be used propel a rocket off the ground. **National Standards and Process Skills Addressed:** Science Standards Science as Inquiry; Physical Science; Science and Technology Science Process Skills Observing; Measuring; Inferring; Predicting; Experimenting; Controlling Variables; Making Models; Investigating Mathematics Standards Problem Solving; Numbers and Operations; Geometry; Measurement; Connections
Resources:	**Web sites:** 3-2-1- Pop! (an excerpt from Rockets—A NASA Educator's Guide With Activities) http://www.latech.edu/ideaplace/nerc/rockets/3-2-1_pop!.pdf NASA Kids Features: Pop Rockets http://www.nasa.gov/audience/forkids/activities/A_Pop_Rockets.html Beginners Guide to Rockets http://exploration.grc.nasa.gov/education/rocket/bgmr.html Brief History of Rockets http://www.grc.nasa.gov/WWW/K-12/TRC/Rockets/history_of_rockets.html
Estimated Length:	**Activity Description:** **Home-Based Kit**
60 Minutes	Each family, at their convenience, should be able to use the instructions and ideas to make a rocket that is propelled by the antacid tablets. There should be enough materials to make several rockets and conduct the extension activity if the family wishes.

	Families should be encouraged to bring the finished rocket to the next family night to share and display with other families. Extra credit could be given to students who bring their rocket to class and offer a presentation. Each school can determine what would be best for the populations that they serve.
	Materials/Supplies • Large Ziploc storage bag (to hold the materials) • Build a bubble-powered rocket design instructions and data collection sheet • 35-mm-film canister with lid • Effervescing (fizzing) antacid tablets • Cardstock or colored construction paper Additional Materials (Needed From Home) • Tape • Small scissors • Paper towels Special Note: Families should be reminded that safety is still a number one priority. A warning should be included in the packet that encourages participating family members to wear safety goggles/glasses when launching the bubble-powered rockets. (Note: plastic sunglasses can be substituted for safety goggles/glasses for this activity.)
Career Extension:	There are many NASA careers that involve or support engineering. Use the URLs below to learn more about these and other NASA career options. Astroventure (Career) Fact Sheets http://astroventure.arc.nasa.gov./teachers/fact_sheets.html NASA People http://quest.nasa.gov/services/people.html Careers: On-Line Resources http://www.nasa.gov/audience/foreducators/topnav/subjects/careers/index.html NASA Jobs: Student Opportunities http://www.nasajobs.nasa.gov/studentopps/employment/default.htm

Additional supporting materials for this activity have been provided for you in appendix D.

Home-Based Family Initiative

Activity Title:	Floating to Earth!
Activity Topic:	To be used as a follow-up to the Family Night—Fun with Hot Air Balloons!
Activity Objectives:	Each family will • Use the scientific method and an inquiry-based approach to design the best parachute. • Learn to work as a team. • Discover the relationship between surface area and drag.
	National Standards and Process Skills Addressed: Science Standards Science as Inquiry; Physical Science; Earth and Space Science; History and Nature of Science Science Process Skills Observing; Measuring; Inferring; Predicting; Interpreting Data; Experimenting; Controlling Variables; Communicating; Hypothesizing; Making Models; Investigating Mathematics Standards Problem Solving; Numbers and Operations; Geometry; Measurement; Data Analysis and Probability.
Resources:	NASA Quest: Aerospace Science Challenge http://quest.arc.nasa.gov/aero/teachers/sc3.html
Estimated Length:	**Activity Description:** **Home-Based Kit**
60 Minutes	The families will work together to design a parachute that safely and quickly sails the plastic figure to the ground. Test the parachute by dropping it from different heights and record the time it took to reach the ground for each drop test. Families should be encouraged to bring their best performing parachute to the next family night to share and display with other families. Extra credit could be given to students who bring their parachute to class and offer a presentation. Each school can determine what would be best for the populations that they serve.

	Materials/Supplies • Large Ziploc storage bag (to hold the materials) • Paper • Thread • Plastic garbage bag • Coffee filters • String • Small plastic figure • Land Your Skydiver Safely! worksheet Additional Materials (Needed from Home) • Tape • Small scissors Special Note: Safety should always be the number one priority. Families should be encouraged to provide adult supervision for small children working with scissors.
Career Extension:	There are many NASA careers that involve flight or support aerospace engineering and research. Use the URLs below to learn more about these and other NASA career options. Astroventure (Career) Fact Sheets http://astroventure.arc.nasa.gov./teachers/fact_sheets.html NASA People http://quest.nasa.gov/services/people.html Careers: On-Line Resources http://www.nasa.gov/audience/foreducators/topnav/subjects/careers/ NASA Jobs: Student Opportunities http://www.nasajobs.nasa.gov/studentopps/employment/default.htm

Additional supporting materials for this activity have been provided for you in appendix E.

Home-Based Family Initiative

Activity Title:	Who Needs a Clock?
Activity Topic:	Making a sundial for the family to use at home! To be used as a followup to the Family Night—The Sparkling Night Sky!
Activity Objectives:	Each family will • Come to understand how the Earth's tilt, rotation about its axis, and motion about the Sun effects the apparent movement of the Sun across the sky. • Learn about latitude and longitude and how their location on Earth combined with the date can effect how long the Sun is visible in the sky. • Discover how sundials work and how they where used to tell time before the invention of the clock.
	National Standards and Process Skills Addressed: Science Standards Science as Inquiry; Earth and Space Science; History and Nature of Science Science Process Skills Observing; Measuring; Inferring; Predicting; Interpreting Data; Experimenting; Communicating; Hypothesizing; Making Models; Investigating Mathematics Standards Numbers and Operations; Geometry; Measurement
Resources:	Liftoff to Space Exploration: How Sundials Work http://liftoff.msfc.nasa.gov/academy/earth/sundial/Sundial-how.html Ancient Observatories: Timeless Knowledge—Make Your Own Sundial Activity http://sunearthday.nasa.gov/2005/museums/maketake.htm NASA Kids Features—Telling Time With the Sun http://www.nasa.gov/audience/forkids/activities/A_Make_a_Sundial.html

Estimated Length:	Activity Description: Home Based Content
60 Minutes	Choose and print a sundial construction template from the Web site provided and based on the hemisphere where the participating families live. Provide families with the Web site information. Families should work together with everyone making a sundial for the family to enjoy! The list of questions offered on the Web site should give the families some direction as they are watching the movement of the Sun through the sundial. Extra credit could be given to students who take their sundial to class and offer a presentation on the use and history of sundials.
	Materials/Supplies • Sundial templates • Information sheets about sundials • Sundial building instructions Additional Materials (Needed from Home) • Tape • Small scissors Special Note: Safety should always be the number one priority. Families should be encouraged to provide adult supervision for small children working with scissors.
Career Extension:	There are many NASA careers that involve astronomy or support space science. Use the URLs below to learn more about these and other NASA career options. Astroventure (Career) Fact Sheets http://astroventure.arc.nasa.gov./teachers/fact_sheets.html NASA People http://quest.nasa.gov/services/people.html Careers: On-Line Resources http://www.nasa.gov/audience/foreducators/topnav/subjects/careers NASA Jobs: Student Opportunities http://www.nasajobs.nasa.gov/studentopps/employment/default.htm

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