|  |
| --- |
| **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-warNotebook 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 forcefrictionforceinvestigationmotion pushpullunbalanced forcepredictable 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.
 | gravitydirectionspeed (acceleration)object cause effect patternpredict observationinvestigation  |
|  * 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   | pendulumNewton’s first law of  motioninertiarotation   |
| **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.
 | electricitymagnetic contact interactmeasurementevidencerepelattract |
|  * 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

  | ironaluminumelementscoppernickel 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.

  | designproblempropertiesstrengthprototype |