

Gr. 2 – Understanding Structures and Mechanisms

Movement

Up and Down Dino

Specific Expectations:

2.1 Follow established safety procedures during science and technology investigations.

2.2 Investigate and describe different kinds of movement.

2.4 Use technological problem-solving skills, and knowledge and skills acquired from previous investigations, to design, build, and test a mechanism that includes one or more simple machines.

2.5 Use appropriate science and technology vocabulary, including *push*, *pull*, *beside*, *above*, *wheel*, *axle*, and *inclined plane*, in oral and written communication.

3.1 Describe different ways in which objects move.

3.2 Identify ways in which the position of an object can be changed.

Big Idea (for lesson):

Students will build and observe the motion of a pendulum, describing the motion and the forces behind it.

Accommodations:

- Increase time
- Visual Aids
- Manipulatives
- Chunking
- Step-by-Step
- Scaffolding
- Copy of Notes
- Student Grouping

Differentiated Instruction:

- Content: Use demo to show the content as you offer verbal descriptions.
- Process: Have students work in pairs and support each other if physical impediments exist.
- Product: Students may show their final product in pairs, and communicate their findings either verbally, visually, or through written means.
- Other: _____

Bloom's Taxonomy:

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

Multiple Intelligence:

- Verbal/Linguistic
- Logical/Mathematical
- Visual/Spatial
- Bodily/Kinesthetic
- Naturalist
- Musical/Rhythmic
- Interpersonal
- Intrapersonal

Delivering The Lesson:

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Portion & Timing	Grouping:			Introduction:	Materials
Minds On: 10 mins	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	<p>Teacher can do a demonstration to introduce pendulums to students. Structure this as a Predict, Observe, Explain demonstration, if desired.</p> <p>Hold the pendulum tight and up to your face, and have students predict what will happen if you let go. As an alternative, the video can also be shown.</p> <p>-Ask students why the results are different if you push the weight? (<i>Answer: You add more force to the system than just provided by gravity... You are putting energy into the object so it swings higher.</i>)</p> <p>-What forces are causing this motion? (<i>Answer: the force of gravity and the tension of the rope.</i>)</p>	<p>Up & Down Dino – Wrecking Ball Science – Swinging Bowling Ball – Cool Science Experiment. mp4</p> <p>String Weight Somewhere to tie pendulum</p>
Action: 20 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input checked="" type="checkbox"/>	<p>Have students build their own Up & Down Dinos according to the instructions on the handout.</p> <p>Teacher can circulate and ask questions of the different groups:</p> <p>-How is this Dino similar to the pendulum we saw before? (<i>Answer: the nut acts as a pendulum to make the head go up and down.</i>)</p> <p>-Can you think of other patterns of movement a pendulum could make?</p> <p>-Why do you think the pendulum slows down? How does air “get in the way”?</p> <p>(<i>Answer: Air gets in the way of the motion of the swing.</i>) If students have trouble visualizing air resistance/friction, show them a picture of a parachutist or demonstrate how a big garbage bag makes running more difficult.</p>	<p>Up & Down Dino Handout (Materials listed)</p>
Consolidate: 10 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input type="checkbox"/>	<p>Now that students have been exposed to pendulums and the force of gravity, try to see if they can explain this pendulum trick. Specific instructions can be found at http://www.stevespanglerscience.com/lab/</p>	<p>Up & Down Dino – Pendulum Catch – Sick Science!</p>

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			<p>experiments/magic-pendulum, or the video can be watched if preferred.</p> <p>Ask students if this is a true pendulum, and direct them back to the definition on their handout if necessary.</p> <p>-Ask students which end of the pendulum is heavier? (<i>Answer: the one with multiple hex nuts.</i>)</p> <p>-Does a normal pendulum pick up speed? Why does this one? (<i>Answer: not unless pushed, and this one does because the heavier end starts to fall quickly to the ground.</i>)</p> <p>-Try hitting a normal pendulum to make it go faster. What do you notice? (<i>Answer: the amplitude, or distance that each swing achieves from the centre point, increases.</i>)</p> <p>-When the heavy end speeds up, what happens to the light end? (<i>Answer: it tries to swing like a pendulum still, but its amplitude is increased so much that it makes a number of full swings.</i>)</p> <p>-Finally, have students describe the motion using appropriate terminology.</p>	#013.mp4
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