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| **WAVES** | 28/07/11 |

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| Key Learning Points | Ocean waves are caused by winds that form ripples in the surface of the water, then gradually increase the height of these ripples until they become waves. The water surface may look like it’s moving with the waves, but actually it’s moving up and down in the same spot, except in shallow water where the water does move.  Waves in the open seas are often 50 feet high. And the biggest wave ever seen by man was about 112 feet high!  **Wave Parts**   * Crest - The highest part of the wave. * Trough - The lowest part of the wave. * Still-Water Line - The level of the ocean if it were flat without any waves. * Wave Height - The vertical distance between the crest and the trough. * Wave Length - The horizontal distance between each crest or each trough. * Wave Period - The time it takes for two successive waves to pass a particular point. * Wave Frequency - The number of waves that pass a particular point in a given time period. * Apmlitude - equal to one-half the wave height or the distance from either the crest or the trough to the still-water line.   Waves that travel far and fast undulate slowly, requiring water particles to make slow oscillations, which reduce friction and loss of energy.  Wave energy is proportionate to the square of its height, thus a 3m high wave has 3 x 3 = 9 times more energy than a 1m wave  As the wave approaches shallow water, the wave begins to drag on the bottom. The dragging between the wave and the bottom causes the wave to SLOW down. As the bottom of the wave slows down, the top which is still moving at the original speed falls over because it has no support – this is when a wave is said to break.  **Sailing in waves**  The crew need to sit roughly in the middle of the boat enabling them to lift the bow or stern out of the water as they sail over the wave. When sailing close-hauled/beating you luff up as the wave approaches and as you cross over the wave bear away down the back side.  If sailing on a reach you should ensure that you do not sail straight down the back of a wave otherwise the bow will dig in when you reach the bottom of the wave, swamping the boat. Bear away a little down the back of the wave, sailing at a slight angle to the wave and as the boat accelerates luff up a little to try and sail along the wave for as long as possible retaining the additional speed the wave gives you.  When running the boat will tend to *surf* as the wave catches up and lift the boat. The boat can accelerate and overtake the wave, the result is that as you fall off the wave the bow can dig in and bury itself in the back of the wave in front. This will not only cause some swamping but slow the boat down and increase the pressure on the rig. To avoid this and sail faster you should sail on reach using the additional speed gained from the wave, even if you sail further and have to put in an additional tack/gybe or two. |
| Cross Reference |  |