Gr. 8 – Understanding Matter & Energy Fluids

Cartesian Diver

Specific Expectations:						
2.1 Follow established safety procedures for using apparatus, tools, and materials.						
2.11 onow established surety procedures for ash	is apparates, tools, and materials.					
2.3 Investigate and compare the density of a variety of liquids.						
2.5 mrestigate and compare the density of a variety of inquito.						
2.4 Investigate applications of the principles of fluid mechanics.						
3.2 Describe the relationship between mass, volume, and density as a property of matter.						
3.3 Explain the difference between solids, liquid	s, and gases in terms of density, using the					
particle theory of matter.						
3.5 Determine the buoyancy of an object, given its density, in a variety of fluids.						
Big Idea (for lesson):						
Students will explore the different densities of fl	uids their properties and their effect on the					
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buoyancy of objects through building and obser-	virig a Cartesian Diver.					
Accommodations:	Differentiated Instruction:					
☐ Increase time	Content: Use demo to show the content as					
Visual Aids	you offer verbal descriptions.					
Manipulatives	Process: Have students work in pairs and					
						
Chunking	support each other if physical impediments					
Step-by-Step	exist.					
Scaffolding	Product: Students may show their final					
Copy of Notes	product in pairs, and communicate their					
Student Grouping	findings either verbally, visually, or through					
	written means.					
	Other:					
Bloom's Taxonomy:	Multiple Intelligence:					
Knowledge						
Comprehension	Logical/Mathematical					
Application	∑ Visual/Spatial					
Analysis	■ Bodily/Kinesthetic					
Synthesis	Naturalist					
■ Evaluation	☐ Musical/Rhythmic					
	Interpersonal					
	Intraporconal					

Delivering The Lesson:

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Fluids

Portion & Timing	Grouping:		ıg:	Introduction:	Materials
Minds On: 10 mins	W	S		Teacher can show a demonstration of a Cartesian Diver before students make their own. As an alternative, the video may also be shown.	Cartesian Diver - Sick Science! #142.mp4
Action: 15 mins	W	S		Have students build their own Cartesian Diver according to the instructions on the handout. Teacher can circulate and ask questions of the different groups: -Would this still work with a different fluid? How about pop? How about syrup? (Answer: Results will vary since the densities of these liquids and divers are all different as well. It's worth doing a couple "test" bottles with these liquids!) -Do you think this experiment depends more on buoyancy or on density? (Answer: These two properties are interrelated. As long as the density of the diver is less than the density of the water, the diver will remain buoyant.) -How is the density of the diver changing when you're just squeezing the bottle? (Answer: The effect of compressing the air in the bottle also squeezes the air in the diver, since water will not compress and there is nothing else to make smaller.)	Cartesian Diver Handout (Materials listed) Various liquids
Consolidate: 15 mins	W	S		After students have figured out their own Cartesian Divers, give them the Hook Challenge to see if they can successfully manipulate the physical properties of fluids.	Cartesian Diver - Hook Challenge! - Sick Science! #187.mp4 (Water, 16 oz cup, scissors, 2 hex nuts, 2 pipettes, 1L bottle, 10" piece of wire, 6" piece of wire)