Bootstrap Instructional Goals:

***examples*** practice...

Constant velocity golf…

***Boolean*** creation - ‘Is the ball in the hole?’

**----> 2 hours...**

(students have a hard time writing examples for situations that are false)

In Moon Lander activity - Boolean “Is rocket in space?” ← fits at the end of U3.

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| **Day** | **Bootstrap Instructional Goals** | **Modeling Physics Instructional Goals** | **Adjustments** |
| Monday  New teams to start (6 total):  Place David and Kevin together (not with Sara, Joanna or MacKenzie)  Place Charles and Haley together  Keep | Golf game - *Teachers in “Pyret Student (sailor)” mode* | J: Speeding up/Slowing down - Whiteboard -> velocity graph, motion map, contract/examples/function.  **fun** next-v(v, a): v + (a \* delta-t)  M: Derive kinematic equations  Highway Hazards - Booleans - Have we hit the horses? \*\*\*introduce Booleans for students\*\*\*  **fun** is-braking  **fun** is-collision  **Extended learning ->** Golf game (4 greens - deployment) - *inferring physical meaning of different ‘greens’.*  “Par 2”... | Kinematic equations should be left out - use the area of the v-t graph as a problem-solving tool  Change this to be a paper-pencil exercise only; insert Graphs and Tracks Pyret-style for the programming piece |
| Tuesday | Mini-golf 1-D (w/ bounce) - Sailor  Pyret sailor mode:  Rocket game  - Teachers write the constant velocity floating portion - RUN  - Teachers write constant acceleration free fall portion - RUN  Bouncing basketball - *conditionals - Student* | Free-fall Paradigm…  Pre-lab… student mode  Discuss measurement options and go to the analysis.  “Galileo’s constant”  Broom Ball Activity ->   * Board Meeting…   Teacher Mode - *Parse out the instructional goals.*  Afternoon - Ball, sand, fan?  Force ‘types’ (interaction)   * System schema * Force Diagram   Teacher Mode - unpacking…  Extended learning W.S. 1 |  |
| Wednesday | Pyret - ‘vectorize’ bounce - 2-D bounce… | Ball-Sand-Fan  Air Hockey - “Part 3” as a deployment.  Newton’s 3rd Law Lab   * System Schema connection (1 INTERACTION - force acts on BOTH objects involved)   Afternoon:  Force of Gravity Lab  Confidence reading on post-its |  |
| Thursday | “Lunar” lander adding conditional for safe landing.  Lunar Lander: Game is complete.  Added Newton’s 2nd Law. | Fields… Gravitational Field, Electric Field  Millikan Experiment Practicum Sim.  Afternoon:  Survey implementation |  |
| Friday |  | Air Resistance Lab?  MEGA-Board -  Units 0-5 Concept Map?  Post surveys - FCI, ICTPS, PCA |  |

End Goal: Finish Unit 4 - make this the complete unit that participants see in entirety

Key Skills and Concepts

|  |  |
| --- | --- |
| Physics | Pyret |
| Unit 0 - Energy, system schema | Unit 1 - Values and expressions  [images] |
| Unit 2 - Constant velocity | Unit 2 - Functions, examples, design recipe  Lander drifting |
| Unit 3 - Uniform acceleration | Unit 3 - Booleans, [if], when lander crashes |
| Unit 4 - Balanced forces, vectors | Unit 4 - 2-d functions, if, is-safe-landing  Initial conditions to land okay |
| Unit 5 - Unbalanced forces | Unit 5 - ΣF, thrust, finished game |

Computational Modeling in Physics First w/ Bootstrap

Unit 0 - Qualitative energy

Unit 1 - Functions

Unit 2 - Constant Velocity

Unit 3 - Uniform Acceleration

Unit 4 - Introduction to Forces/Balanced Forces

Unit 5 - More About Forces/Unbalanced Forces

Unit 6? - Impulse-Momentum

Unit 7? - Quantitative Energy

Melissa’s graphics to-do:

* Units 2-4 concept flow map - created on paper
* “The Model So Far” - filled for units 1-5
  + Include both physics and Pyret/programming concepts
* Unit 5 concept flow map - create on paper first
* Type/Value/Expression mega-table
  + Number, String, Image, Boolean

Jess’s to-do list:

* Contracts so far table

Moving forward:

3-day Pyret sailor mode intro

Sailor mode morning warm-ups each day (½ hour?)