

Lesson Plans for LORD Company 6 Simple Machines

The LORD Company 6 Simple Machines curriculum would fall into the category of “E” or engineering in the STEAM format in education.

The approach to these 6 lessons is to challenge each child to do something on their own that they would not be able to do without the help of a machine i.e. on their own strength – no success. With a machine is success!

To start with, we need to secure a place of attachment about 6 ft high. Any doorway will provide this with a ring hook screwed into the middle of the upper door jamb. What follows are the 6 Simple Machines lessons:

A) Pulley

Materials needed: Tug of War rope with knots.

- 1) Put a 9” piece of tape on the floor as the win or lose goal for the tug of War.
- 2) Lay the tug of war rope over the tape to the right & left
- 3) Put a larger student on one end of the rope and a smaller student at the other end of the rope.
- 4) Let them proceed with the tug of war with the likely outcome that the larger student will win the match.
- 5) Question: How can _____ win? Maybe a machine can help.
- 6) Lay the pulley assembly out on the floor with the end of the pulley grip in the direction of the bigger child. The rope with the pulley assembly stretched out about 4 to 6 feet to the smaller child. The smaller child will pull on the pulley rope hand over hand and will reel the larger child over the tape.
- 7) Conclusion: Without the machine is failure. With the machine is success!

B) Wheel and Axle

- 1) A child sits on the seat of the wheel and axle unit on the floor with the wheel and axle removed. NOTE: Child should sit cross legs on the unit. The rope should extend a little lower within the child’s grasp.
- 2) Challenge the child to grasp the rope and lift himself/herself off the floor for a count of 60.
- 3) After they fail in their attempt, insert the wheel and axle into the assembly and help the child to start the rope onto the axle and then direct the child to crank the wheel to be lifted by their own efforts from the floor for a count of 60 and as far as they wish to count being above the floor. NOTE: Teacher should hold the wheel on its edge to make sure the

teacher should hold the wheel on its edge to make sure the lowering of the unit is controlled when the child is ready to descend.

4) **Without the machine is failure. With the machine is success!**

C) **Lever and Fulcrum**

- 1) **On the balanced lever and fulcrum, have the largest child in the class to stand on one end of the plank.**
- 2) **Challenge any other child in the class to stand on the opposite end to see if they can raise the heavier child from the floor. Let any child that would like to try.**
- 3) **After they fail in their attempts, replace the balanced board with the adjusted lever and fulcrum.**
- 4) **Have the large child stand on the end of this board closest to the new fulcrum position.**
- 5) **Any child in the class will now be able to stand on the opposite end of the board and will be successful in raising the larger child from the floor.**
- 6) **Conclusion: Without the machine is failure. With the machine is success!**

D) **Wedge**

- 1) **Present to the class a small plank of wood to each child in The Class. Challenge them to make the one piece of wood into two pieces of wood. Pass the piece of wood to all children for them to try and break it.**
- 2) **After they fail in their attempt to do this, bring out the Wedge presentation.**
- 3) **Have the 1st child for this presentation put on safety goggles.**
- 4) **Place the board in the middle groove of the "Wedge" material and rehearse with the child how to position the wedge (chisel) over the board that they could not break in two by their own strength and strike the wedge (chisel) with the rubber mallet to split the board into 2 parts. NOTE: There are notches in the wood to start the chisel point.**
- 5) **Conclusion: Without the machine is failure. With the machine is success!**

E) **Screw (Clamp)**

- 1) **Present to each in the class a strip of hardwood and challenge them to break it.**
- 2) **After they will fail in their attempt to break it, bring out the clamp assembly. Explain and show the children that the circular grooves in the axle of the clamp represent a screw.**
- 3) **Put the strip of wood on the top of the assembly and position the clamp to have a little pressure on the assembly to keep the clamp in position on the strip of wood.**
- 4) **Have the child that first wants to complete this presentation to put on the safety glasses**

- put on the safety glasses.
- 5) Instruct the child to turn the clamp until the strip of wood breaks in two. Allow the other children in the class to try it.
 - 6) **Conclusion: Without the machine is failure. With the machine is success.**

F) Inclined Plane

- 1) **Bring out the toy car in the inclined plane material. Put the toy car with string attached to a weight that is a little more than the car onto a table.**
- 2) **Let the weight on the string hang over the end of the table. When released, the weight will cause the car to be pulled off the table onto the floor.**
- 3) **Challenge the children to say how they can keep the car on the table without touching the car or putting a barrier in front of the car.**
- 4) **After there is failure in keeping the car on the table, bring out the inclined plane.**
- 5) **Place the car onto the top of the inclined plane with the weight hanging over the edge of the table and the car will go down the inclined plane lifting the weight.**
- 6) **Conclusion: Without the machine is failure. With the machine is success.**

Follow up materials would be tools and large machines that use these simple machine concepts individually or in combination to achieve success in jobs that just cannot be done by individual human strength. One example would be a bicycle using the wheel and axle for pedaling and the chain and gears as an example of the pulley. LORD Company will be working on some materials and pictures that will show other examples of simple machines at use in advanced tools.

One interesting story might be the legend of John Henry who beat a coal digging machine by the power of his own might.

The sad part of the legend is that John Henry died in his efforts.

LORD Company hopes that these 6 simple machine presentations will be effective to promote the Engineering part of the STEAM curriculum.

Observation:

For the adult, normally, motivation is the soul of success.

For the child, success is the motivation of the soul!

The roll of the teacher is to make sure the child succeeds.

