Conference for the Advancement of Mathematics Teaching
Summer 2015

Exploring Functions with Physics Concepts

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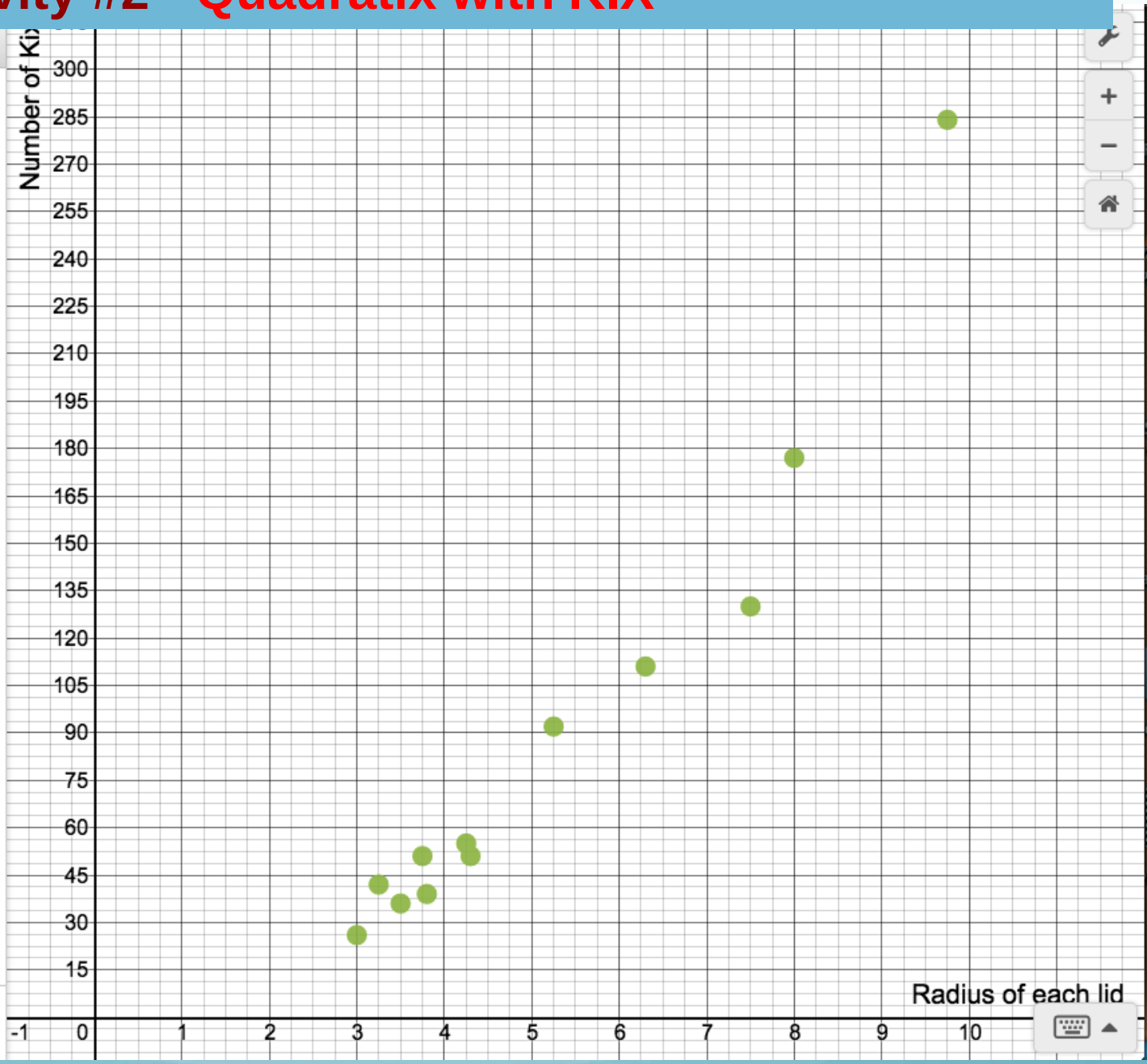
This presentation has been compressed and edited; Student pictures have been removed, but the web resources and links are still included.

II. Student Activity #2 - Exploring Quadratic Functions

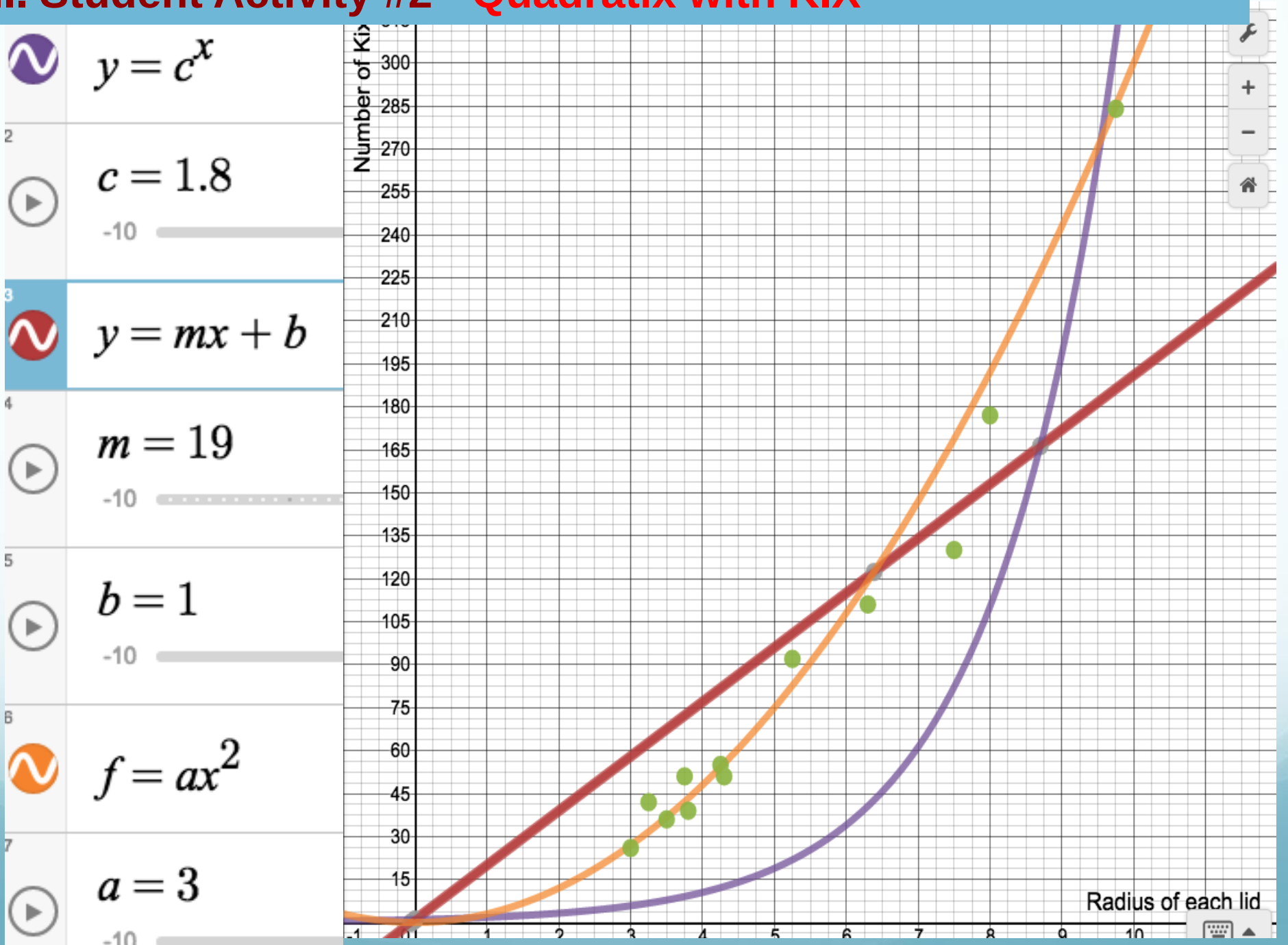
- **Quadratix with KIX**

II. Student Activity #2 - Quadratix with KIX

x_1	y_1
3	26
3.25	42
3.5	36
9.75	284
3.75	51
5.25	92
3.8	39
4.25	55
6.3	111
7.5	130
8	177
4.3	51
.....	.....
.....	.....



II. Student Activity #2 - Quadratix with KIX



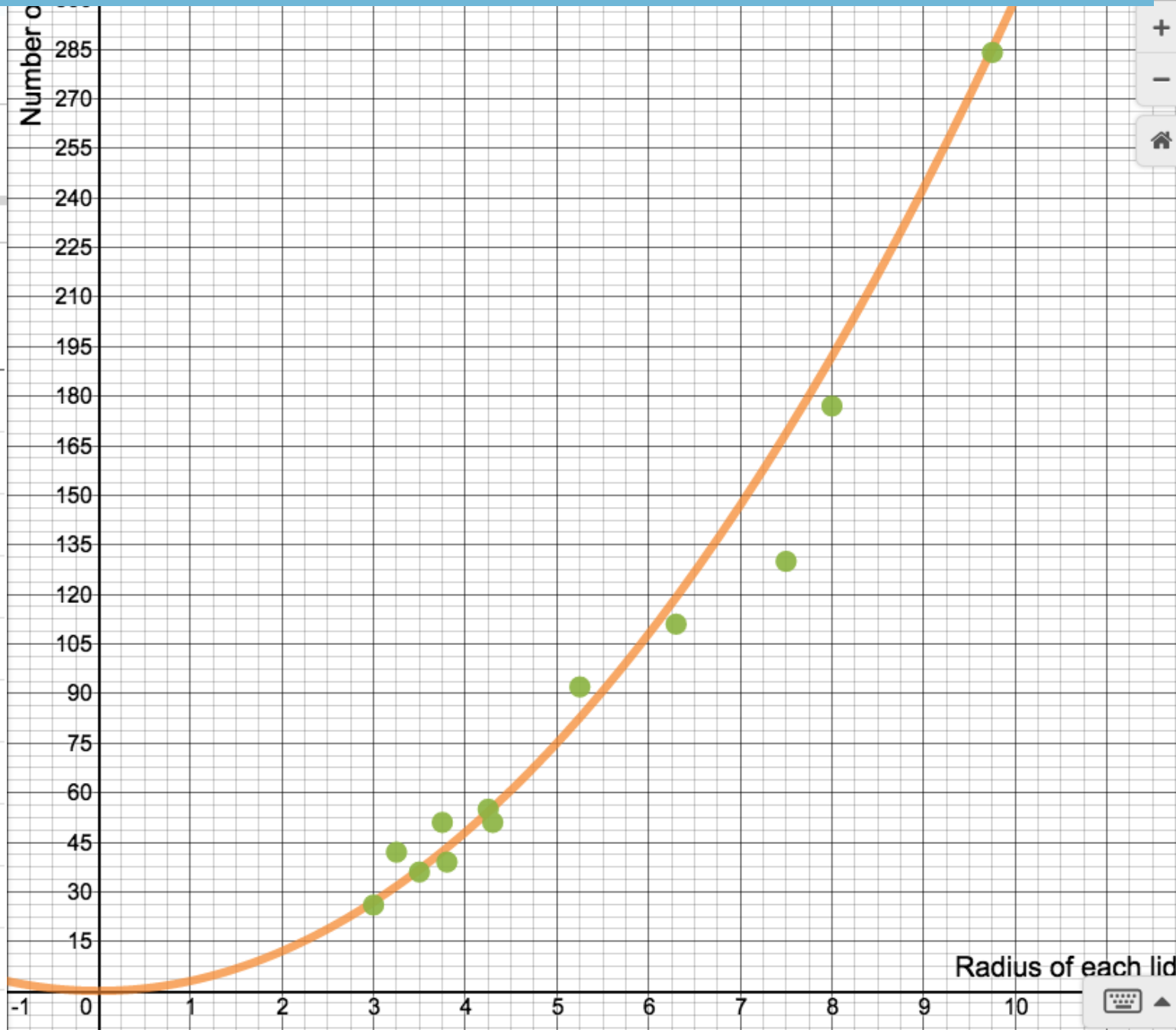
II. Student Activity #2 - Quadratix with KIX

$f = ax^2$

$a = 3$

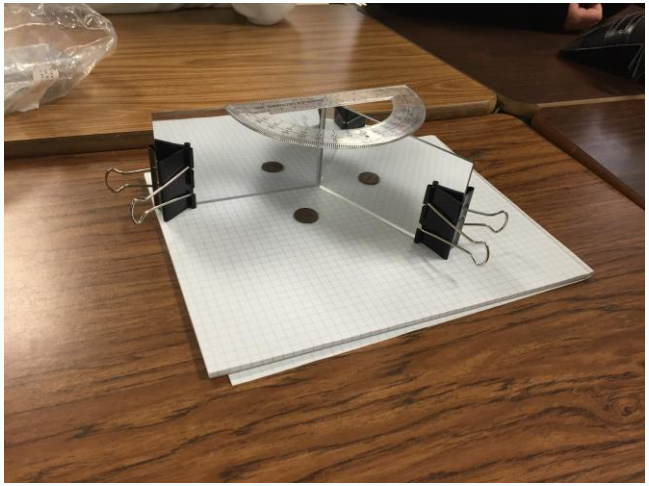
1

x_1	y_1
3	26
3.25	42
3.5	36
9.75	284
3.75	51
5.25	92
3.8	39
4.25	55
6.3	111
7.5	130
8	177



II. Student Activity #3 - Exploring Rational Functions and Inverse Variation

- **Multiple IMAGES**



II. Student Activity #3 - Multiple Images

Function rule:

$$y = \frac{360}{q}$$

What does this mean?

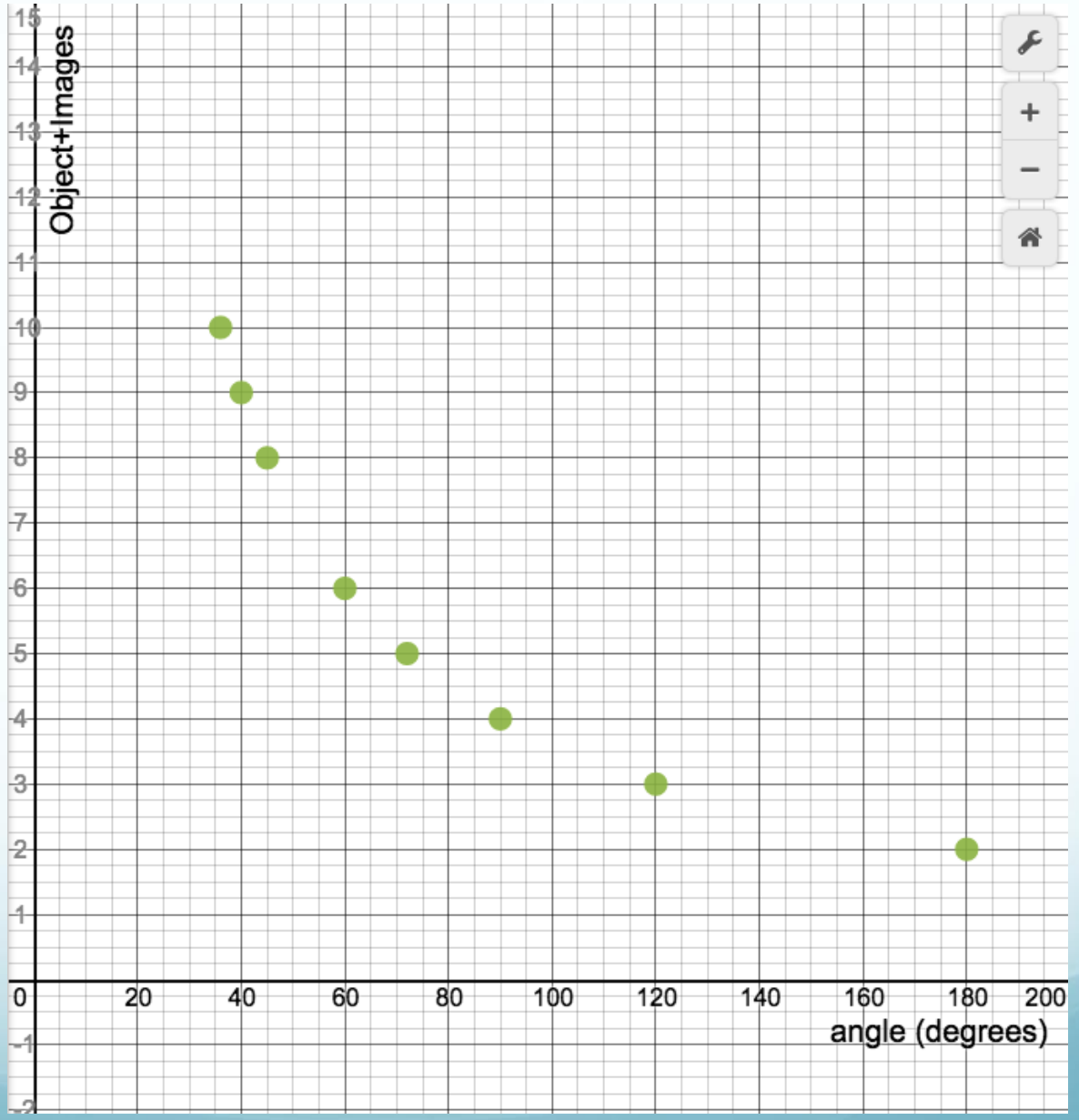
$$N = \frac{360}{q} - 1$$

Angle Between the two mirrors	Object + Number of Images
180^o	2
120^o	3
90^o	4
72^o	5
60^o	6
45^o	8
40^o	9
36^o	10

$N = \frac{360}{q} - 1$

II. Student Activity #3- Multiple Images

x_1	y_1
180	2
120	3
90	4
72	5
60	6
45	8
40	9
36	10



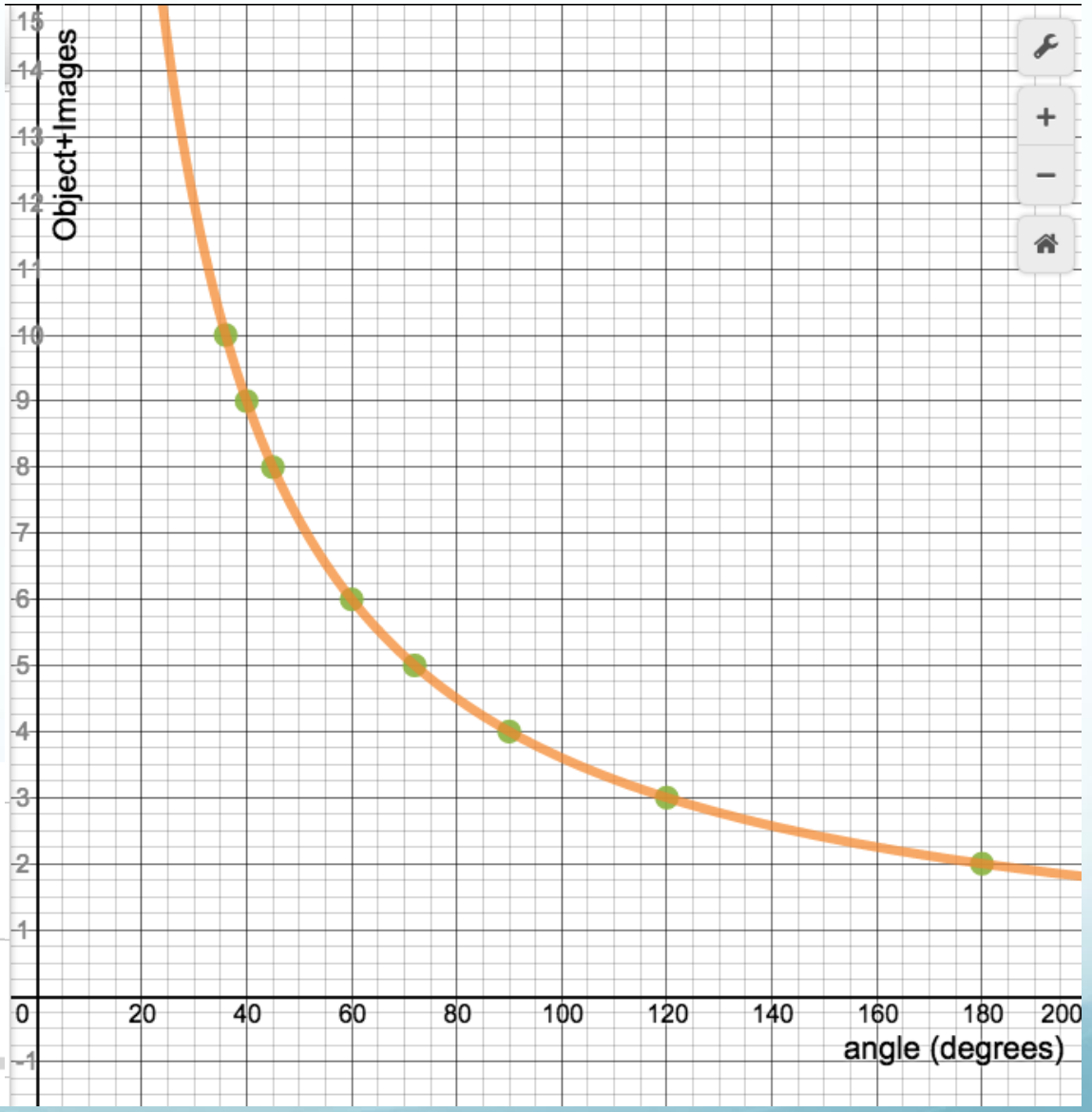
II. Student Activity #3- Multiple Images

x_1	y_1
180	2
120	3
90	4
72	5
60	6
45	8
40	9
36	10

3 $f(x) = \frac{a}{x}$

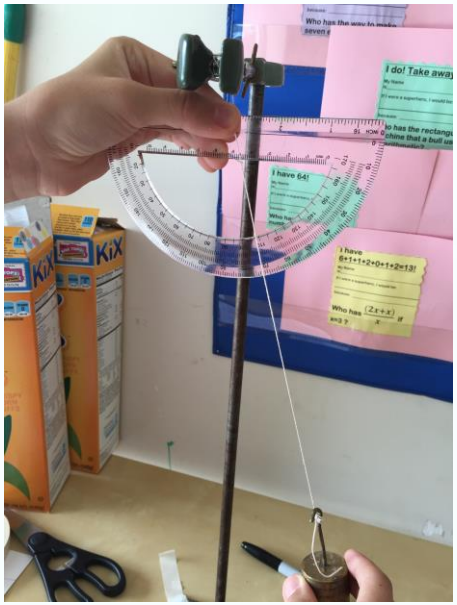
4 $a = 360$

10



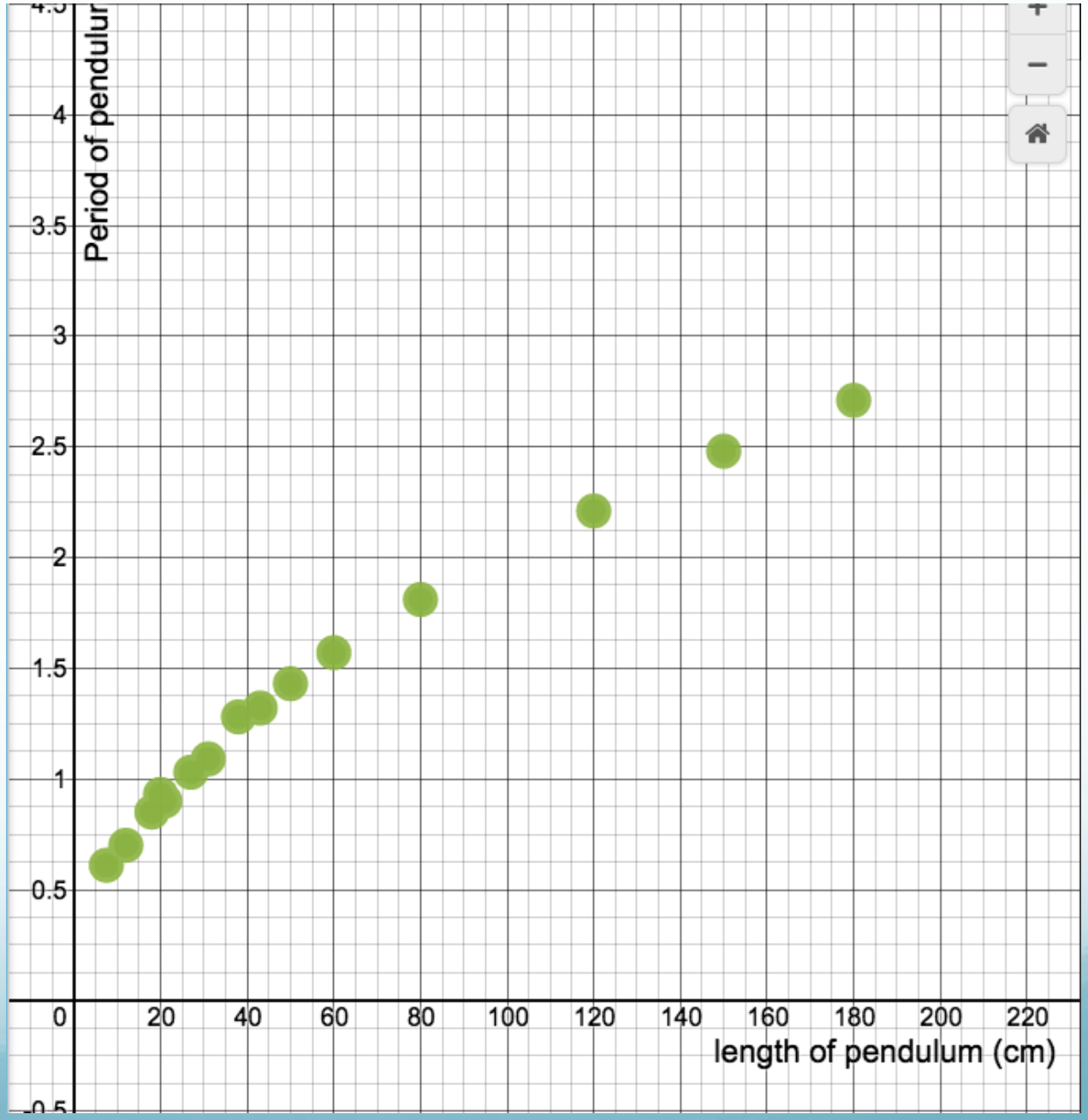
II. Student Activity #4 – Exploring Square Root Functions

- **Period of a pendulum**



II. Student Activity #4 – Period of a Pendulum

x_1	y_1
7.5	.61
12	.70
18	.85
20	.93
21	.90
27	1.03
31	1.09
38	1.28
43	1.32
50	1.43
60	1.57
80	1.81
120	2.21
150	2.48
180	2.71

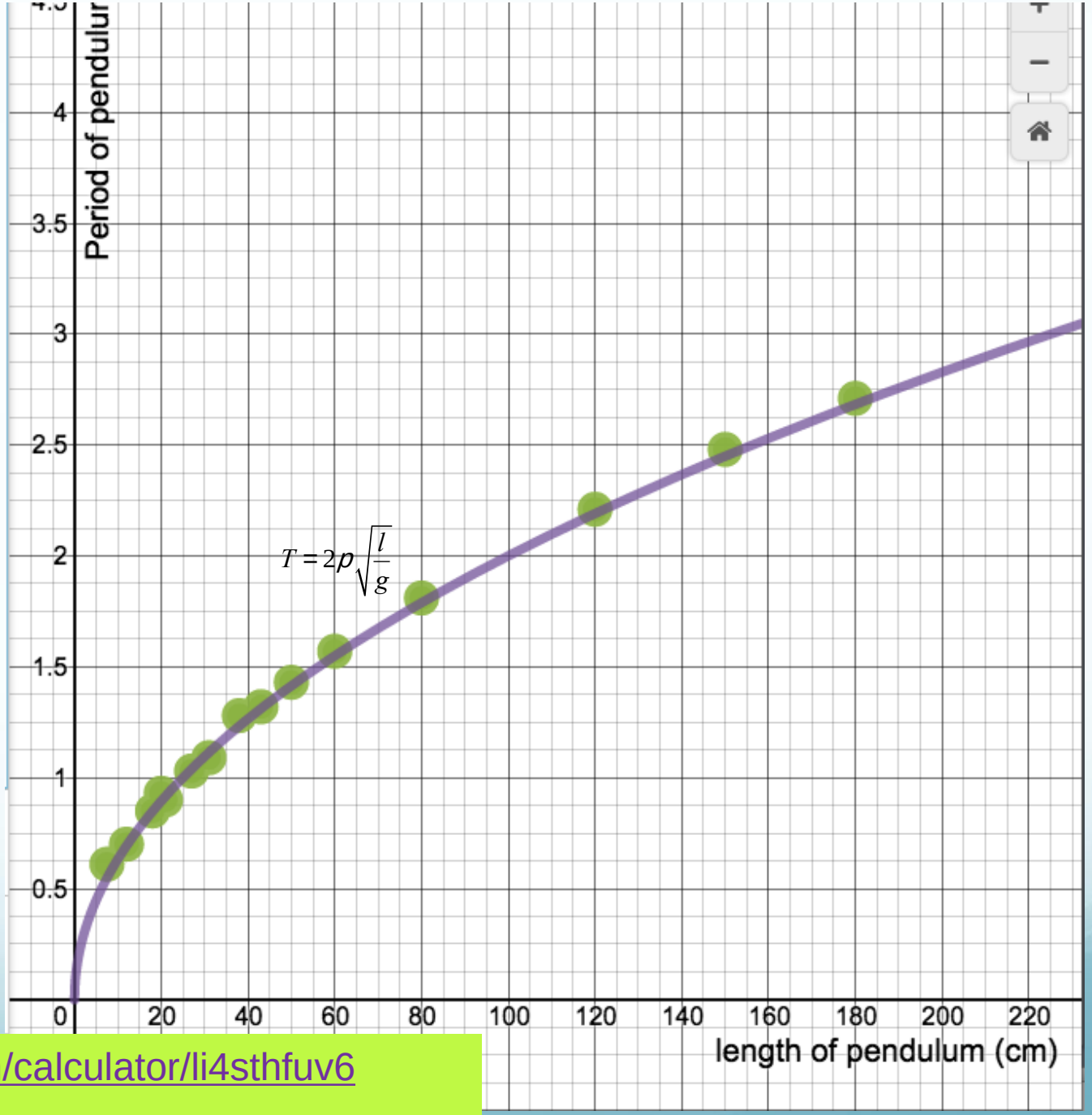


2 $f(x) = a\sqrt{x}$

3 $a = 0.2$

-10

$$T = 2p\sqrt{\frac{l}{g}}$$

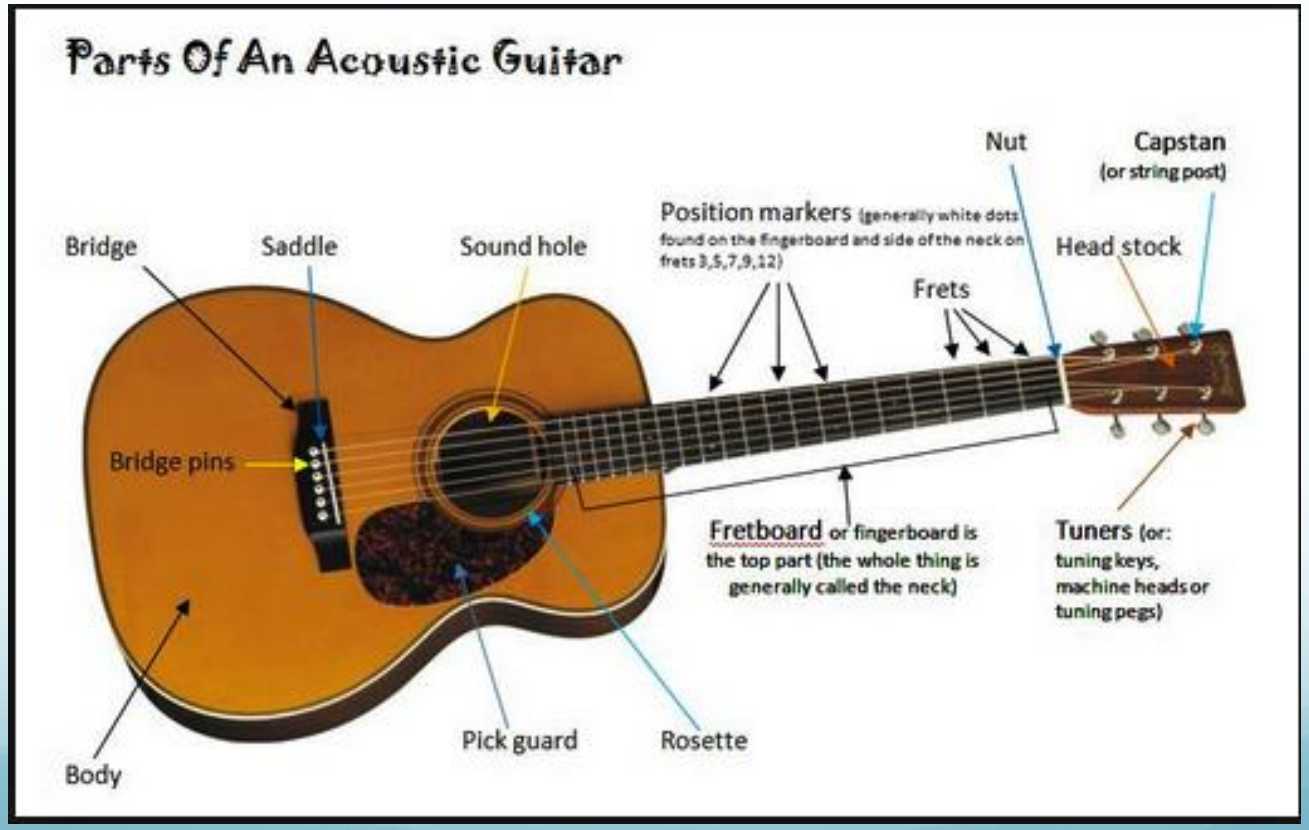


http://phet.colorado.edu/en/simulation/legacy/pendulum-lab

https://www.desmos.com/calculator/li4sthfuv6

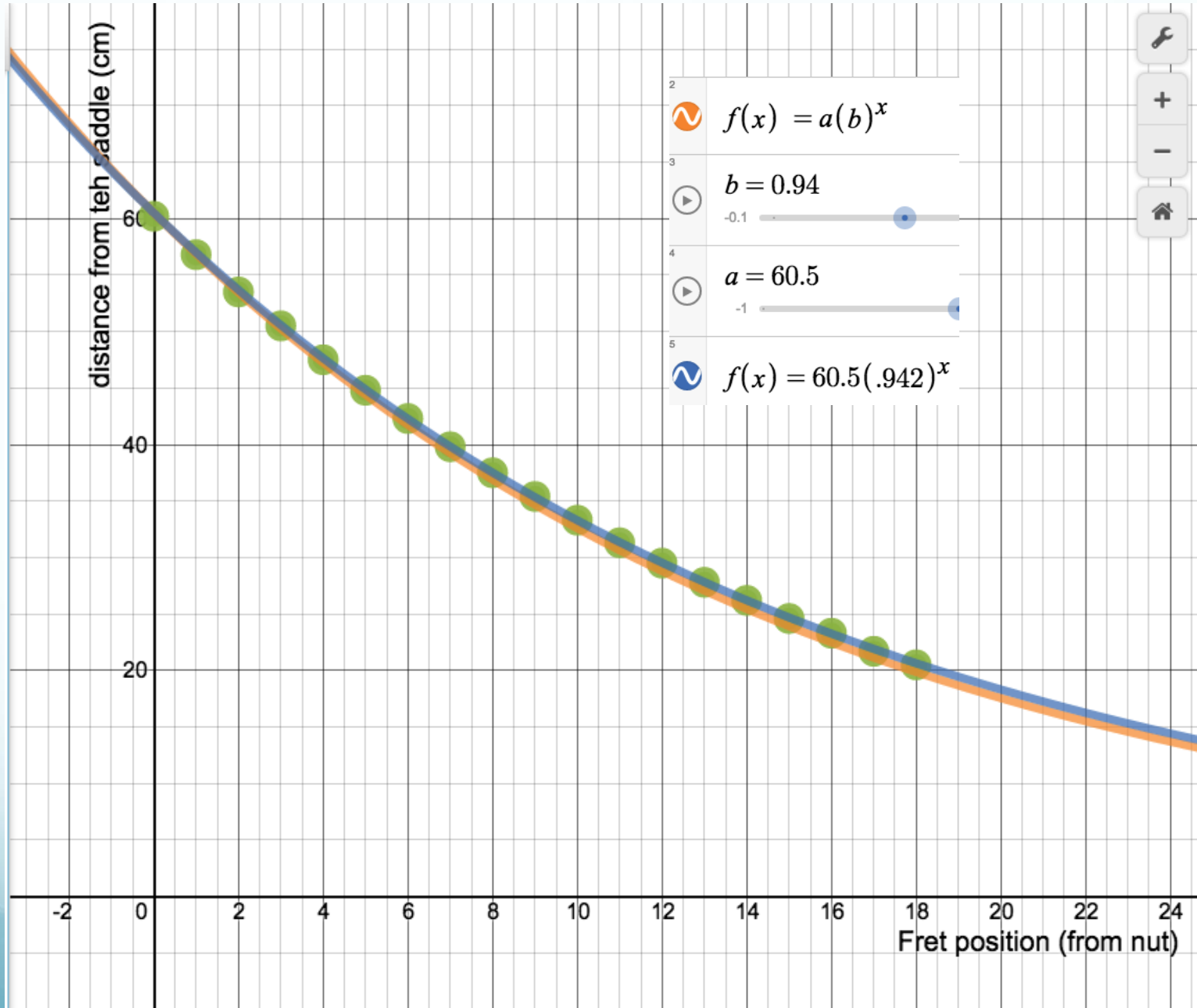
II. Student Activity #5 – Exploring Exponential Functions

- **Exponential Growth and Decay with M & Ms**
- **Bouncing Balls**
- **The Design of a guitar**



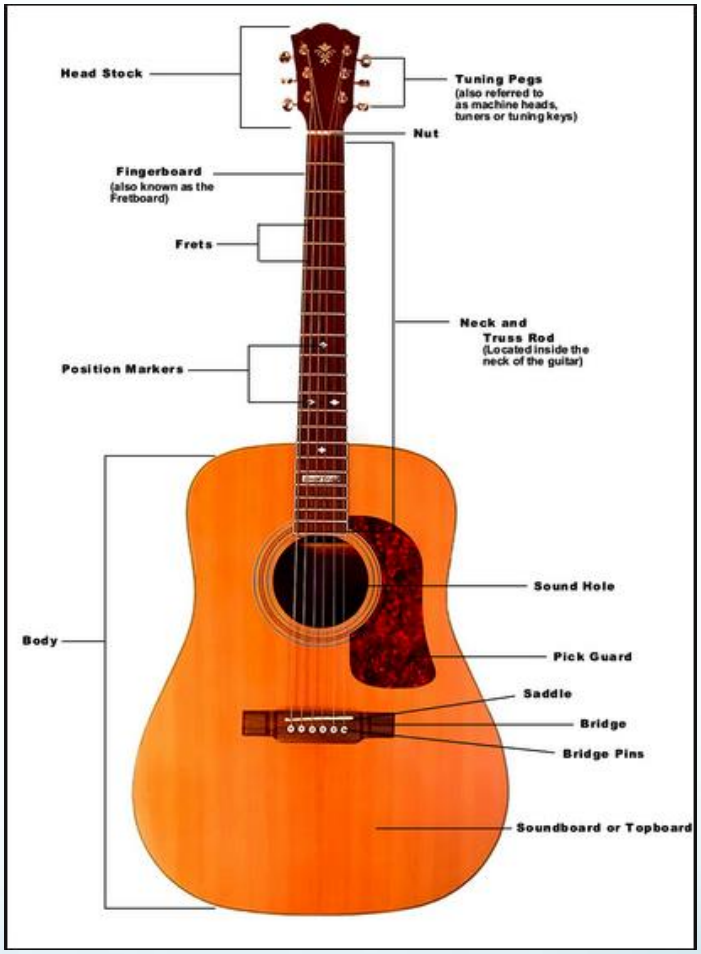
II. Student Activity #5 – Exploring Exponential Functions

x_1	y_1
0	60.2
1	56.8
2	53.5
3	50.5
4	47.5
5	44.8
6	42.3
7	39.8
8	37.5
9	35.4
10	33.3
11	31.3
12	29.5
13	27.8
14	26.2
15	24.6
16	23.3
17	21.7
18	20.5



II. Student Activity #5 – The Design of a Guitar

note in the scale	corresponding fret position	relative predicted distance from saddle in millimeters
A	0	645.00
$A^{\#}$	1	609.17
B	2	575.32
C	3	543.36
$C^{\#}$	4	513.17
D	5	484.67
$D^{\#}$	6	457.74
E	7	432.31
F	8	408.29
$F^{\#}$	9	385.61
G	10	364.19
$G^{\#}$	11	343.95
A	12	324.85

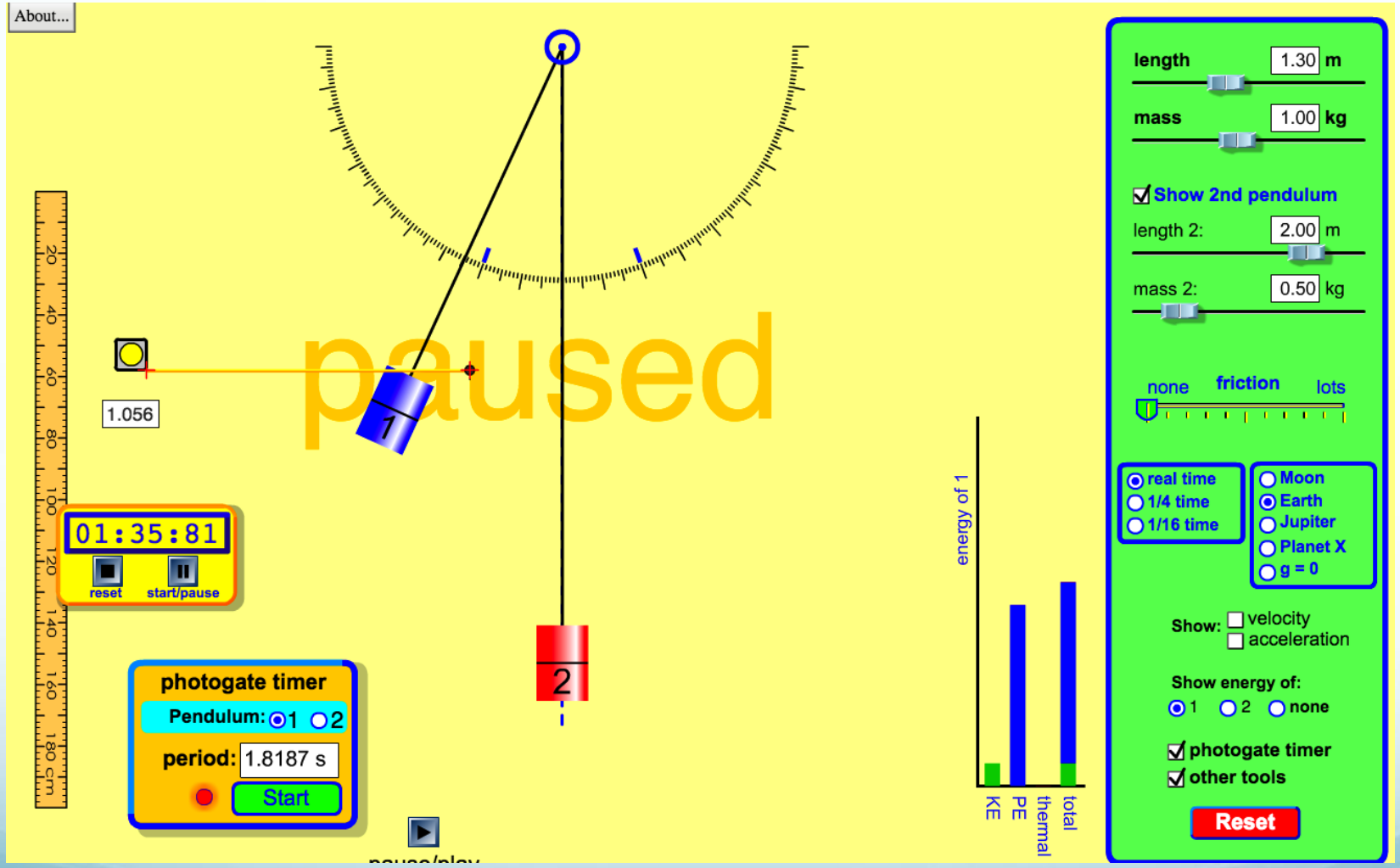


II. Student Activity #6 – Exploring Trigonometric Functions

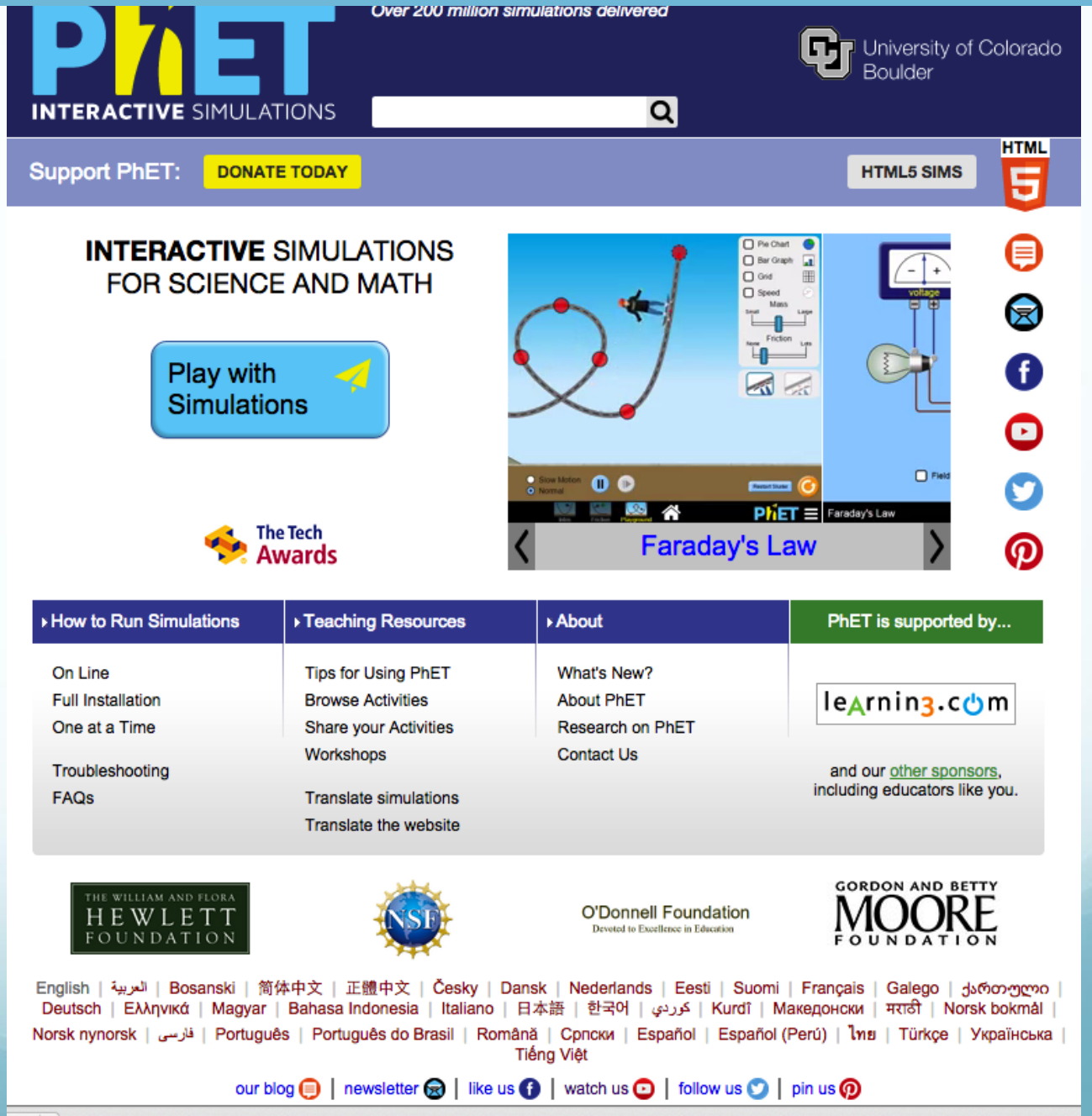
- **Rolling Hula-Hoop**
- **Weather and Climate, and Tides**

Interactive Activities & Web resources

1. https://phet.colorado.edu/en/simulation/legacy/pendulum-lab

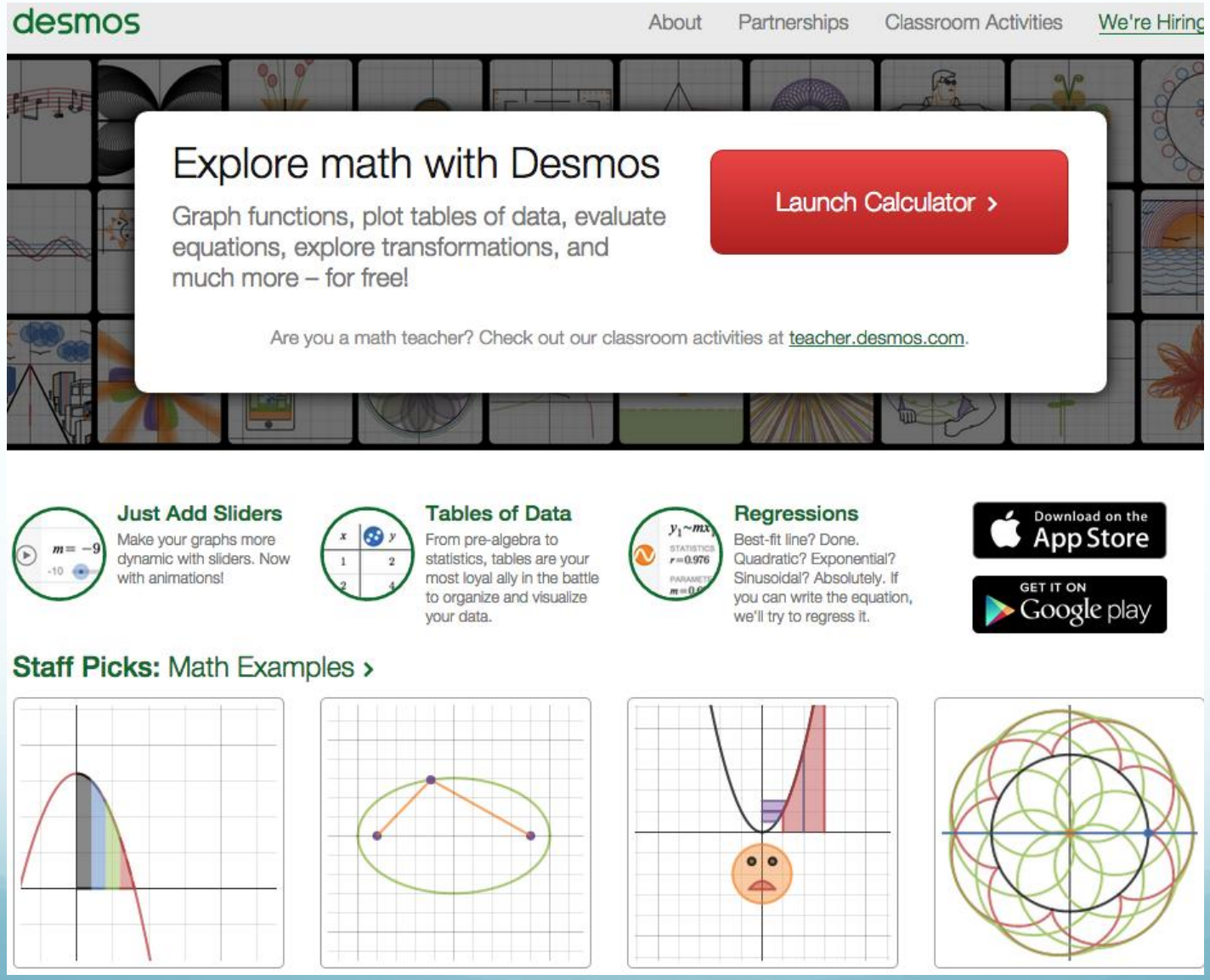


III. Interactive Activities & Web resources



III. Interactive Activities & Web resources

2. https://www.desmos.com/

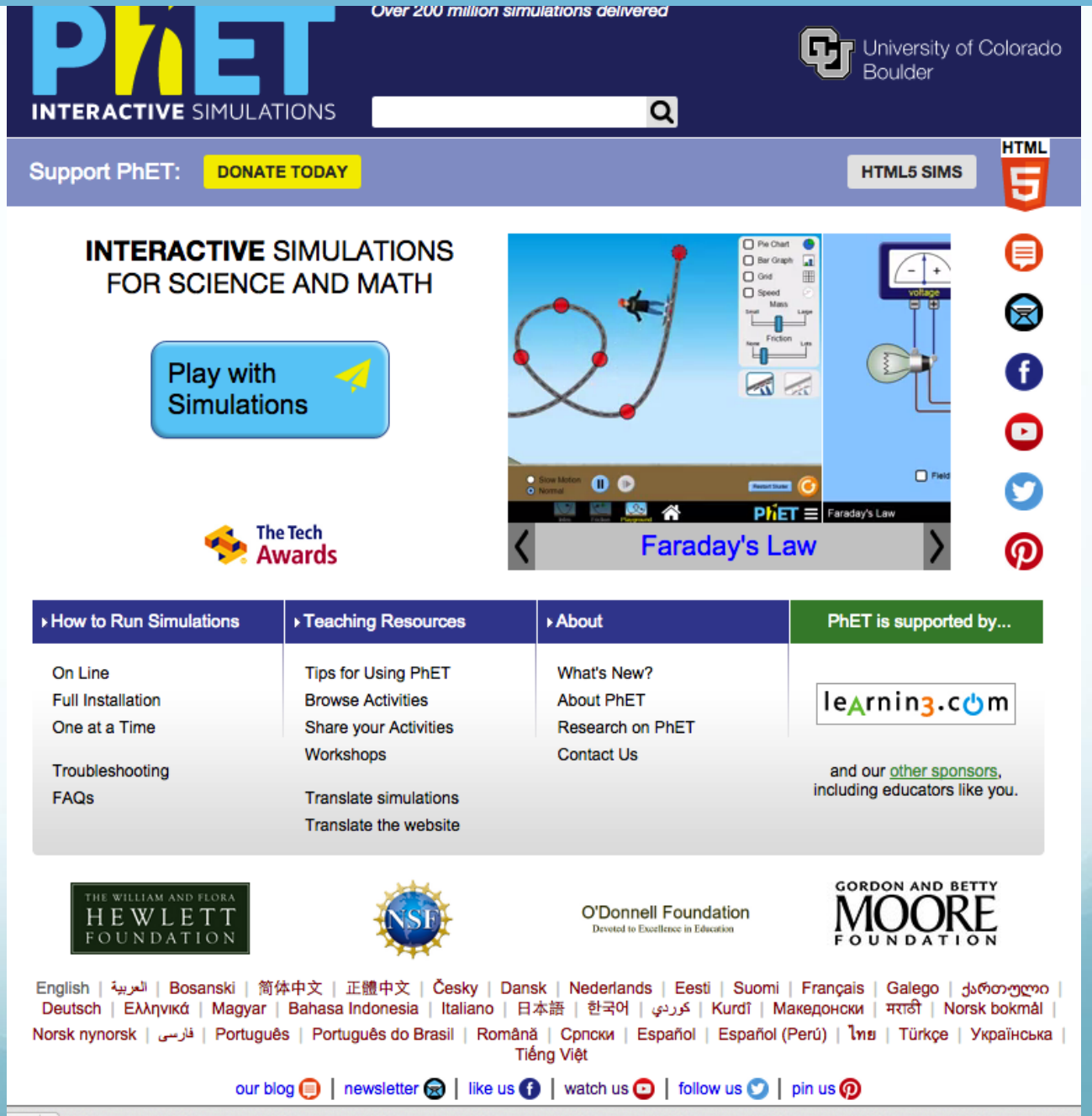


Interactive Activities & Web resources

3. http://qrcode.kaywa.com/

http://www.qrstuff.com/

III. Interactive Activities & Web resources



V. Student Products

1. Websites – weebly.com; wix

2. Videos, Powerpoints and Prezis

3. Math Paper

Thank you!

Other References

Source:
http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/continuum/pages/exponentialfunc55.aspx

http://archives.math.utk.edu/ICTCM/VOL15/S72A/paper.pdf

http://www.rivermill-academy.org/common/pages/DisplayFile.aspx?itemId=25128065

http://www.qrstuff.com/