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| **Unit 3.1: Third Grade: Force and Motion: Let’s Move It!**  **LEARNING PLAN**  **(overview)** | | |
|  | **Pre – Assessment of student conceptions** | |
| “[Talking About Forces](https://drive.google.com/file/d/0B6eck9S5plSJWjZwQmsyRTlhbk0/view?usp=sharing)” Assessment Probe, be sure to administer **prior** to beginning **Instructional Cycle 3.1.1** | |
| **Instructional Cycle & Focus Question** | **Phenomenon & Formative Assessments** | **Synopsis of Learning Activities with Vocabulary** |
| **Instructional Cycle 3.1.1**  Why don’t the dishes move?  **(5 Lessons)**     * How can you win a tug-of-war against any opponent? | **Tablecloth trick (dishes stay in place).**    Tug-of-war  Notebook Entries:   * *Is the box moving?* (no) * *How can we make it move?* (3-5 partner predictions will be recorded) * *How should we develop teams in tug-of-war?* * *Why does the flag eventually move to one side or the other?*   Discourse:   * Discuss ways of moving the box (answers should include pulling and or pushing) * Teacher-facilitated discussion with anchor charts * Students discover that movement occurs by the greater applied force   Models:   * Draw a snapshot (0:20) of the video image of the people against the elephant in the [video](https://www.youtube.com/watch?v=H0bHuIUQOJ0). * Predict the force that will occur within the event by drawing arrows. * Possible changes occur to the notebook sketches to reinforce understandings toward the phenomenon. * Arrows appear by the amount of force being applied through the event. | balanced force  friction  force  investigation  motion  push  pull  unbalanced force  predictable repeating  pattern |
| * Why do objects fall? * How much force is needed? | [Falling Objects (gravity) and Flicking (Forces Interacting)](https://docs.google.com/document/d/1ndjpx9FtrMs1VPTAmI6hv22AXaLI7xKCHuVe81HTEjQ/edit)    Notebook Entries:   * Falling Objects Trial #1-3 [table](https://drive.google.com/a/pasd.org/file/d/0Bx10usvvEUb8T2hKUUVlU1V1MTg/view) * Predictions enclosed (lesson 3.1.2a and 3.1.2b) * Explanatory sentence of the results to conclude which ball hits the ground first.   Discourse:   * Reflection on the  [nonfiction passage](http://www.readworks.org/passages/what-gravity)  about objects falling on the Earth’s surface  compared with the moon’s surface * Causes and effects of heavier objects versus lighter ones and smaller versus larger objects.   Models*:*   * Notes on the results of the flicking force      (lesson 3.1.2b) for each type of ball. * Cause and effects of each trial through drawings or notes/charting. | gravity  direction  speed (acceleration)  object  cause  effect  pattern  predict  observation  investigation |
| * Why does a pendulum move? | Motion of a Pendulum (Resting Object Movement)    Notebook Entries:   * [Construction plan](https://drive.google.com/file/d/0B6eck9S5plSJNGVhMnZmZmFfQW8/view?usp=sharing) of the student pendulum * Predictions of the patterned movement * Notes from [video clip of Foucault Pendulum](https://www.youtube.com/watch?v=iqpV1236_Q0)     Discourse:   * Explanations of the observations * Acting forces on the pendulum   Models:  Pendulum model and revisions  [Assisted directions](http://www.wikihow.com/Build-and-Use-a-Pendulum) for an accommodation | pendulum  Newton’s first law of  motion  inertia  rotation |
| **Instructional Cycle 3.1.2**  What causes movement when objects are not touching?  **(2 Lessons)**     * Why does clothing stick to the dryer sheet?        * How do magnets behave? | **Floating ring magnets on a pencil and hair attracted to a static balloon.**    Static Electricity and the Force of Magnetism  Notebook Entries:   * Responding and posing questions to investigations. * Evidence of an understanding of terminology by its use in written explanations. * Drawings/notes of observations throughout the investigation. * Predictions of the objects’ behaviors.   Discourse:   * Asking questions of peers. * Interaction with the materials and offering reasoning from observation.   Models:   * Illustrations of particle movement from negatively charged to positively charged objects (3.1.4a). * Illustrations of the magnet’s predicted effect on movement and evidence of the observed  action. | electricity  magnetic  contact  interact  measurement  evidence  repel  attract |
| * How do magnets behave around other objects?        * How do magnets work? | Magnetism Interactions (without contact)  Notebook Entries:   * Object investigation table with prediction. * “What is a magnet?” definition response. * Predictions of magnets’ behavior.   Discourse:   * Asking questions with peers and listening to peer responses. * Explanation with supported evidence of observed effects.   Models:   * Illustrations of observations * [Video of how magnets are made](https://www.youtube.com/watch?v=noGGcyPHtdI) - enrichment | iron  aluminum  elements  copper  nickel  cobalt |
| **Instructional Cycle 3.1.3**  How can we solve a problem using magnets?  **(7 Lessons)** | **An electromagnetic crane**  Notebook Entries   * Drawing of properties and strengths * Design a prototype invention   Discourse:   * *What jobs have you noticed magnets doing?* * *What problems do you notice around school or at home?* * *What problems may be helped by magnets and what may not?*   Design:   * Design a prototype to solve a problem. * Build a prototype to solve a problem. | design  problem  properties  strength  prototype |