

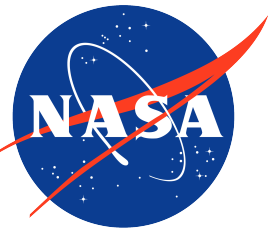


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# Fall 2021 Precalc Lesson 13.2

Dr. O'Brien  
Herbert H. Lehman High School  
14 December 2021

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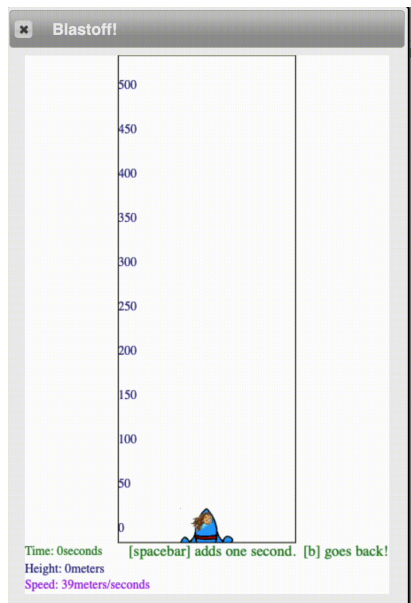


## Do now

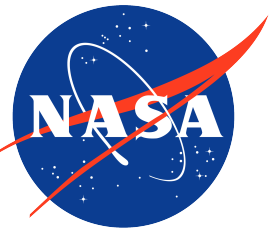
be sure to: Get out your **binder**. Make sure you receive your **Brainstorm your own game** worksheet. Copy the **goal** and answer **do now** questions below. Write a complete sentence for each answer:

Watch the video to your right.

1. How high does the rocket get? How long does it take to get there?
2. **Make a prediction:** the height of the rocket it can be described as a function of time. What sort of function do you think this is? **HINT:** look at your library of parent functions.

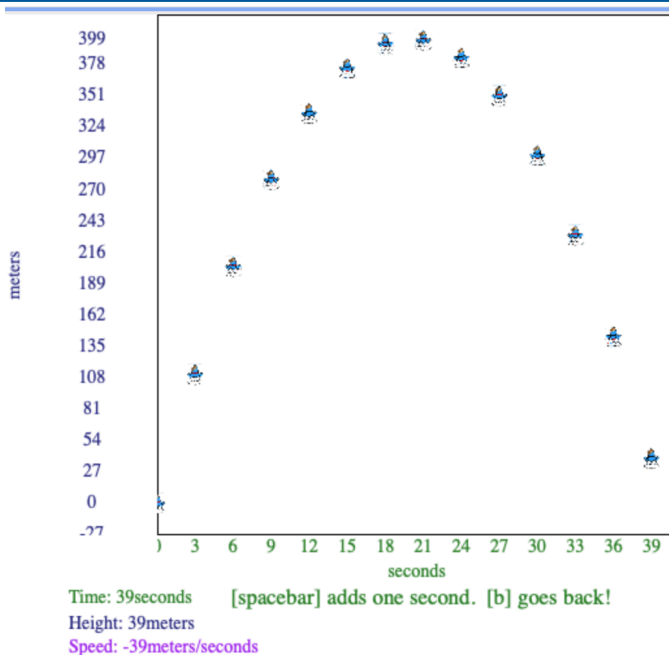


**class:** precalc **goal:** HDW use functions in Pyret for computational modeling?

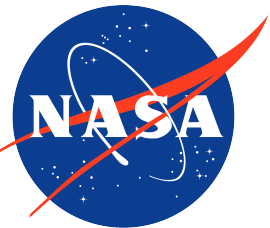


## Do now

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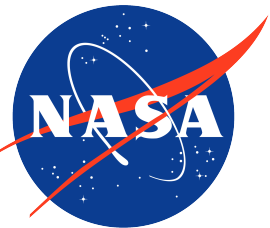


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### framing

- **what:** use functions in Pyret for computational modeling
- **why:** in the real world (science, medicine, engineering) math and computer science is frequently used to analyze and make predictions about real world phenomena
- **where to:** using functions in Pyret to model movement in our video game



## Vocab

be sure to: Keep your **notebook** open. Copy the definition for **comp. modeling** in your notebook. The other definitions should be in your notes. If not copy them!

Computational  
modeling

Using computer  
programs to analyze  
and make predictions  
about real world  
systems (especially in  
science, medicine, and  
engineering)

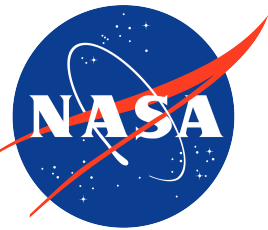
### REVIEW:

function

a mathematical object that takes in  
an input and produces a unique  
output

function definition

Code that names a function,  
defines its arguments, and states  
the expression to compute when  
code is used



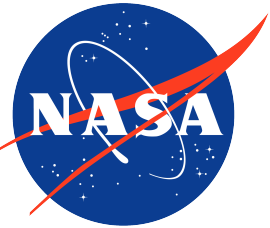
## Writing to learn: warm up

be sure to: Answer the questions below in your **notebook**. Be prepared to share out.

A NASA rocket takes off from Cape Canaveral, Florida. It's traveling at **11 m/s**.

1. How could you determine the distance traveled by the rocket in **5 seconds**? How about in **2 minutes**?
2. Write a function  $h(t)$  that will return the height of the rocket at a time  $t$ 
  - A. Sketch a graph for this function.
  - B. What family does this function belong to (see library of parent functions)
  - C. Describe the domain and range for this function.





## Coding to learn: warm up

be sure to:

1. Open **Rocket Height Starter File** in Google Classroom. Save a copy.
2. Modify the function  $h(t)$  so it works correctly. Observe the the path of the rocket and the graph.
3. How can you make the rocket move faster or slower? Experiment in Pyret. Then use precise mathematical language to describe how you're changing the function in your **notebook**. Be prepared to share out.





# Coding to learn: activity

Dr. O'Brien 12/14

Be sure to:

Work with your partner to answer the questions below in your notebook. Be prepared to share out at the end of class!

1. Examine the table to the right

- A. Specify the function  $h(t)$  along with its properties (family, x-/y-intercepts, domain and range).
- B. Model your function  $h(t)$  in Pyret. Describe how the behavior of the rocket is different from before.

2. You want your rocket to reach its maximum height after **exactly 15 seconds** and then land.

- A. Sketch a graph of this situation by hand. Identify the family of this function, its other properties, and how it is transformed from its parent. Use this information to find the function.
- B. Model your function in Pyret. Explain whether it behaves as expected. If it doesn't, figure out what you did wrong and try again!

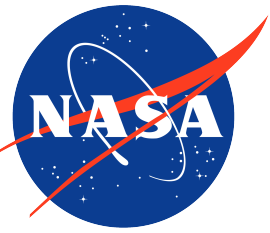
3. Make the rocket reach a height of **exactly 400 m** and then land. Sketch the graph, and write the function in your notebook. Then model it in Pyret to test if the function works as expected, explain why or why not in your notes.

t	$h(t)$
0	0
2	8
5	50
10	200

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## Reflection: Thinking about thinking

be sure to: Answer each question below with a complete sentence.

1. How did you use computational modeling in class today?
2. In what situations could it be useful to be able to combine math with computational modeling? Use your imagination!

