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## PARENT LETTER FOR IT'S ROCKET SCIENCE

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Dear Parents,

Your student is in for an adventure with our exciting Rockets and Kerbal Space Program camp. Below is the summary for each part. Your camp may start with either of these. Remember that we love to hear from you so let us know how your student is enjoying

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### ROCKETS

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#### PRINCIPLES OF ROCKET FLIGHT

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Students will learn details of Newton's Three Laws of Motion.

Be sure to see if your student can name them and how they apply to space travel:

- 1<sup>st</sup> Law: The law of inertia. Just how do we get that rocket off the launch pad?
- 2<sup>nd</sup> Law: Force is Equal to Mass times Acceleration. Have your child explain how the mass of the object launched affected how far the car moved.
- 3<sup>rd</sup> Law: For every action there is an equal but opposite reaction.

The 3<sup>rd</sup> law affects all of the rocket fuels so we will do a series of experiments on propulsion and rocket fuels including chemical rockets, balloon rockets, straw rockets, and experiments of how fuel needs to burn FAST to create the thrust needed to launch and guide the rockets.



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#### ROCKET DESIGNS

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Now it's on to the actual design of the rockets that we will take home.

- Next they will build bottle rockets. Again they will incorporate pressure to create the thrust needed to launch the rocket.
  - Last but not least they will build their solid fuel rocket! This rocket will have a parachute to help it be recovered for multiple uses.
  - They will be excited to have created their own rocket from scratch!
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## KERBAL SPACE PROGRAM

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Every day, students will take the physics and aerospace engineering principles they are learning and apply them in Kerbal Space Program.

The premise of Kerbal Space Program is to help the “lovable-but-hapless” Kerbals reach their dream of conquering space by completing missions and expanding on their research. KSP is a sandbox game (like Minecraft) but it is physics-based, which makes it a great educational tool when learning about aerospace engineering!

We start at a space center on our home planet, Kerbin, which is populated by Kerbals. The fictional planet of Kerbin, and the fictional solar system it is in, are quite similar to our own, complete with planets, moons, and even gas giants.

We’ll fly planes, drive rocket cars, and build and blast off our own rockets! It’s a fun and addictive game, but there is a learning curve that makes getting into it a bit challenging, so it takes some sticking-with-it at first.

We’ll be playing in KerbalEdu, which is the official “school-ready” version of Kerbal Space Program developed by TeacherGaming and Squad. It incorporates missions and scenarios that are useful tools in teaching the basics of how to play, important scientific concepts, and a little history of the “race to space.”

We’ll start with learning the basic controls of Kerbal Space Program (KSP) by flying and landing a plane. Then we’ll practice taking off as we go to investigate an unidentified object that fell from space. Turns out it was Sputnik, the first satellite to be successfully launched into orbit around Earth!

We’ll then master acceleration and speed control as we complete time trials and gather data about our Opel RAK-2 high speed car. Next we learn about trajectories while we launch a prototype of the first rocket (the NELL rocket) into a cabbage patch on the runway.

From there we will learn the basics of rocket design and flight so that we can work toward our big design of the R-7 and launch our own Sputnik into orbit. Last, but certainly not least, we’ll learn advanced rocket building and we’ll alter our R-7 to hold a Kerbal. We’ll launch our first Kerbal into orbit around Kerbin, and return home safely! It’s a very exciting time for Kerbal-kind!

If at the end of camp, your child is begging you to purchase Kerbal Space Program for your home computer, please ask us about the **limited** number of Kerbal Space Program discounts we received with our purchases of KerbalEdu licenses. They are discounts for the non-Edu version of KSP. This game can **ONLY** be played on a computer. Please make sure your home computer has the minimum required specifications before asking us for one of our limited number of discount codes. You can see these specs at [http://wiki.kerbalspaceprogram.com/wiki/System\\_Specs](http://wiki.kerbalspaceprogram.com/wiki/System_Specs).

We hope your child enjoyed this camp! Please always feel free to share your thoughts about our programs. We love your feedback!