MiSP Simple Machines / Inclined Plane Assessment L1

Name _____ Date _____

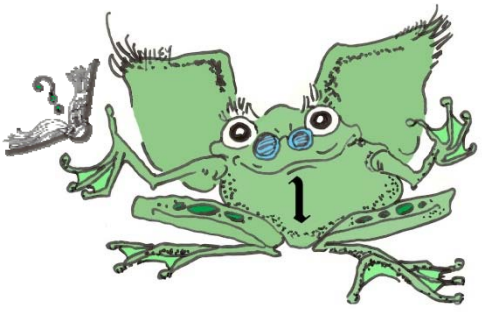
Introduction:

A family was talking about a plan to build a ramp to their home's front door because the children's grandfather, who lives with them, can only move about in a wheelchair. They talked in terms of standard units (pounds and feet) rather than metric units (newtons and meters). The combined weight of the grandfather and his wheelchair is **200 pounds**. The height from the ground to the front door is **four feet**.

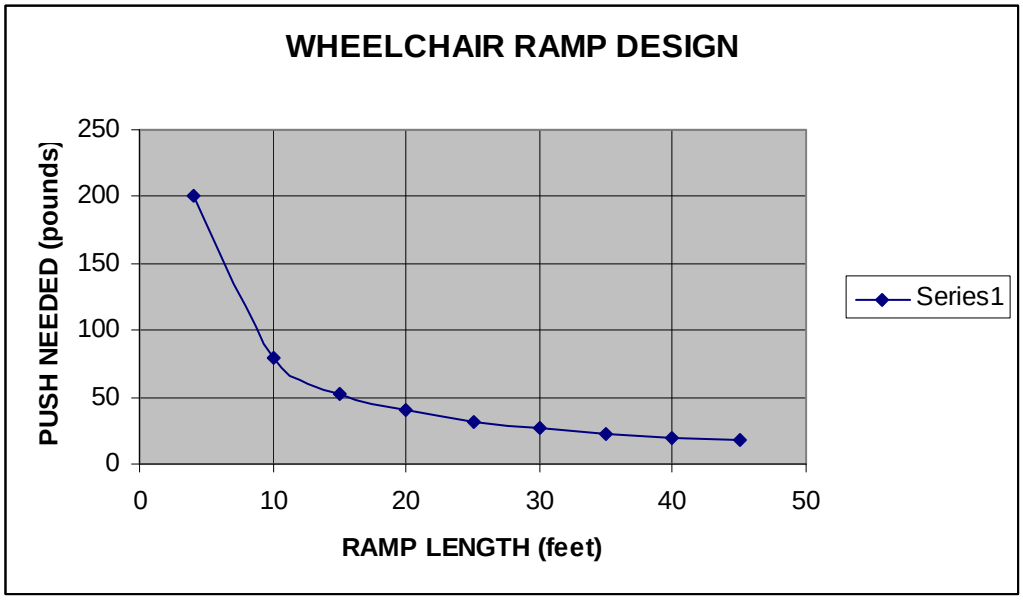
The youngest member of the family wanted to help his grandfather enter the house, but he was only able to do **25 pounds** of push.

Family members disagreed about how long to make the ramp. Luckily, the family's eighth-grade child came up with some data based on experimentation she had done in school:

	DISTANCE TO DOOR (FEET)	PUSH NEEDED (POUNDS)
NO RAMP	4	200
RAMP	10	80
RAMP	15	53
RAMP	20	40
RAMP	25	32
RAMP	30	27
RAMP	35	23
RAMP	40	20
RAMP	45	18



The data from the chart was graphed as follows:



1. Based on the data chart and graph, how long should the ramp be if the youngest child in the family will be able to push his grandfather up the ramp with a force of 25 pounds? Why?

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2. How much push would be required for a ramp 27½ feet long?

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3. A ramp is a type of simple machine called an inclined plane. How does an inclined plane make it easier to do work?

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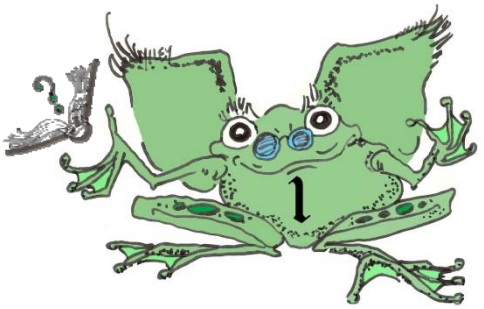

4. The work of moving the child's grandfather up to the front door is helped by the ramp, but there is a cost. What is the trade-off when using a ramp to make a job easier?

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