The Snowball Games
Candice Henry, Malaika Jordan, and Yolanda McKee

The Snowball Games: Scene 1

3 Mondays and 3 straight snowstorms for a frustrated Northeast

By Ed Payne and Mariano Castillo, CNN, Updated 9:16 PM ET, Mon February 9, 2015

(CNN)As the snow falls, so do records for extreme weather. In Boston on Monday -- with 62.5 inches of snowfall since January 15 -- the record for most snow in a 30-day period has already been broken. The previous record was set in 1978.

With the third storm in as many weeks, how long will it be before the new record will be surpassed?

"I know that it's frustrating right now, particularly with the amount of snow, and it's frustrating to all of us," said Boston Mayor Marty Walsh. "This is snow like we've never seen before in the past."
Boston is in the cross hairs again, and winter storm warnings are in place across large portions of the Northeast, including Massachusetts, New York, Connecticut, Rhode Island, Vermont, New Hampshire and Maine.

The National Weather Service forecasts 12 to 16 inches of snow by the time the storm ends Tuesday. For upstate New York, the numbers are 8 to 14 inches.

After the storm, cold air will funnel in, followed by yet another snow event for Thursday and Friday. Authorities say the problem is not the storm itself, but that it comes right after two previous ones. Three straight Mondays, three straight snowstorms. To put it in perspective: Only nine days into February, the amount of snowfall makes this year the fifth-snowiest recorded February.

Schools and streets

Schools in parts of the Northeast, including Boston, will be closed Monday and Tuesday.
Boston's mayor said students haven't had a full week of school in three weeks. He issued another snow emergency and parking ban Sunday in anticipation of all the new snow. Cars left on city streets were being ticketed and towed to make room for snowplows.
The Massachusetts Bay Transportation Authority, known as the T, suspended all rail services starting at 7 p.m. ET Monday. No rail service is scheduled for Tuesday.
Walsh urged Bostonians to stay indoors until the worst is over. "These storms that we're getting are unprecedented," he said. "We've never seen this type of snow in the city of Boston at any other time in the history of our city."

Excerpted from
Payne, E. and Castillo, M. CNN (2015). 3 Mondays and 3 straight snowstorms for a frustrated Northeast. Retrieved from http://www.cnn.com/2015/02/09/us/northeast-snow/

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The Snowball Games: Scene 2

It has been a long winter… students everywhere are celebrating the numerous snow days as they are not ready to go back to school and nature is cooperating. Hailey, Grace, Blake, and Logan live in the same neighborhood and are enjoying their daily snow ball fights. However, they are getting a little bored fighting each other and want to challenge the kids on the next street over, the only problem is, they have a huge snow bank on that street which makes it virtually impossible to beat them. Hailey, however, has a plan and gets Grace, Blake, and Logan to meet her at her house to discuss how they can win the snowball games.

Hailey: All right team, we are all here because we are going to challenge the kids on Spring Road to a snow ball fight.

Logan: I know that's what we said yesterday, but have you seen the snow bank on that street, it's like 30 feet tall!

Blake: *(sarcastically says)* Really??

Logan: Okay maybe 4 or 5 feet tall....

Hailey: Logan, that's why we are meeting, so we can be strategic and win, Grace tell them…

Grace: Okay, a snowball is really just a projectile, we throw it up and it comes down. Just call me Sir Isaac Newton, no make that Madam, I have this all down to a science. You know I have the highest grade in Physical Science!

Blake: Um… stop bragging and tell us the plan.

Logan: (whispers) Who is Isaac Newton, is he the guy who invented Fig Newtons?

Grace: This is the plan, all we have to worry about is inertia and gravity, and energy.

Hailey, Logan, and Blake: (with a puzzled look on their faces) Huh?

Grace: What do you mean huh? We learned this in class, don't you remember Mr. Bolden talking about potential energy, kinetic energy, the way that energy converts??? (she looks around) okay I guess not.

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The Snowball Games: Scene 3

The team despite not wanting anything to do with school have spent the past 45 minutes reviewing physics concepts to get a winning edge on the Spring Road kids.

Hailey: Phew, my brain hurts, but at least I know what Grace is talking about now. The only issues are because the bank is so high we have to make sure that our snowballs not only get all the way across the street, but that they also get high enough to get over the 5 foot snow bank on their street.

Logan: Not only that, but we need the snowballs to fly fast, we have to keep them going.

Blake: Our arms are going to be so sore tonight!

Grace: They don't have to be… we just need something that is going to do the work for us.

Hailey: Yes!! Like a simple machine. That will do the work for us… it will magnify our force and speed up our snowballs.

Blake: I'm getting excited… this can work!

Grace: Absolutely Blake, now we just need to make sure that whatever we come up with can do all of that and be accurate and precise.

Logan: Oooohhh, like a catapult…

Hailey's Mom: *(jokingly says)* Well kids, may the odds forever be in your favor!

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The Snowball Games Sample Box Chart

Assignment: Fill in box chart. Please use the space below the box chart record your learning issues' research results.

Facts	Questions
Hypotheses	Learning Issues
Vocabulary	

Research on Learning Issues:

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The Snowball Games: Group Assignment

Use the information and learning issues that you researched from the scenes to design a catapult that can help your team win the snowball fight against the Spring Road kids.

- You will be given bamboo skewers, masking tape, large marshmallows, small marshmallows, a spoon, and rubber bands to create your catapult.
    - What is the problem to be solved?
    - What are some solutions to the problem?
    - Create a sketch of your catapult design.
    - Use your materials to build a prototype of your design.
    - Test your prototype.
        - It must be able to launch the small marshmallows over the 1.5 foot fortress and land in an 8 x 8 inch square, from the launching point 3 feet away *(your rulers are only in centimeters and millimeters, don't forget to convert)*
    - Re-Design your prototype to meet the given constraints if needed

Reflection – at least 4 paragraphs (the use of diagrams are strongly encouraged)
Based upon what you have learned, discuss the results of your snowball fight as it relates to:

- Accuracy and precision
- Projectile motion with regards to gravity, trajectory, and the horizontal and vertical component
- The difference between potential and kinetic energy
- The Law of Conservation of Energy (what happens to the catapult throughout the snowball launch)
- Energy Transformation
- The points on the horizontal component of the projectile in which the snowball will have the most and least potential and kinetic energy
- How simple machines "do" work to magnify force?
- What changes if any would you make to your catapult? Why or why not?

Snow Ball Games: Resources

Projectile Motion

- https://phet.colorado.edu/en/simulation/legacy/projectile-motion
- http://www.physicsclassroom.com/class/vectors/Lesson-2/Characteristics-of-a-Projectile-s-Trajectory
- http://www.fearofphysics.com/Proj/proj.html

Potential/Kinetic Energy:Energy Transformation

- https://phet.colorado.edu/en/simulation/legacy/energy-skate-park
- https://www.scientificamerican.com/article/bring-science-home-rubber-bands-energy/
- http://www.physicsclassroom.com/mmedia/energy/ce.cfm
- http://mathletenation.com/content/catapults-potential-elastic-energy

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Snow Ball Games Peer / Self Evaluation Form

Instructions: Choose the number that best represents how well you and your peers each participated in the group. 4= Excellent 3= Good 2=Fair 1= poor

	Your Name _____	# 2's Name _____	# 3's Name _____	# 4's Name _____	# 5's Name _____
Brought needed materials to class and was ready to work					
Stayed focused on the task and what needed to be done.					
Demonstrated skill in performing tasks such as generating hypotheses, learning issues and questions; and critically appraises case, explaining reasoning process.					
Respectfully listened to, shared with, and supported the efforts of others, and tried to keep people working well together.					

What did I do well? _____

_____

What can I improve? _____

_____

How can the group improve? _____

_____