Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Hour \_\_\_\_\_\_\_\_\_\_\_

**Newton’s Third Law Stations**

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| **For every action there is an equal and opposite re-action.** |

**Station 1:**

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| Resources/Materials Required: |
| -Marbles & Stationary Object (Book, piece of wood)-Laptops |

The first station you will work with marbles. Please NO THROWING marbles. You will be asked to only do observations. Thank you for following this simple rule.

You will have two tasks to perform:

1. Choose two marbles and set one marble at the end of a flat surface.
2. Push the second marble into the first marble (at the end of the surface).
3. Observe what happens when the two marbles collide—notice the reaction to the collision. Write your observations here. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What happened with the transfer of energy from one marble to the next?

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1. Now repeat the process using a stationary object and record your observations. What happened differently from your first observation?

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1. Now you will watch one or two videos based on time or teacher directions.
	1. Bill Nye <https://www.youtube.com/watch?v=NRKmJgIokxg>

What are two things you learned?

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* 1. NASA video <https://www.youtube.com/watch?v=cP0Bb3WXJ_k>

What are two things you learned?

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Station 2:

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| Resources/Materials Required: |
| -Straws-Balloons-Towels (for cleanup and to dry objects)-Legos or Paper for car building-Wheels |

The goal of Station 2 is to build either a Lego balloon car or a paper car. At this station, you are to create a car that is propelled forward by using a balloon and a straw. You can be creative or as basic as you like. Upon completion of your car building, answer the questions below.

1. Were you able to build a car that moved forward by the air expelled from the balloon? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What design changes/modifications could you make so it travels further and/or faster and/or travels AT ALL?

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1. What parts of your car helped it perform well and what parts did not perform well? What were the best and worst parts of your design?

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1. What materials may have helped you build a better car?

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Station 3:

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| Resources/Materials Required: |
| -Water -Aluminum Pans -Marker to draw line down middle of pan -Film Canisters-Alka Seltzer-Towels (for cleanup and to dry objects) |

1. Take 2 film canisters, a seltzer tablet (Alka-Seltzer), water and an aluminum pan.
2. Use a permanent marker to draw a line down the center of the pan.
3. Pour water into each canister until half full, and equal to each other.
4. Cap the first canister and lay it on its side with the cap facing toward the line on the pan.
5. Work quickly to add 1/2 of an Alka-Seltzer tablet to the second canister.
6. Immediately cap the canister and lay it cap-side at the center line in the pan, facing the other canister.
7. Observe what happens and write it here:

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1. What created that reaction?

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1. What else do you think you could try to add to make a different or similar reaction?

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