

The Kepler Transit Demonstration

The Kepler Transit Demonstration illustrates how the Kepler science team will discover Earth-size planets around other stars by the transit method with the Kepler satellite photometer.

This document, along with LEGO Orrery parts list and instructions can be downloaded from the Kepler Education website — <http://www.lawrencehallofscience.org/kepler/>

Components:

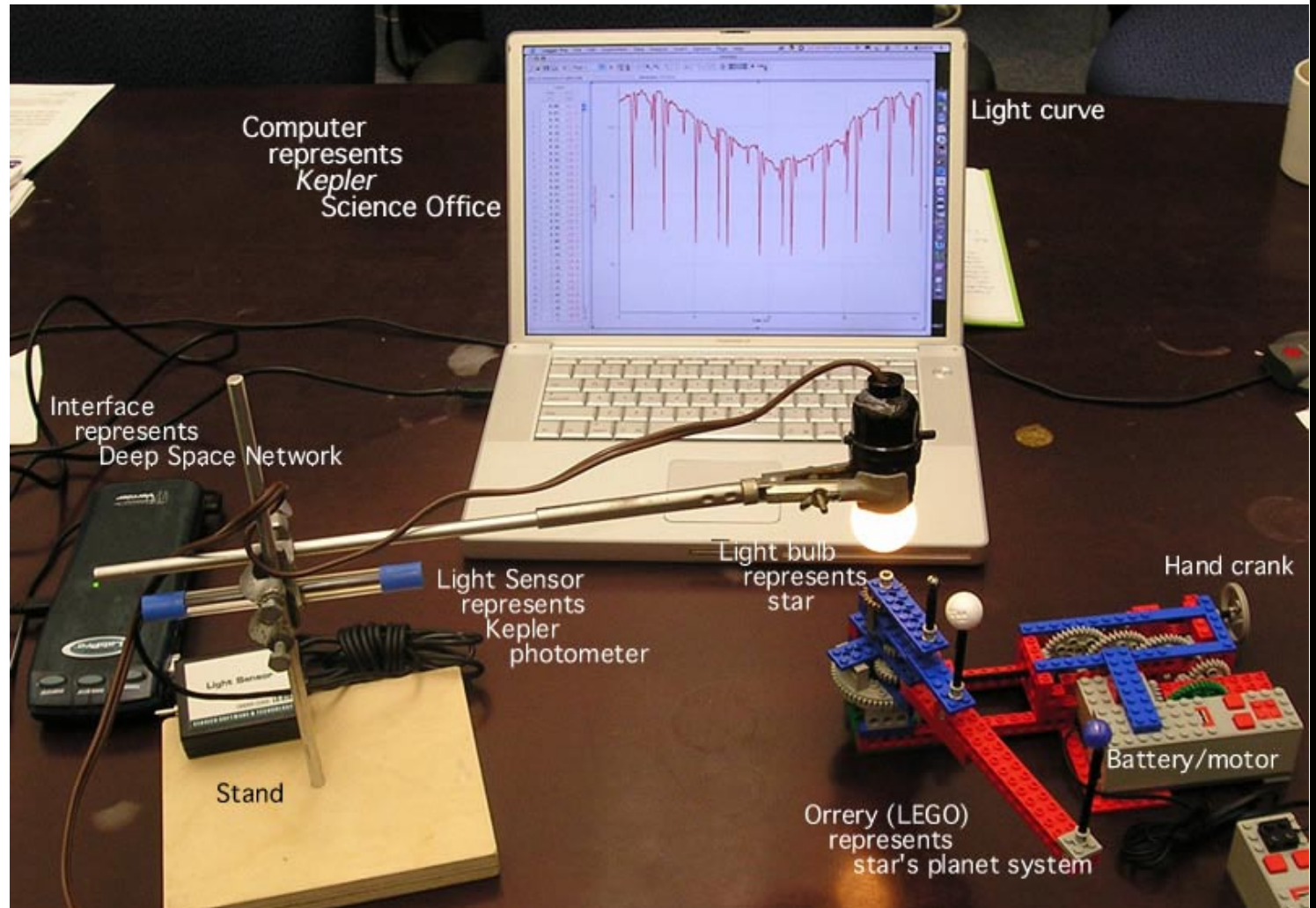
A LEGO-orrrery model represents a planet system that can be set in motion with either a hand crank or electric motor.

A light bulb at the center of the orrrery represents the star.

A light sensor represents the Kepler spacecraft photometer.

The light sensor is connected through an interface box (which represents NASA Deep Space Network) to...

A computer that represents the Kepler Science Office.



Sources of components:

From **Vernier Software and Technology** <http://www.vernier.com/>

Interface: Go! Link \$59.00 (Sep 2004)

Light Sensor LS-BTA \$45.00 (Sep 2004)

Software: Logger Pro 3 [LP] \$149 (Sep 2004)
for PC and Mac

[you can also download free demo version]

From a **science company**, e.g. Science Kit
<http://www.sciencekit.com/>

Metal Base (10cm x 15cm) with Rod

Size (8mm dia x 46mm long) \$8.95
WW6308001

Buret Clamp Plain jaws \$7.60 WW6107500

Plastic jaws \$8.75 WW6108000,
adjustable, to hold light sensor

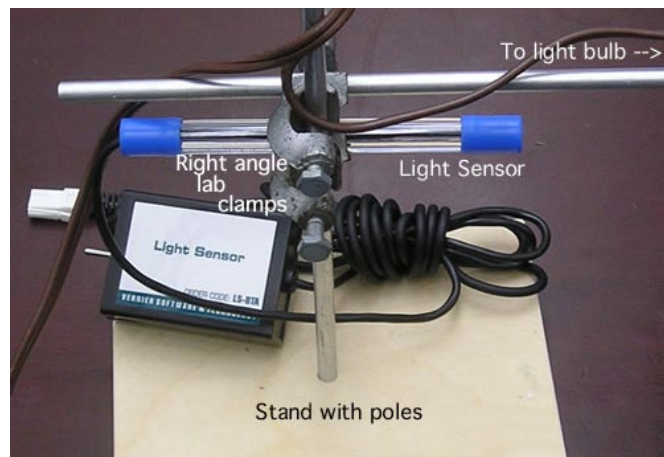
Right Angle Clamp Holder - (6112000) \$7.95
(to hold horizontal rod for clamp on utility
light)

Clamp On Utility Light \$11.90 WW4639500

From a **hardware store**

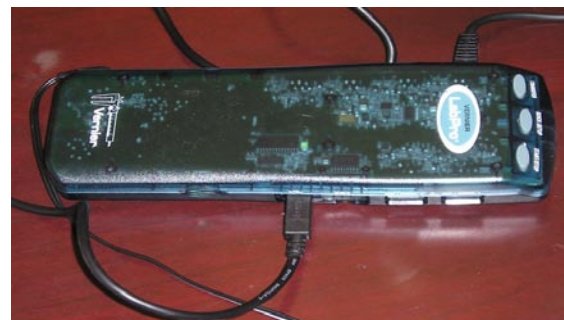
Light bulb, 7.5W, medium standard base,
about 1.3" dia.

An extra metal rod as a horizontal support for
clamp on utility light



From a Bead or Craft Store

4 (or 5) beads
from 3 to 20 mm
in diameter for
planets.

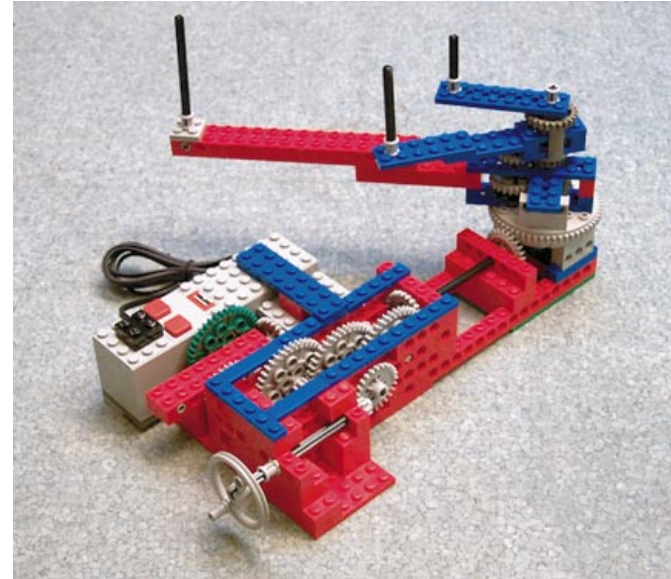


Interface shown
here is for 4
inputs. The Go!
Link unit is all
that is needed
for 1 input.



LEGO orrery assembly instructions

7/9/04



Uses the following kits from LEGO Education

Available online at <http://www.legoeducationstore.com/>

W979649

LEGO Technology Resource Set

W779876

LEGO Large Turntable (set of 2)

W979615

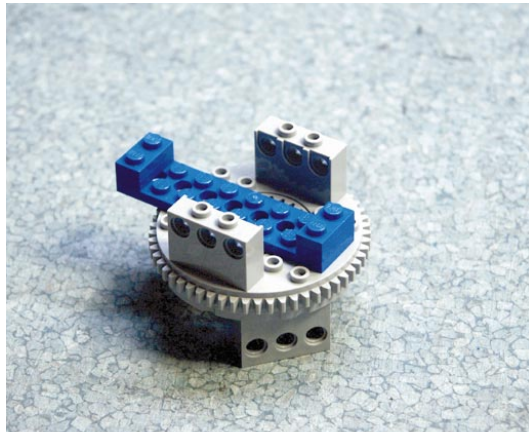
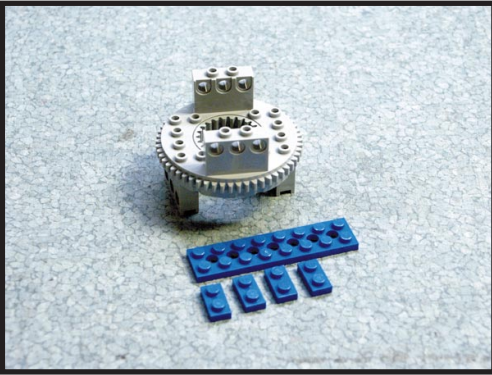
LEGO 9V motor and battery box set

(W979649 and W779876 include enough parts to make two complete non-motorized models.)

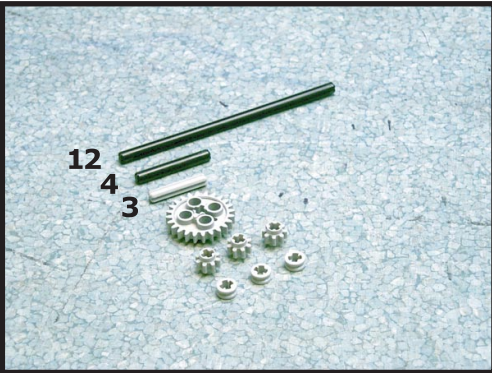
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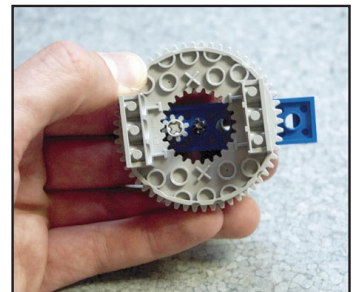
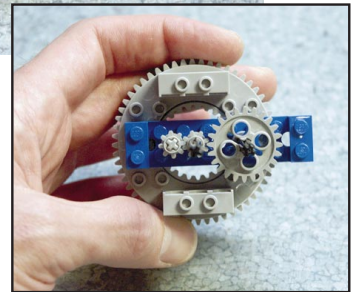
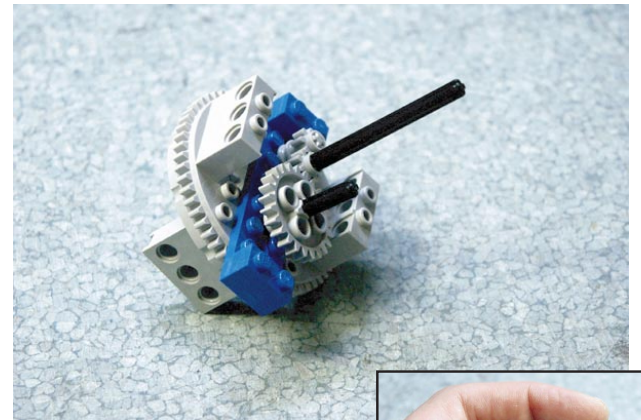
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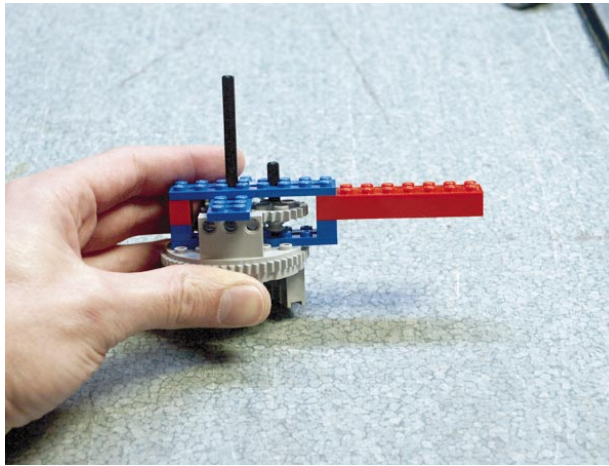
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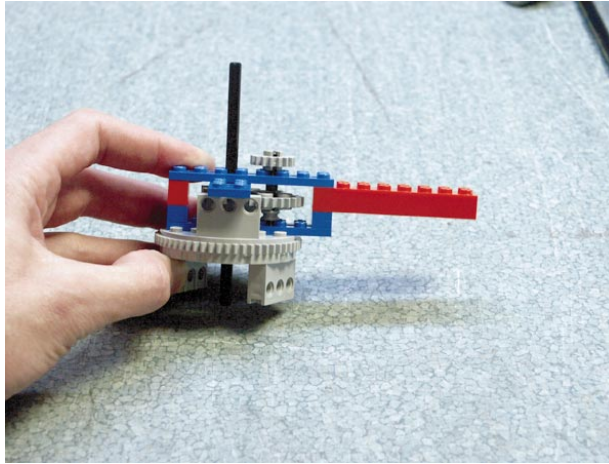
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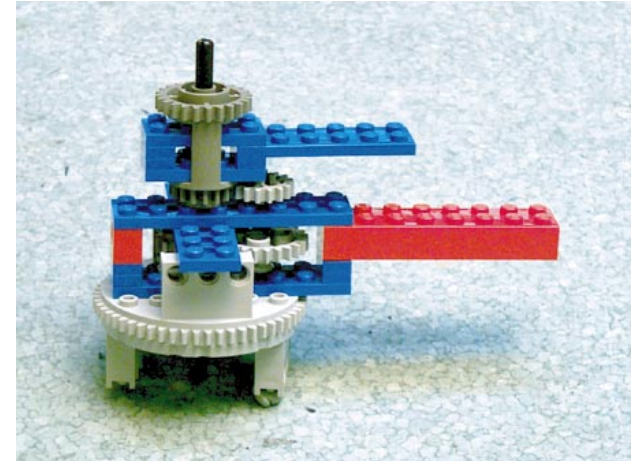


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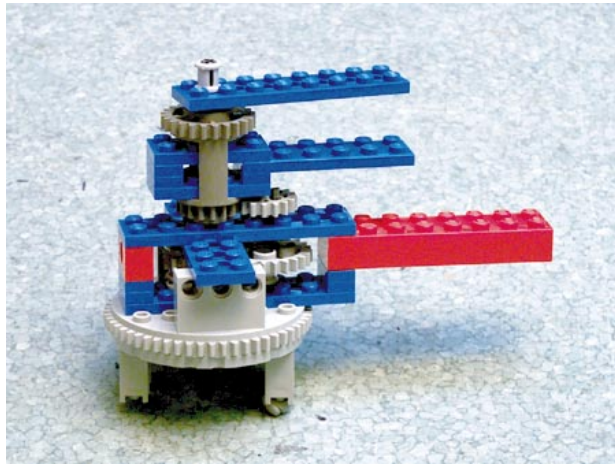


Note: Don't push this gear all the way down on the shaft. (If it's pushed down too far, it will bind with the blue piece.)

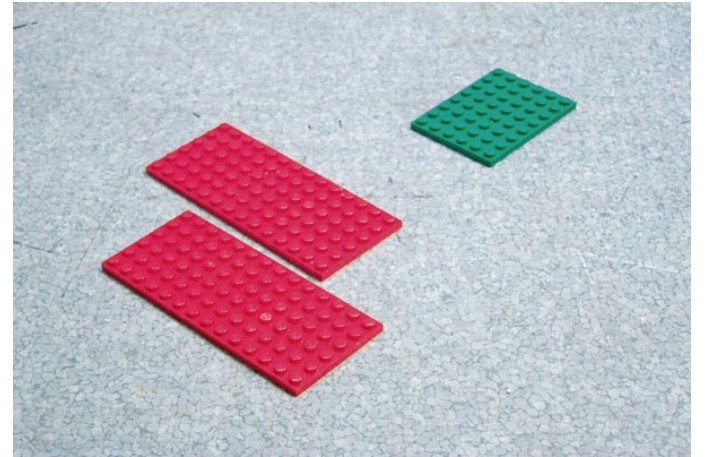
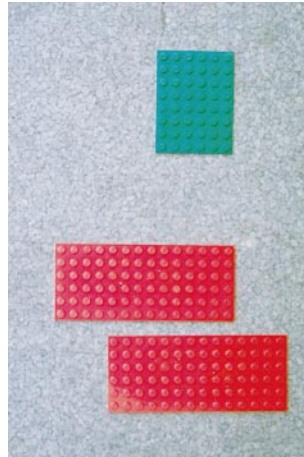
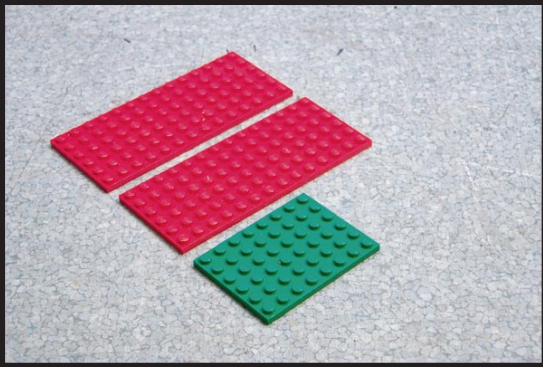
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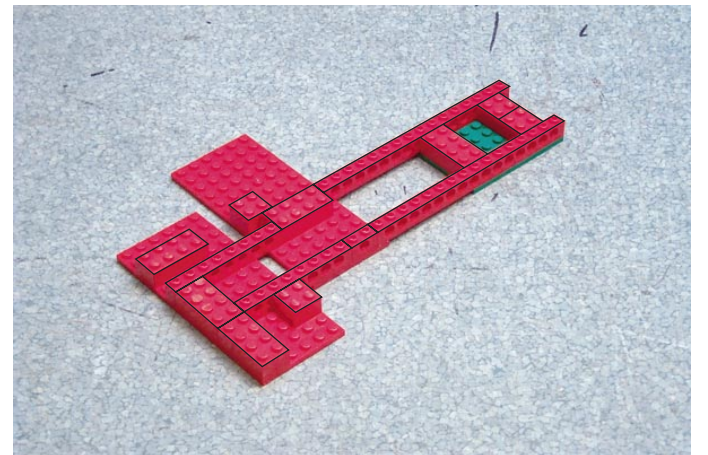
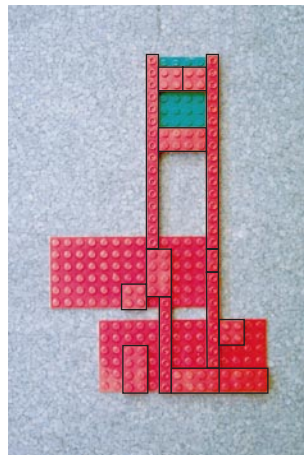
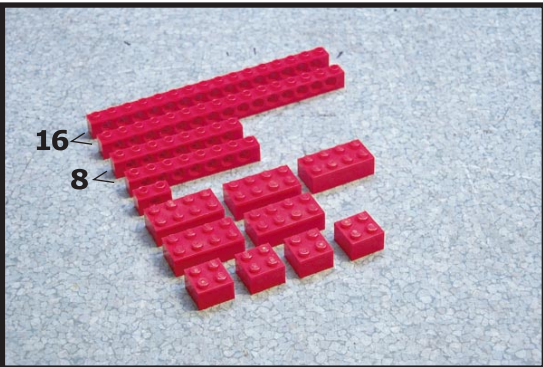
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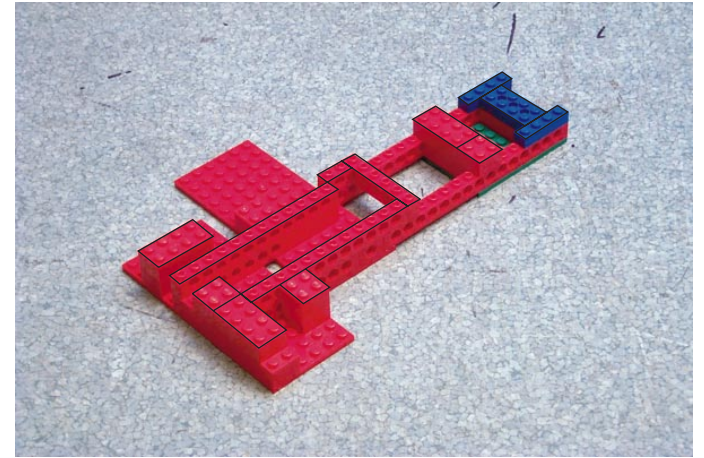
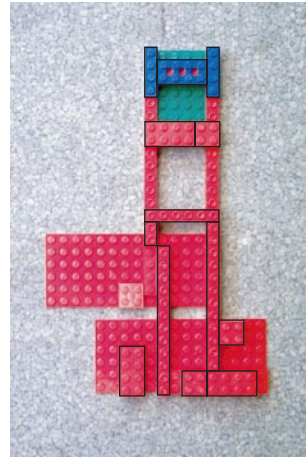
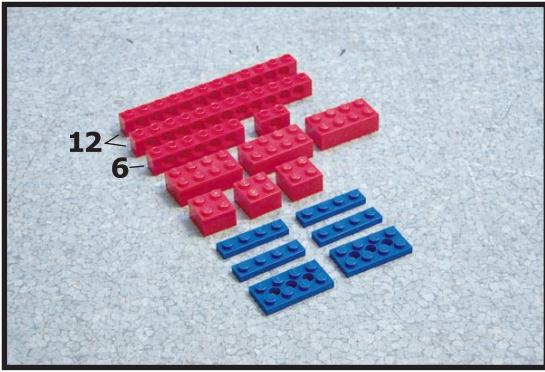
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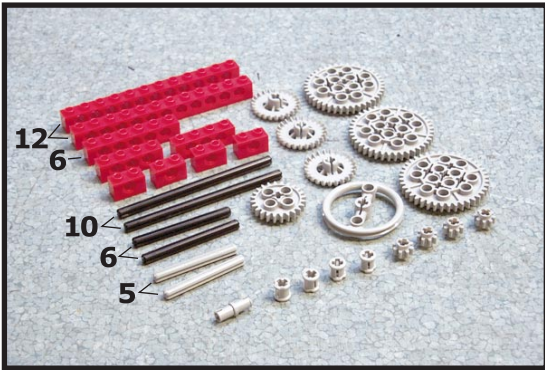
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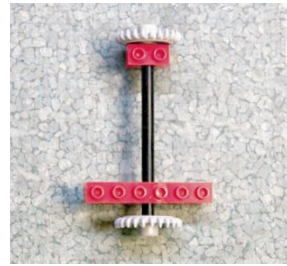
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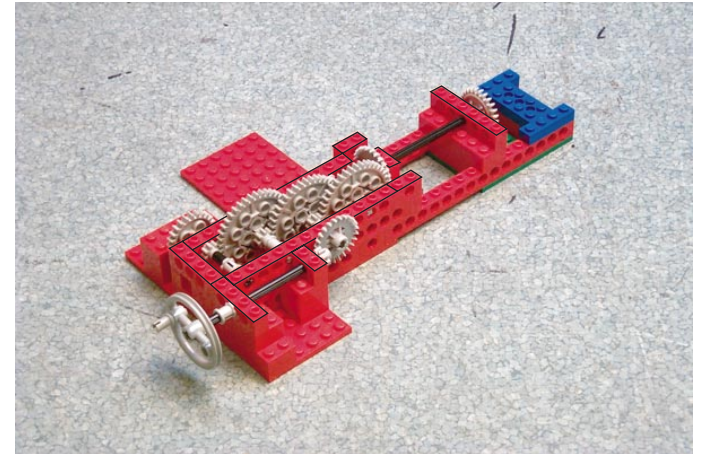
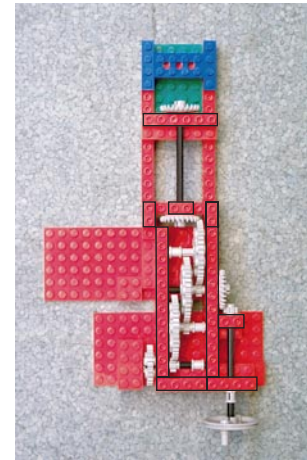
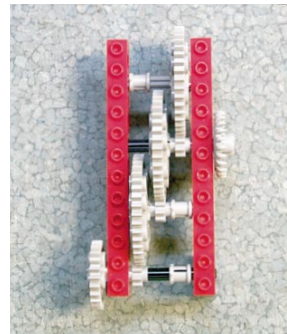
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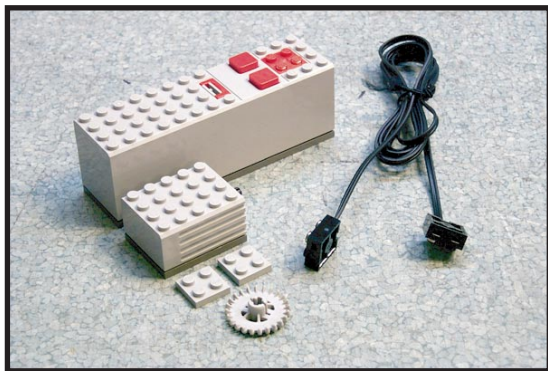
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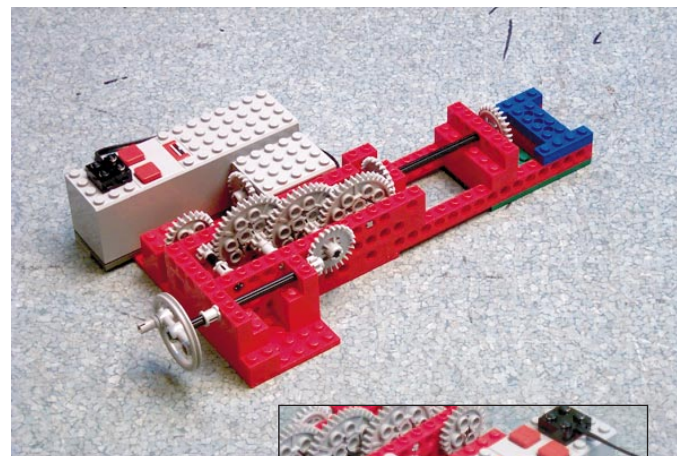
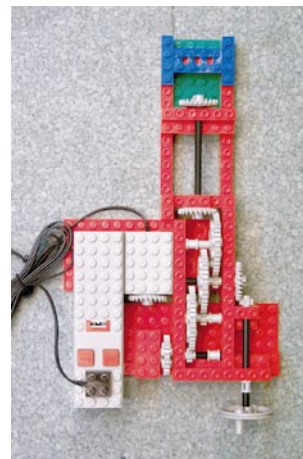
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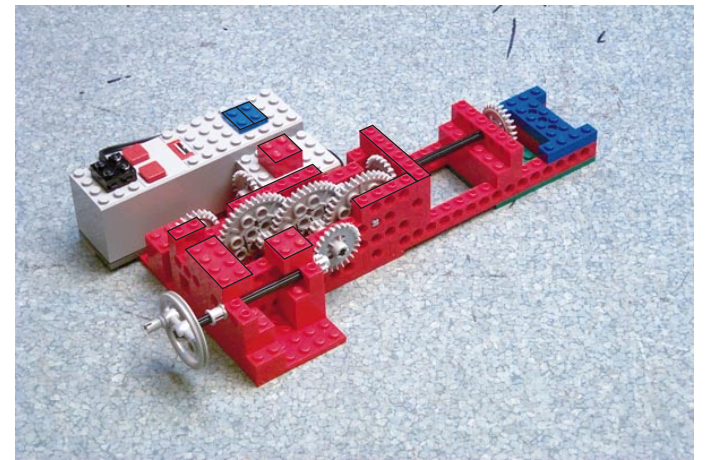
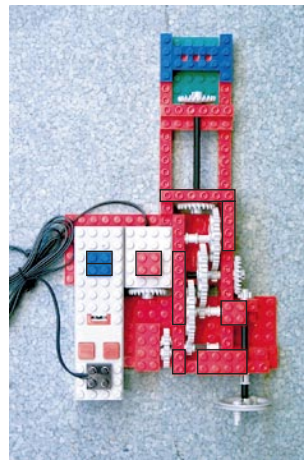
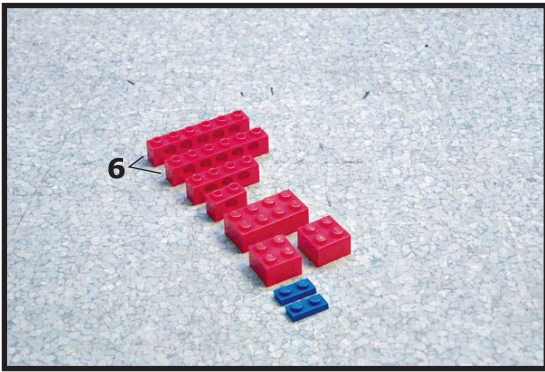
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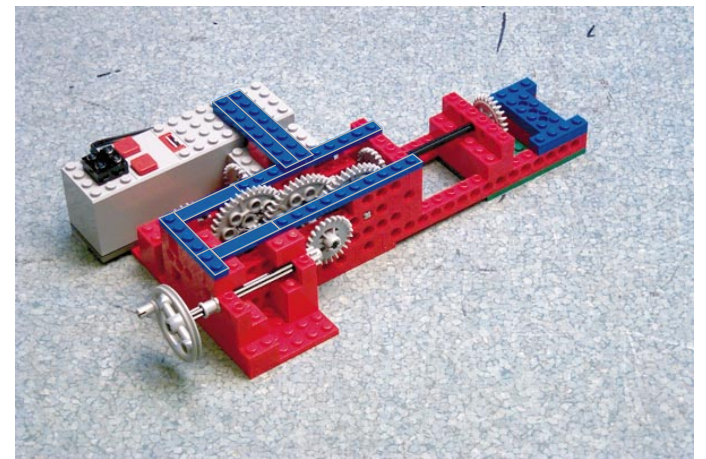
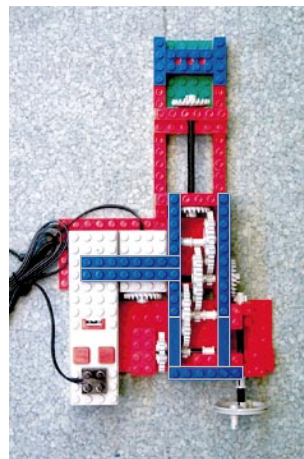
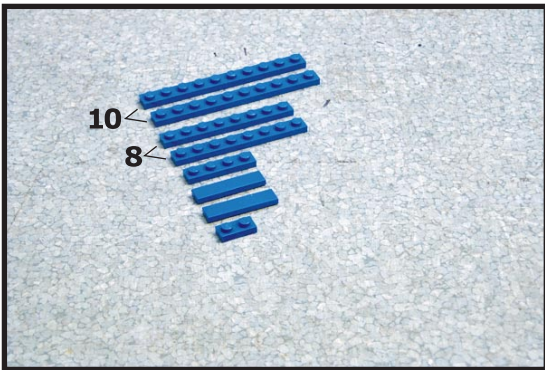
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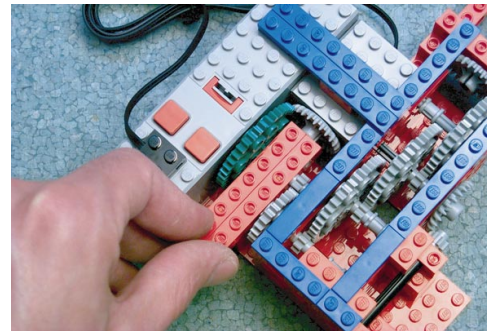
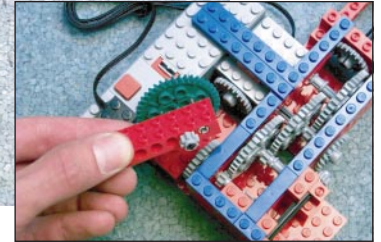
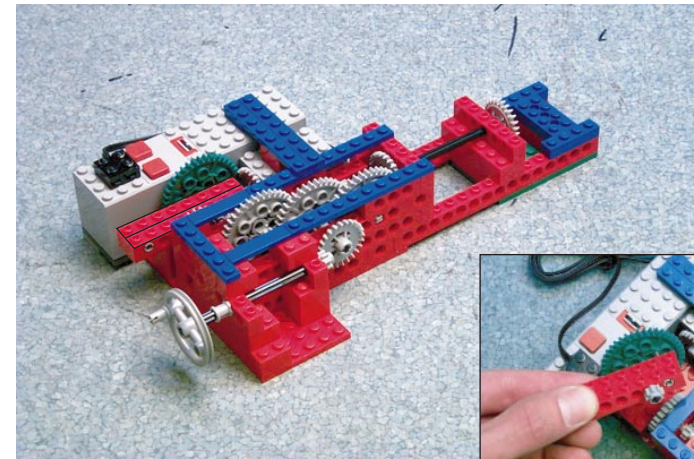
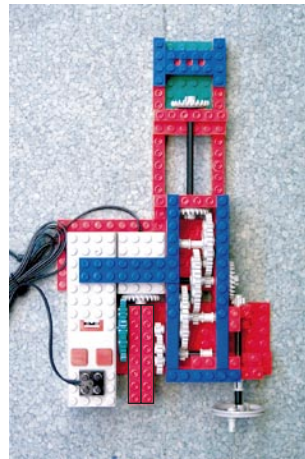
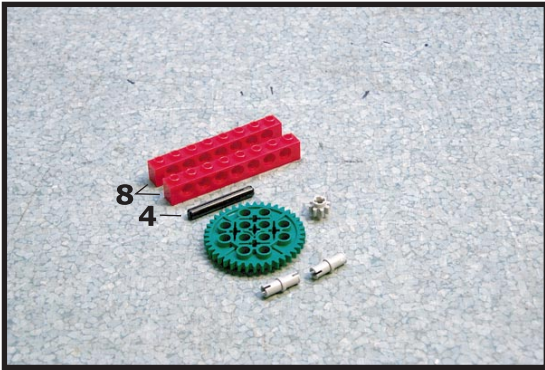
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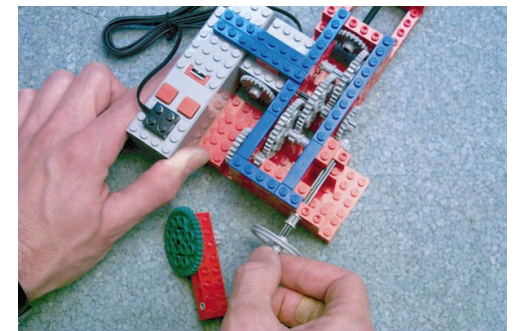
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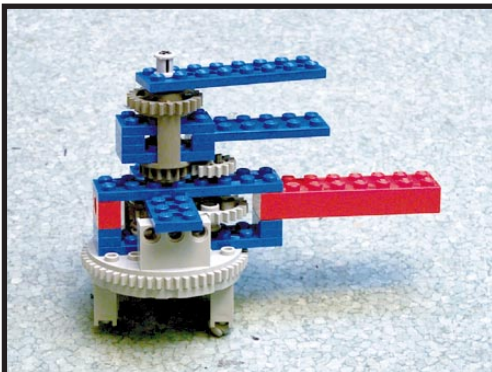


For motorized operation,
leave gear block in place.

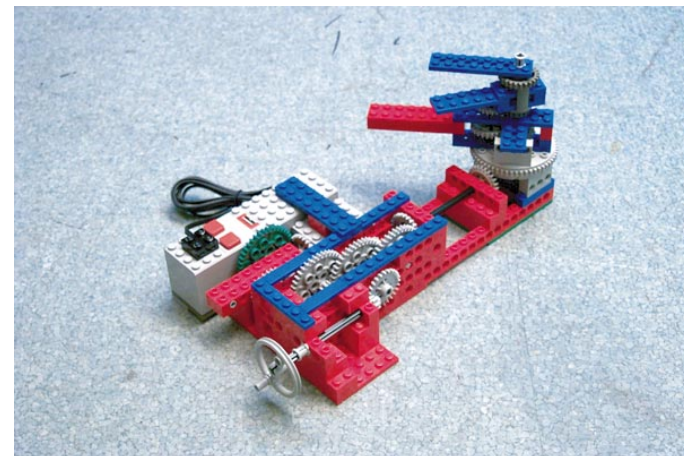


To disengage motor,
remove gear block

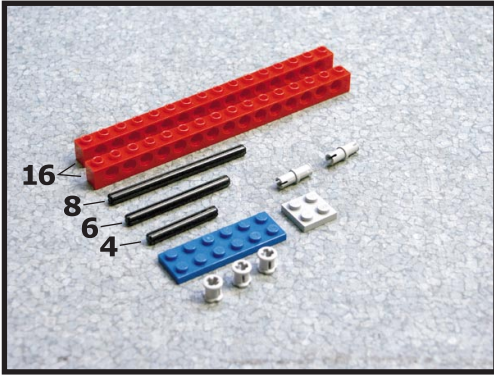
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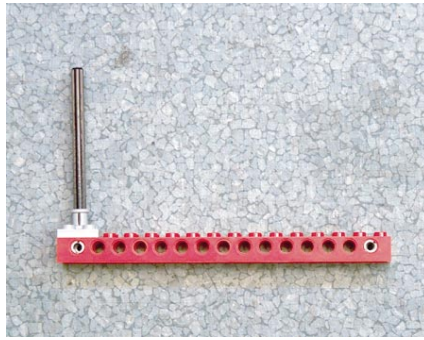
(From Step 6)



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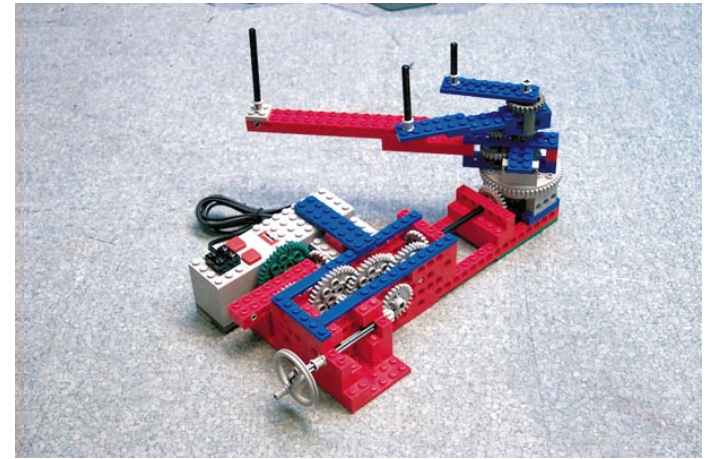
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b



c



The planet beads can be fasten to the LEGO struts in a number of ways. Here are 3 ideas.



Fasten bead to a pin and tape the pin to the strut.



Fasten the bead to a pin, heat the pin over a flame, and drive the pin into the top of the strut (melting into the plastic).



Fasten bead to a pin and tie the pin to the strut, securing the knots with glue.