

Appendix

Lesson plan for Sailing Simulator

Lesson #1: Introduction and Steering

Lesson Objectives

- Introduce the sailor to the process of getting into the boat and getting comfortable. This will also be a learning process for the therapist and instructor, because they will need to use the Hoyer Lift.
- Introduce the sailor to terms *tack*, *gybe*
- Introduce the sailor to steering with the joystick

Steps

1. Make sure red emergency locks are unlocked (twist and pull up).
2. Turn on compressor and computer, **do not** start VSAIL program.
3. Load the sailor and make them comfortable using foam cushions as necessary.
4. Lock red emergency locks (push down).
5. Orientation
 - a. Show where sheet and joystick are in VSAIL Simulator.
 - b. Determine the degree to which the sailor can control the sheet and joystick.
6. Turn on program.
7. Setting up Variables
 - a. Under RAMS, ensure **Enable Heel Ram** is unchecked. ¹
 - b. Under VIEW.
 - i. Uncheck **True Wind Direction Gauge**.
 - ii. Uncheck **Speed and Apparent Wind Gauge**. ²
 - iii. Check **Snail Trail** ³
 - c. Hit Hotkey 2 (makes wind 10 knots)
 - d. Under BOAT, check **Liberty Motor Sailor**. ⁴
 - e. Under BUOYS, check **Upwind/Downwind**.
 - f. Under LOCATION, check **Black Rock, Australia**.
8. Have sailor hold joystick and release sheet entirely because you don't want them worrying about the sheet. You will trim the sheet.
9. Have the sailor steer the boat in the direction of the wind arrows.

² You don't want the sailor to have to worry about wind at all. For the purposes of this lesson, the boat is essentially a motorboat.

³ You will be able to use this tool to show the sailor whether they are steering on a true course.

¹ You don't want the sailor heeling yet.

⁴ This boat will motor at 2 knots even with the sails completely eased and pointing dead into the wind.



Steering downwind

Steering Across the wind

10. Have the sailor steer the boat across the arrows.
11. Have the sailor turn the boat through the wind (tell them to turn left or right until their sails switch over). Explain that this is called *tacking*. Instruct them that they need to turn firmly through the wind.
12. Have the sailor turn the boat so that the stern of the boat goes through the wind. Explain that this is called *gybing*.
13. Have the sailor steer towards a lighthouse.



Steer towards lighthouse

Steer in a circle

14. Have the sailor steer the boat in a circle around the buoy.
15. Have the sailor turn the boat and sail the circle in the opposite direction. Under LOCATION, check **Watch the Rocks**.
16. Have the sailor steer around the rocks and buoys, and have them tack and gybe at least once.

Now the sailor should be comfortably steering in a straight line and in a circle. They should be comfortable sailing towards a point on the horizon and maneuvering around rocks and buoys.

Lesson #2: Sail Trim and Stopping

Being able to trim the sails on the boat is what makes sailing possible. It is essential that any sailor understands how to trim their sails correctly. The sailor will also need to recognize certain key terms which they will hear constantly as sailors.

Lesson Objectives

- Introduce the sailor to basic sail trim.
- Introduce the sailor to the art of stopping the boat while under sail, for instance for the purpose of docking.
- Introduce the sailor to terms *come up* and *fall off*.

Steps

1. Get the sailor in the boat and comfortable.
2. Turn on compressor, computer, and VSAIL program.
3. Chalk Talk
 - a. Points of Sail (*close reach, beam reach, broad reach, run, no-go zone*)
 - b. How to trim the sails
 - i. ease until they start flapping or as you go away from the wind
 - ii. pull in as you go closer to the wind
 - iii. you can't go directly into the wind (45 degrees is the closest you can get)
4. Setting up Variables
 - a. Under VIEW
 - i. Check **True Wind Direction Gauge**.
 - ii. Check **Speed and Apparent Wind Gauge**.⁵
 - iii. Check **Snail Trail**.⁶
 - b. Under BOAT, check **Liberty Motor Sailor**.⁷
 - c. Under LOCATION
 - i. Uncheck **Watch the Rocks!**
 - ii. Check **Black Rock, Australia**.
 - d. Under BUOYS, check **None**.
5. Have sailor point out wind direction.
6. Have sailor trim main sheet so that they can see how hard they need to pull. Explain to them that pulling the mainsheet is also called *trimming* the mainsheet. Ensure that they have enough strength to maintain sail position.
7. Instructor steers with joystick. Sailor trims to your course for practice.
8. Steer closer to the wind and have the sailor trim the sails in accordingly. Explain that this is called *coming up*.
9. Steer away from the wind and have the sailor ease the sails accordingly. Explain that this is *falling off*.
10. Steer directly into the wind. Have the sailor try to get the sails to stop luffing. Explain that you can't go directly into the wind.
11. Yield the joystick to the sailor and have them sail around while trimming and steering. The sailor should tack, gybe, fall off, and come up at least once.
12. More Variables
 - a. Under LOCATION, check **Sydney Harbour, Australia**.
 - b. Under BUOYS, check **Up/Down Wind**.

⁵ The sailor should be able to identify the gauges and determine the wind direction and speed.

⁶ This will allow them to determine whether they made a good, 90-degree tack.

⁷ Just in case they don't pick up trimming immediately

- c. Under BOAT, check **Liberty**.⁸

13. Have them sail around the buoys

At this point in the disabled sailors' education, the instructor should not have to touch the sheet or the joystick. The sailor should be able to sail without a motor, should understand the points of sail and how to trim the sails accordingly with the help of the telltales, and should be able to go to a point upwind of their current position.

Lesson #3: Heeling over

Perhaps the most frightening part of sailing is heeling over. As we know, sailing usually involves heeling over, and we are used to the feeling. New sailors are not used to this feeling, and this can be especially frightening for someone who cannot use their legs. Therefore, it is best to introduce heeling over once the sailor knows how to trim sails and steer so that they will not be too concerned when they find themselves tilting over.

Lesson Objective:

- Have the sailor become comfortable with heeling over..

Steps:

1. Sailor in Boat and comfortable.⁹
2. Compressor and computer on, VSAIL program off.
3. Emergency stops unlocked.¹⁰
4. Chalk Talk
 - a. What is heeling over? Why does it happen?
 - b. How do you stop heeling?
 - i. For someone who can move easily, shift to the high side.
 - ii. For someone who can't, ease sails or come up into the wind.
5. Open Program.
6. Setting up Variables
 - a. Under BOAT, check **Liberty Motor Sailor**.
 - b. Under SAILOR
 - i. Click **Mass**.
 - ii. Enter mass of sailor (this can be approximate).
 - c. Under WIND, WAVES, and TIDE
 - i. Click **Speed**
 - ii. Check **8 knots**.¹¹

⁸ They should no longer need the motor

⁹ It is especially important that the sailor be comfortable and, if the sailor is disabled in such a way that they have no control of their trunk or lack proprioceptive sense (body position), packed in tight so they will be stable.

¹⁰ The boat should be able to heel over.

¹¹ The wind should be as light as possible.

- d. Under BUOYS, check **None**.
7. Let the sailor sail around for a few minutes.
8. Pause program.
9. Under RAMS, check **Enable Heel Ram**.¹²
10. Make sure emergency stops are off.
11. Make sure the sailor is ready.
12. Have the sailor release the sheet.¹³
13. Press Play button.
14. Have the sailor trim the sheet and heel over.
15. Have the sailor over-trim on a beam reach.
16. Have them flatten the boat.¹⁴
17. Under BUOYS, check **Trapezoidal** and have sailor sail around buoys for practice.

The sailor should now know how to flatten the boat and should be reasonably—although perhaps not completely--comfortable with heeling over.

Lesson #4: High Wind, Gusts, Shifts, and Docking

Sailors know that wind changes. Until this point, the sailor has been sailing in 8 knots of breeze without gusts or shifts. However, real wind is never that consistent. Also, every sailor should know how to dock a boat, or at least be able to turn the boat into the wind and stop it at a particular point on the water. Finally, the sailor should be able to get the boat moving again after having stopped dead into the wind.

Lesson Objectives

- Sailor should know how to deal with gusts and wind shifts.
- Sailor should be comfortable when these occur.
- Sailor should be able to stop the boat next to a buoy.
- Sailor should be able to get the boat moving again after being stopped dead into the wind.

Steps

1. Sailor in Boat.
2. Compressor and computer on, VSAIL program off.
3. Chalk Talk
 - a. What happens in high wind?
 - b. How do you flatten the boat? (Sailor should already know how to flatten the boat.)

¹² The VSAIL simulator will now heel over and acts exactly like an Access 303 dinghy.

¹³ You don't want the sailor to heel over right when you start the program because they happen to be trimmed in all the way.

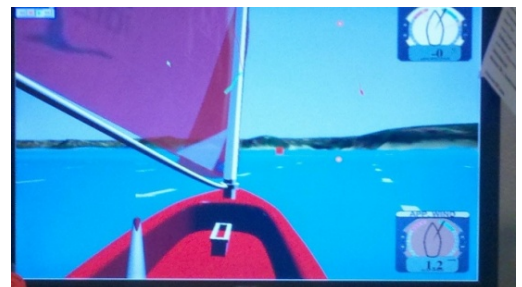
¹⁴ The sailor needs to understand what over-trimming will do to the heel of the boat on a beam reach, and how to flatten the boat if that occurs.

- c. What can you expect in a gust?
 - d. What is a shift?
4. Turn on program.
5. Variable Setup
 - a. Under BOAT, check **Liberty Motor Sailor**.
 - b. Under SAILOR.
 - i. Click **Mass**.
 - ii. Enter Mass.
 - c. Under LOCATION, check **Black Rock, Australia**.
 - d. Under WIND, WAVES, & TIDE
 - i. Click **Speed**.
 - ii. Check **8 knots**.
 - e. Under BUOYS, check **Trapezoidal**
 - f. Under RAMS, check **Enable Heel Ram**.
6. Have sailor sail around, keeping boat flat with sails.
7. Have the sailor steer towards a buoy and stop close to it (check boat speed) by quickly turning the bow of the boat into the wind.
8. Have the sailor get the boat moving again by these steps:

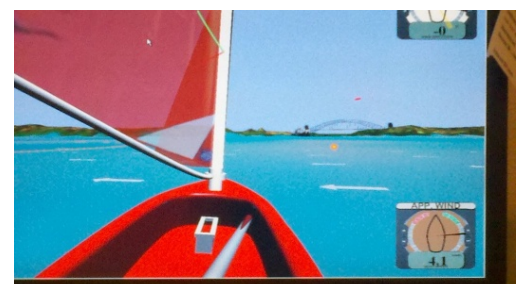
- a. Sails are luffing dead into the wind



- b. The wind will start to push the boat backwards. Use this momentum to turn the stern of the boat in one direction, which will cause the bow to go in the other direction



- c. Once the bow has been turned sufficiently away from the wind, trim the sails to move



forward and turn the tiller so the bow moves further away from the wind.

9. Increase wind speed by 2 knots every few minutes, once they are ready.¹⁵
 - a. Hit Hotkey 3, then 4, then 5, then 6.¹⁶
10. Under WIND, WAVES, & TIDE.
 - a. Click **Speed**.
 - b. Check **8 knots**.
 - c. Click **Gusts**.
 - d. Check **Repeatable**.
11. Under VIEW
 - a. Click **Maps**.
 - b. Check **Show Gusts**.¹⁷
12. Have the sailor sail around.
13. Make wind speed 12 knots (Hotkey 3).
14. Under WIND, WAVES, & TIDE, check **Shifts**.
15. Have sailor sail around.

The sailor should now be ready for any conditions.

Lesson #5: Evaluation & Practice

Before heading to the DSC, it is a good idea to give the sailor some time to practice and to evaluate their readiness for actual sailing on the water. The point of this lesson, therefore, is to change the wind speed, gusts, and shifts to simulate the behavior of actual wind on the water, so that the sailor can practice adjusting to the new wind.

Lesson Objectives:

- Make sure the sailor is ready to get out on the water.
- Sailor should be proficient at sailing safely in all conditions.

Steps

1. Sailor in Boat.
2. All Variables set to “on” including the Heel Ram.
3. Quiz sailor on the parts of the boat.
4. Have them sail around; modify wind, gusts, shifts, obstacles as you please.

¹⁶ This takes the wind speed from 8 knots to 10, 12, 14, 16, and 18 respectively.

¹⁵ The instructor should be standing with his hand near the keyboard.

¹⁷ The sailor can see the gusts on the larger map and see what they look like in general.

5. Let them practice.
6. Determine whether they are ready to go to the DSC accessible program. If not, provide remedial instruction.
7. Congratulate the sailor for having come so far in learning sailing.