

EDUC-430	INVESTIGATING CHILDREN’S THINKING																																	
Grade 3 content standard(s) for investigating magnets OR floating/sinking	<ul style="list-style-type: none"> • 3.1.3.A9- Distinguish between fact and opinion • 3.2.3.A1-Differentiate between properties of objects • 3.2.3.A2- Recognize that all objects have matter 																																	
Misconceptions/naïve ideas around floating/sinking	<ul style="list-style-type: none"> • Big/heavy things sink, small/light things float. • Hollow things float; things with air in them float. • Things with holes sink. • Flat things float. • The sharp edge of an object makes it sink. • Vertical things sink; horizontal things float. • Hard things sink; soft things float. • Floating fillers help heavy things float. • A large amount of water makes things float. • Sticky liquid makes things float. • weight vs density misconceptions <div data-bbox="597 863 1258 1482" style="border: 1px solid black; padding: 5px;"> <p>FIGURE 2 Student worksheet—sample counter evidence is provided, but the column should be left blank when distributed to students</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #00a651; color: white;">Misconceptions</th> <th style="background-color: #00a651; color: white;">Supporting evidence</th> <th style="background-color: #00a651; color: white;">Counterevidence</th> </tr> </thead> <tbody> <tr> <td>I Big/heavy things sink; small/light things float.</td> <td>A boulder sinks, while a leaf and a feather float.</td> <td>Small rocks or coins sink, although they are small. 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If cut into two unequal pieces, both pieces still sink in water regardless of size.</td> </tr> <tr> <td>II Hollow things float; things with air in them float.</td> <td>Balloons, beach balls, and basketballs float.</td> <td>A submarine sinks although it has air in it all the time.</td> </tr> <tr> <td>III Things with holes sink.</td> <td>A boat or ship with a hole in it sinks, e.g., Titanic.</td> <td>Objects made of floating materials (e.g., wood and foam) will float in water even if there is a hole in them.</td> </tr> <tr> <td>IV Flat things float.</td> <td>Water rafts and surfboards float.</td> <td>A flat piece of iron and a ceramic plate sink.</td> </tr> <tr> <td>V The sharp edge of an object makes it sink.</td> <td>Things with an edge are easier to push in snow, soil, and other solid materials.</td> <td>A piece of clay made into an edge shape will sink in water no matter how it is placed in water.</td> </tr> <tr> <td>VI Vertical things sink; horizontal things float.</td> <td>When we stand in water, we sink; when we lie on water, we float.</td> <td>If we put a piece of wood pencil in water, no matter how you put it in, it floats.</td> </tr> <tr> <td>VII Hard things sink; soft things float.</td> <td>Rocks sink, while balloons float.</td> <td>A piece of clay sinks in water although it is soft. A piece of wood floats in water although it is hard.</td> </tr> <tr> <td>VIII Floating fillers help heavy things float.</td> <td>Life preservers help people float in water.</td> <td>If a sealed container sinks, adding foam peanuts and resealing the container won't make it float.</td> </tr> <tr> <td>IX A large amount of water makes things float.</td> <td>Boats float in the ocean.</td> <td>Some things sink in the ocean although the ocean is huge.</td> </tr> <tr> <td>X Sticky liquid makes things float.</td> <td>A clay ball floats in corn syrup.</td> <td>Objects that sink in water will sink in cooking oil, although the oil is very sticky.</td> </tr> </tbody> </table> </div>	Misconceptions	Supporting evidence	Counterevidence	I Big/heavy things sink; small/light things float.	A boulder sinks, while a leaf and a feather float.	Small rocks or coins sink, although they are small. Objects made of floating wood will float in water regardless of size. 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Materials for investigating floating/sinking with possible discrepant event	<ul style="list-style-type: none"> • Bowl (Hanna) • Balls- baseball and tennis ball (Matt) • Pencil (Matt) • Coins (Jasey) • Orange/Clementine (Jasey) • Foam Blocks • Plastic Bottles- empty and full (Erin) • Stones- regular (Hanna) 																																	

	<ul style="list-style-type: none"> • TeddyBear manipulatives (Jasey)
<p>Discussion prompts/questions to elicit discussion around floating/sinking</p>	<p>PEOE</p> <ul style="list-style-type: none"> • What will happen if we put _____ into this bowl of water? • Does the size of an object effect whether something sinks or floats? • Why do you think this? Where does your thinking come from? • What can we observe now that _____ is in the bowl of water? • What have we observed? Does this match our predications/previous thoughts? • Why does _____ (sink/float) in the water? What’s going on here?
<p>Drawing prompt around floating/sinking</p>	<ul style="list-style-type: none"> • Draw predictions and then draw what is observed. • Take pictures of student drawings and allow them to take drawings home.