



Justin (5.10yrs.) invites me to join him as he continues to think about the workings of a pirate ship. He makes a detailed drawing illustrating some key features of his vessel.

How does this ship work? Would you show me on your drawing?

Justin: " **This is the steering wheel and at the bottom there are wheels between the two lines and when you turn the steering wheel they go (indicates sweeping turn with his hands) and the boat turns.**"

What's this part at the back?

Justin: "**That the swisher.**"

What does it do?



Justin: "**It goes swish, swish.**"

But how does it work?

Justin: "**It goes swish, swish like this (indicates a paddling motion with his hand) and that makes the boat go. There's a handle by the steering wheel. When you push it down the swisher goes. When you push it up the swisher stops.**"

But how does that make the boat go forward?

Justin: "**When it goes swish, swish it pushes the water this way. The water goes this way (motions to the right) and that makes the boat go this way (motions to the left).**"*(Justin uses arrows to show the direction of the swishing then covers those marks while showing the movement of water resulting from the swishing.)*

This is nothing short of an explanation of Newton's 3rd law of motion. For every action there is an equal and opposite reaction.