Gr. 6 - Understanding Structures & Mechanisms

Flight

Hoopglider/Boomerang

Specific Expectations:

2.1 Follow established safety procedures for using tools and materials and operating flying devices.

2.3 Use scientific inquiry/research skills to investigate the properties of air.

2.4 Use technological problem-solving skills to design, build, and test a flying device.

2.5 Use appropriate science and technology vocabulary, including *aerodynamics, compress, flight, glide, propel, drag, thrust,* and *lift,* in oral and written communication.

3.1 Identify the properties of air that make flight possible.

3.3 Identify and describe the four forces of flight – lift, weight, drag, and thrust.

Big Idea (for lesson):

Students investigate what materials and designs make effective and sturdy hoopgliders and boomerangs, and look at the forces at play when these structures are at work.

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 submit 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

Gr. 6 - Understanding Structures & Mechanisms

Flight

Delivering The Lesson:

Portion & Timing	Grouping:			Introduction:	Materials
Minds On: 5 mins	W ☒	S ☐	I ☐	Teacher begins by doing a Predict, Observe, Explain demo with students showing Bernoulli's Principle: -Hold a strip of paper close to their lips and blow across the top. -Paper responds by moving up, towards the stream of moving air, which is often unexpected. Ask students the following questions: -Where is air moving faster, above or below the paper? (*Answer: above.)* -Based on your observations, does slower-moving or faster-moving air exert more pressure? (*Answer: slower-moving air, so it was able to push the sheet up.*) -How does this relate to aircraft design? (*Answer: Engineers use this property to give lift to airplanes and other crafts*.)	-Narrow strip of light paper
Action: 25 mins	W ☐	S ☒	I ☒	Have students build their own hoop gliders and boomerangs according to the instructions on the handout. Compare performances of the structures and consider the differences in design. Try to have students make 3 different varieties of hoop gliders and boomerangs. Teacher can circulate and ask questions of the different groups: -How would your structure hold up when exposed to natural forces? -Does symmetry play a role? Does balance?	Hoopglider & Boomerang Handout (Materials listed)
Consolidate: 10 mins	W ☒	S ☐	I ☐	Teacher asks class to pick their best design for both the hoopglider and boomerang. Students engage in a community talking circle and share what went well, what didn't and what materials they wish they had for this project.	Hoverspeed-Hovercraft-Arriving-in-Calais.mp4