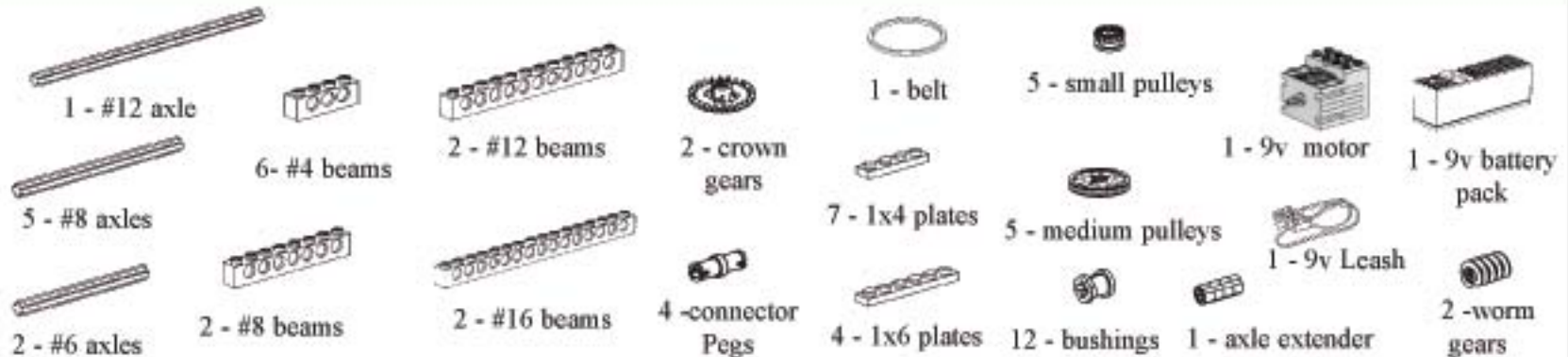


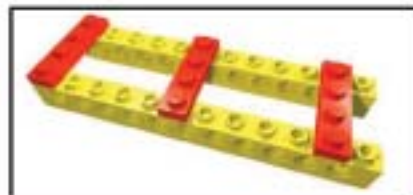
PROJECT 2: Walking Robot Vehicle #0007

Make
sure
you
have:



Build...

1. Collect two #12 beams and lay them parallel to each other, about 1.6 cm apart. Connect the first, sixth, and eleventh sets of studs with three 1x4 plates.



2. Run two #6 axles through the third and eighth beam holes. Insert both axles through a crown gear (between the beams and with the teeth pointing away from you) as they slide through. Center the gears. On each axle end, add a small pulley and then a medium pulley.

NOTE: It is extremely important for all the pulleys to have a similar orientation to each other. Look for the long slotted line on each medium pulley, and have each line pointing in the same direction for all four!



3. Connect the 1x4 plates on the first and sixth studs with two 1x6 plates. Cover the 1x4 plate on the eighth studs with a second 1x4 plate. Set the assembly aside.



4. Collect a #12 axle. Put a bushing, worm gear, and a second bushing about 1 cm from one end.



5. Insert the long end of the axle into the center hole of a 1x4 beam. Repeat the pattern of a bushing, worm gear, and another bushing.



Name:

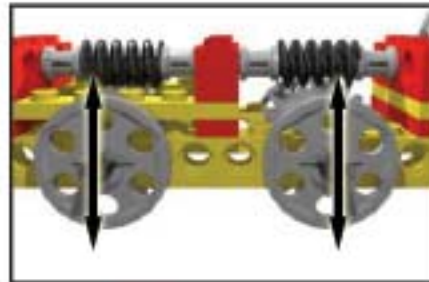
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6. Insert both ends of the #12 axle into the center holes of two more 1x4 beams. There should be an axle end that extends about 1.6 cm from one of the beams. Add a medium pulley on the exposed part of the axle.



7. Place this worm gear assembly on top of the crown gear assembly.

NOTE: This is the trickiest part of the project. Try to keep all four medium pulleys aligned in the same direction! You might have to wiggle the crown gears in order to get a proper fit!



8. Put a 1x4 plate on both of the #4 beams at the rear of the vehicle. Connect these with two 1x6 plates paralleling the sides of the vehicle. Add a #4 beam onto the #4 beam at the front of the vehicle, behind the medium pulley.



9. Add an axle extender on one end of a #8 axle. Insert the axle into the center hole of a #4 beam and add a small pulley to the opposite end of the axle. Put a 1x4 plate on the bottom of the beam.



10. Attach the assembly to the 1x4 beam at the front of the vehicle. The small pulley should be above the medium pulley.



11. Add a 9-volt motor to the rear and top of the vehicle. The motor axle should fit into the axle extender, and the motor should rest 3 studs from the rear. Connect the small pulley to the medium pulley below it with a belt. Set the vehicle aside.

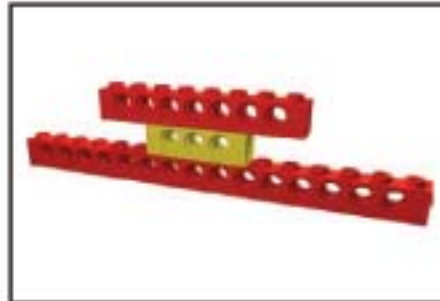


Name:

Date:

Project #2: Walking Robot Vehicle (contd.)
#0007

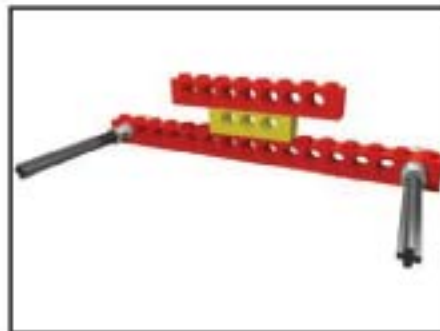
12. Time for the legs! Start by centering a #4 beam on a #16 beam. Follow this by centering a #8 beam on the #4 beam.



15. Build a second leg that is a mirror image of the first one you built.



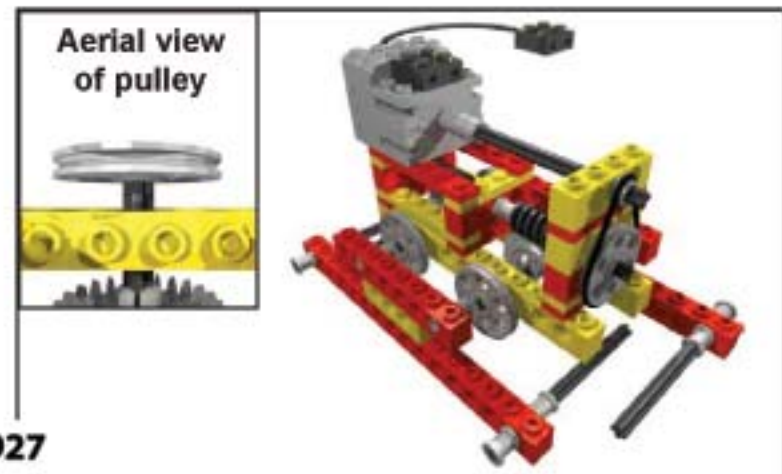
13. Put bushings on the end of two #8 axles. Insert the axles into both end holes of the #16 beam, so that the bushing is on the right and the axle extends to the left. Fix the axles in place with a second set of bushings.



16. Insert the connector pegs of the first leg you made into the bottom most holes of the medium pulleys on the right side of the robot vehicle.

(This means that the connector peg should be inserted into the pulley nearest the front of the vehicle.) The axles should extend underneath the vehicle!

14. Insert a connector peg in the first and second holes of the #8 beam. The pegs should extend in the same direction as the axles.



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Project #2: Walking Robot Vehicle(contd.)
#0007

17. Attach the second leg in a similar fashion to the top-most hole of the opposing set of medium pulleys.



18. Use a 9-volt leash and battery pack to make your robot vehicle walk!



Try this...

1. Try reversing the direction of the walker. Does the robot walker walk backward as well as forward?

2. Have your walker travel over a variety of surfaces. How well does your walker walk over the table? The floor? A book?

3. Reflect on your walker's robot qualities. Do you think this model is a true robot?

4. Identify a reason you would want to use a robot walker. Identify one problem that a robot walker may have.

Name:

Date:



CHALLENGES #0008 & #0009

Name:

Challenge One: Drive Over an Obstacle!

Design and build a wheeled robotic vehicle that can climb over a 2 cm tall barrier!

Try this...

1. Increase the height of the barrier 1 cm on each attempt to discover the maximum height you can cross!

Hints...

Use different sized wheels on your robotic vehicle. Do smaller or larger wheels make it easier to cross barriers?

Journal Entry:

continue on back of page

Challenge Two: Walking a Weight!

Design and build a walking robotic vehicle capable of pulling or carrying a 1-liter bottle of water. This walker can have as many legs as necessary.

Try this...

1. Identify a potential use for this vehicle!
2. Does your robot "slip" when carrying the 1-liter bottle?

Hints...

Alter the vehicle's gear train to give it more power. Try changing the the walker's feet so that it grips the surface more effectively.

Journal Entry:

continue on back of page

Date:



Personal Project: Original Robotic Vehicle #0010

Design and make your own unique robotic vehicle! This vehicle may be wheeled, legged, or have tracks, and must use at least one motor. Discuss your original project with your instructor.

Describe your project:

Journal Entry:

Name:

Date: