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| **Lesson Title : Forces** | **Unit #:1** | **Lesson #:1** | **Activity #:2** |
| **Activity Title:Identifying forces** |

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| **Estimated Lesson Duration:** | **3 days** |
| **Estimated Activity Duration:** | **2 days** |

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| **Setting:** | **Last day of lesson on forces. Classroom** |

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| **Activity Objectives: I can determine the forces that can move an object that is at rest.** |

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| **Activity Guiding Questions:**  |

What is the difference between a contact or non-contact force?

How do you explain what a force is?

How many kinds of forces are there?

Is this the same force as star wars?

Can/ do forces move all objects? What about heavy objects?

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| **Next Generation Science Standards (NGSS)**  |
| **Science and Engineering Practices (Check all that apply)**  | **Crosscutting Concepts (Check all that apply)** |
| X Asking questions (for science) and defining problems (for engineering) | ☐ Patterns |
| ☐ Developing and using models | X Cause and effect |
| ☐ Planning and carrying out investigations | ☐ Scale, proportion, and quantity |
| ☐ Analyzing and interpreting data | ☐ Systems and system models |
| ☐ Using mathematics and computational thinking | ☐ Energy and matter: Flows, cycles, and conservation |
| ☐ Constructing explanations (for science) and designing solutions (for engineering) | ☐ Structure and function.  |
| ☐ Engaging in argument from evidence | ☐ Stability and change.  |
| ☐ Obtaining, evaluating, and communicating information  |  |

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| **Ohio’s New Learning Standards for Science (ONLS)** |
| **Expectations for Learning - Cognitive Demands (Check all that apply)** |
| ☐ Designing Technological/Engineering Solutions Using Science concepts **(T)** |
| X Demonstrating Science Knowledge **(D)** |
| ☐ Interpreting and Communicating Science Concepts **(C)** |
| ☐ Recalling Accurate Science **(R)** |

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| **Common Core State Standards -- Mathematics (CCSS)** |
| **Standards for Mathematical Practice (Check all that apply)** |
| ☐ Make sense of problems and persevere in solving them | ☐ Useappropriate tools strategically |
| ☐ Reason abstractly and quantitatively | ☐ Attendto precision |
| ☐ Construct viable arguments and critique the reasoning of others | ☐ Look for and make use of structure |
| ☐ Model with mathematics | ☐ Look for and express regularity in repeated reasoning |

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| **Unit Academic Standards (NGSS, ONLS and/or CCSS):** |

**OHIO 5 PS 4 The amount of change in movement of an object is based on the mass of the object and the amount of force related.**

**NGSS 3-5 PS2 A Force and Motion**

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| **Materials**:  |

PowerPoint <https://docs.google.com/viewer?a=v&pid=sites&srcid=c2FzZWFzLm9yZ3xtZWxpc3NhLWEtZG9sbC0yMDE1fGd4OjM4ODU2MzdjNmJiMmY5YTM>

Student worksheet

<https://docs.google.com/viewer?a=v&pid=sites&srcid=c2FzZWFzLm9yZ3xtZWxpc3NhLWEtZG9sbC0yMDE1fGd4Ojc2YmFmYzQ3MWI3ZjdmZjE>

Supplies:

Magnetic wands and magnetic balls

Toy car that is spring operated

Balloon

Match box car

Blow drier

Ping pong ball

Pinwheel

Toy marble track set

Plastic cup

Cork

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| **Teacher Advance Preparation: set up stations for each force** |

Set up stations-

 Station one-magnetic marble and magnetic wand

 Station two- toy car that operates by pushing down on a spring

 Station three- balloon that is blown up

 Station four- toy car

 Station five- blow drier and ping pong ball

 Station six- pinwheel

 Station seven- marble track toy

 Station eight-cork in a cup of water

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| **Activity Procedures:**  |

Follow PowerPoint for today’s lesson starting with review slide

Review – Bell work – name a contact and a non contact force from yesterday’s lesson

After review introduce the station locations and explain that they will rotate clockwise filling out the worksheet.

Group students in groups of 4.

3- 5 min per station for rotations. Students will rotate when the timer rings using an online timer.

Student Directions on worksheet- fill out worksheet and turn in at end of lab

Direction on the worksheet-Directions: Your group will be conducting activities at eight different stations. For each station observe and identify the force that is at work. Explain whether the force you identified is contact or non-contact. Work as a table and be prepared to turn in your worksheet.

**Formative Assessments:** Link the items in the Activities that will be used as formative assessments.

Students will turn in lab worksheet. (Attached to material)

**Summative Assessments:** These are optional; there may be summative assessments at the end of a set of Activities or only at the end of the entire Unit.

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| **Differentiation:** Describe how you modified parts of the Lesson to support the needs of different learners.Refer to Activity Template for details. |

All the students were engaged in the hands on activity. Students were supported by peers as they worked in groups.

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| **Reflection:** Reflect upon the successes and shortcomings of the lesson. |

The students were able to see the difference between contact and non contact forces. The student were able to correctly identify each stations force and then contact or non contact. The examples of wind – blow drier had the most impact as the students were able to the air coming out of the blow drier and then balance the ping pong. The pinwheel then reinforced the idea. The students had prior knowledge of gravity and magnetism. Buoyancy and spring continued to be a struggle as the concept were new. Spring force could have been better explained with more toys that use springs, or the toys that are clear and show the spring inside (just saw one in science catalog).