Common Core Math in 8th Grade

Extensive work with linear equations (equations whose graph is a line) ties together much of what your student will learn this year. They'll understand them in the context of functions and represent them using tables, graphs, and equations. They'll take data that suggest a linear relationship, find an appropriate line, and make predictions based on the graph or the equation. Geometry will center around lines as well — shifting, stretching or reflecting 2- and 3-dimensional objects using specific lines as a reference. Linear functions will be one basis for understanding more complicated functions such as quadratic and trigonometric functions, and links to the extensive sixth and seventh grade work with proportional relationships. They will also be analyzing angles formed when lines intersect, and finding the distance between two points on a line using the Pythagorean Theorem.

Examples:

A great activity that introduces the use of linear equations is "Barbie Bungee." Students experiment by measuring how far Barbie falls when using a "bungee cord" made up of a few rubber bands linked together. Then they make predictions about how many rubber bands would be needed for a much higher drop, based on the linear graph that emerges from their data.

One teacher who popularized this is Fawn Nguyen, a middle school teacher in California who shares her classroom activities on a blog. Other teachers, including some in Lane County, have used things like water balloons in place of Barbie. Here's Fawn's description of Barbie Bungee. The overheard student comments are great! http://fawnnguyen.com/barbie-bungee/ (see reverse)

In this Teaching Channel Video students use different methods to find the line of best fit as well as analyzing the linear equation. https://www.teachingchannel.org/videos/stem-lesson-ideas-bungee-jump

An activity like this provides a very concrete context for interpreting the different parts of a linear equation. Why does the line cross the y-axis at this point? Where does that number come from? These are questions that students can address in a context so that lines to them aren't just "y = mx + b".

Tips for parents:

- Encourage children to grapple with mathematical ideas and to persevere. Careful and complete reasoning is much more important than quickly arriving at an answer.

- There are skill-based supports emerging that are aligned with Common Core. The Khan Academy is working hard to create worthwhile tasks, for example. But if your child needs extra support, you might consider working together with your child on an activity like the Barbie Bungee one or activities from Mathalicious, which because they are interesting and sometimes "real world" are quite engaging.

- There are many contexts in which linear functions arise, for example costs of cell phone plans as discussed in the high school handout. If you or someone you know can point this out, explaining why the material is important, this can help motivation and engagement at a challenging age.

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For further information see:
ime.math.arizona.edu/progressions
and illustrativemathematics.org

Example: Barbie Bungee

Objective: In teams, create a bungee line for Barbie to allow her the most thrilling, yet SAFE, fall from a height of 3 meters. First measure Barbie's height for up to six rubber band lengths, and record in a table.

Rubber band length	Distance of Fall *cm*
0	28.5 (Barbie's height)
1	35.8
2	43.1
3	
4	
5	
6	

Once groups made their prediction, I drop Barbie. (The numbers on the left were their initial guesses before doing anything else.)

This was a blast!! I had two children lying on the ground with meter sticks as judges. We clearly had a winning jump when one group's Barbie came within 2 cm of the floor.

What I heard around the room: "I noticed the centimeters went up by 10 on average." "Her height is the y-intercept." "Nine rubber bands is approximately 100 cm, so we need…" "Stop stretching the rubber bands, you're gonna ruin our estimate!" "Each meter stick is 98 cm."(His two teammates did not say anything when they heard this!) "I have to re-do our graph. I stuck it too close to the top, and the line of best fit has nowhere to go." "You're not supposed to connect the dots!" "This was so much fun!" "Oh, I didn't realize how stretchy the rubber bands got." (To which another student said, "Hello, it's rubber.") "Ken is heavier [than Barbie]. We forgot this." "Hair centimeters! She was that close!"