



RCM CONSTRUCTION VEHICLES

EXPERIMENTS



7408

227 PCS



6+

8 **MODELS
TO BUILD**

**ULTIMATE CUSTOMIZED
CONSTRUCTION VEHICLES**



>>> TABLE OF CONTENTS

TIP!

You will find additional information in the "Check it out" sections on pages 14, 32, 38, 47.



TIP!

Above each set of assembly instructions, you will find a red bar:

>>> It shows you the difficulty level for the model's assembly:



easy

medium

hard

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Excavators

Excavators are construction vehicles that have a bucket that can be used to move materials. Build two different types of excavators — a bulldozer and backhoe — and learn about simple machines.

The models:

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Backhoe.....	15

Movers

Build two different construction machines: a dump truck and concrete mixer. These machines are used to move construction materials. Learn about concrete and cement.

The model:

Dump Truck	23
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Lifters

Build a crane and forklift, which can be used to lift materials, and learn about pulleys and levers.

The models:

Crane.....	39
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Graders

Graders are construction vehicles used to create flat surfaces. In this section, you can build two different construction vehicles used for grading: a grader and a skid-steer loader.

The models:

Grader	53
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Two Bonus Models!

Download the assembly steps for two additional models, a reach forklift and a wheel tractor-scraper, at:

https://issuu.com/gigotoys/docs/_7408model-en



>>> TIPS AND TRICKS

Here are a few tips for assembling and using the models. Read them carefully before starting.

A. Place the tires on the wheels

Place a tire over each of the four wheels before you build the first model.

B. The peg remover

The kit includes a yellow tool called the peg remover. End A of the peg remover makes it easy to remove anchor pins from the frames.

C. Batteries in IR remote control unit

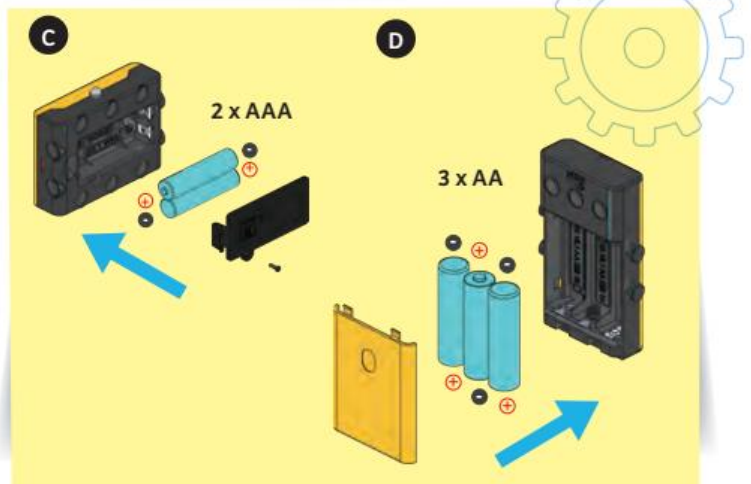
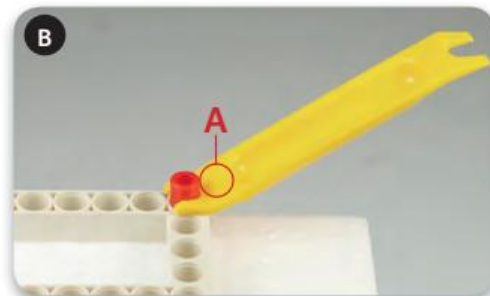
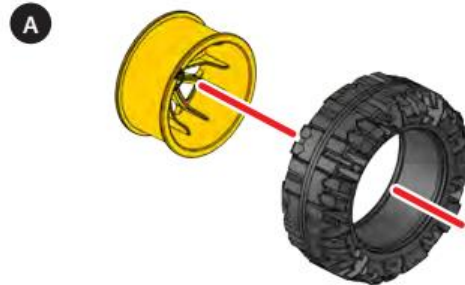
Open the battery compartment by unscrewing the screw and removing the cover. Insert two batteries, paying attention to the polarity indicated in the compartment and on the batteries. Close the compartment again and reinsert the screw to secure it.

D. Batteries in IR battery box

Insert the batteries according to their indicated plus-minus polarity. Close the compartment with the cover.

E. Using the IR remote control

To control a model, turn on both the motor unit and the remote control unit by moving their switches from the "off" position (0) to any of the four channels (1-4). The motor unit and the remote control must be set to the same channel to communicate. The channels enable you to use up to four models (sold separately) at the same time in the same space. One set of buttons on the IR remote control unit drives the vehicle forward and backward. The second set of buttons controls the vehicle's steering. The third set of buttons control the "action" of the vehicle, such as lifting the bucket on the dump truck. The remote control works best indoors because sunlight interferes with the infrared signals and reduces the range of the remote control. These models are intended for indoor use.



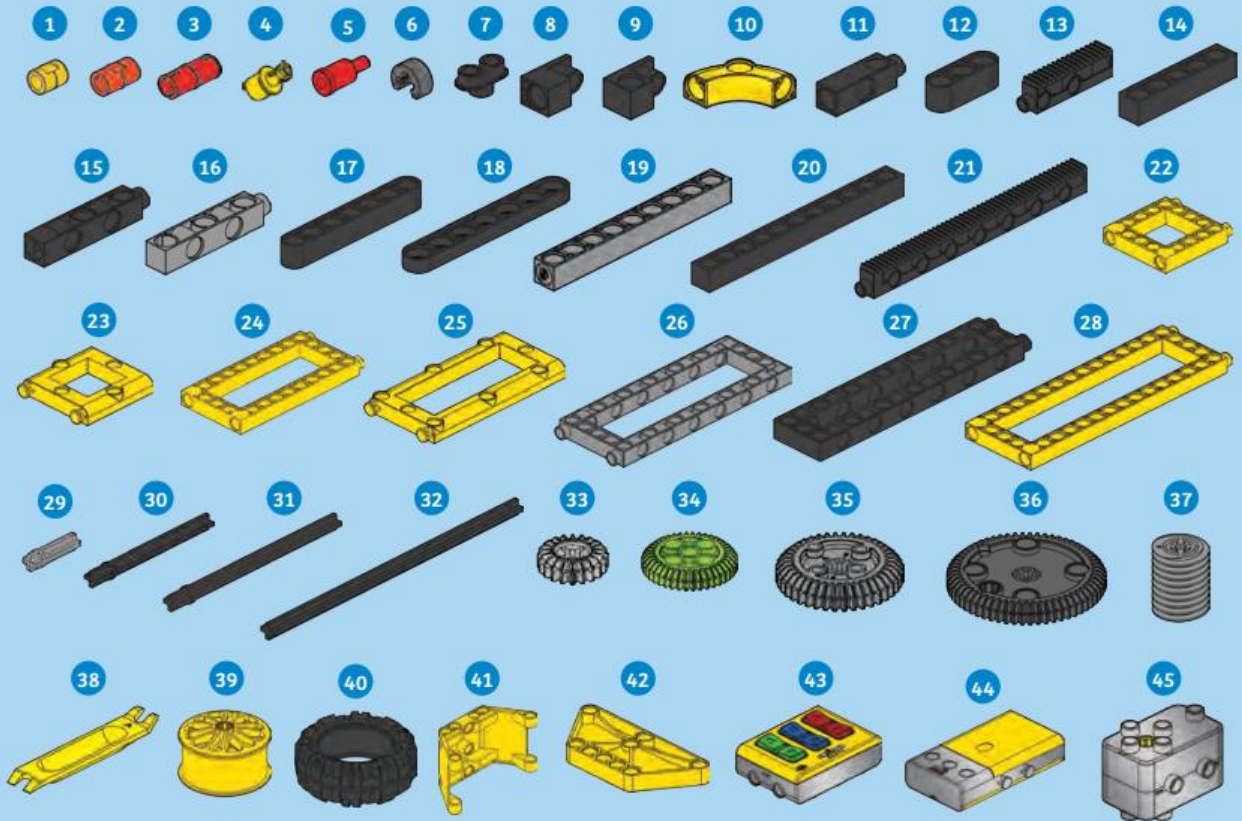
IMPORTANT!

Make sure your remote control unit and your motor unit are both set to the same channel (1-4) or else they will not work. When the remote control and motor are not in use, turn them off by setting their switches to "0" so as to not drain the batteries.





What's inside your experiment kit:



You will also need:

2 x AAA batteries (1.5-volt, type AAA/LR03) and
3 x AA batteries (1.5-volt, type AA/LR6)

Checklist: Find – Inspect – Check off

No.	Description	Qty.	Item No.	No.	Description	Qty.	Item No.
1	B-SHORT PEG	34	7344-W10-C2Y	24	C-5x10 FRAME	2	7413-W10-I1Y
2	C-LONG PEG	18	7061-W10-C10	25	C-5x10 ARCH FRAME	2	7411-W10-E1Y
3	C-AXLE CONNECTOR	16	1156-W10-A1R	26	C-5x13 DUAL FRAME	3	7061-W10-U1S1
4	C-AXLE	2	7026-W10-H1Y	27	C-3x13 DUAL FRAME	2	7406-W10-A1D
5	C-CAM CONNECTOR	5	7026-W10-J3R	28	C-5x15 FRAME	2	7413-W10-J1Y
6	C-AXLE FIXING	1	3620-W10-A1D	29	C-motor AXLE	3	7026-W10-L1S1
7	C-TWO-IN-ONE CONVERTER	12	7061-W10-G1D	30	C-70mm AXLE II	7	7061-W10-Q1D
8	C-FRONT CONVERTER	4	7061-W10-J2D	31	C-100mm AXLE II	1	7413-W10-L2D
9	C-LATERAL CONVERTER	4	7061-W10-J1D	32	C-150mm AXLE I	1	7026-W10-P1D
10	C-BENDED ARCH ROD	4	3941-W10-C1Y	33	C-20T GEAR	8	7026-W10-D2S
11	C-3 HOLE DUAL ROD	8	7061-W10-R1D	34	C-40T SPINDLE GEAR	1	7408-W10-D1G
12	C-3 HOLE ROUND ROD	8	7404-W10-C1D	35	C-40T GEAR	6	7346-W10-C1S
13	C-50mm RACK	1	7061-W10-T1D	36	C-60T GEAR	1	7026-W10-W5S
14	C-5 HOLE ROD	5	7413-W10-K2D	37	C-WORM GEAR	2	7344-W10-A1S1
15	C-5 HOLE DUAL ROD	4	7026-W10-S3D	38	B-PEG REMOVER	1	7061-W10-B1Y
16	C-5 HOLE DUAL ROD BOTTOM CLOSED	4	7026-W10-S2S1	39	C-TURBO TIRE RIM	4	7407-W10-B1Y
17	C-7 HOLE ROUND ROD	8	7404-W10-C2D	40	C-TRUCK TIRE	4	7408-W10-C1D
18	C-7 HOLE PROLATE ROD	8	7404-W10-C3D	41	C-TRAPEZOID COVER	5	7408-W10-B1Y
19	C-9 HOLE ROD	4	7407-W10-C1S	42	C-TRAPEZOID FRAME	2	7408-W10-A1Y
20	C-11 HOLE ROD	6	7413-W10-P1D	43	C-IR REMOTE CONTROLLER	1	7337-W85-A2-US
21	C-150mm RACK	1	7061-W10-T2D	44	C-IR REMOTE RECEIVER	1	7408-W85-A-US
22	C-5x5 FRAME	6	7413-W10-Q1Y	45	C-40X MOTOR WITH WIRE CONNECTOR	3	7400-W85-A
23	C-5x5 ARCH FRAME	2	7411-W10-F1Y				

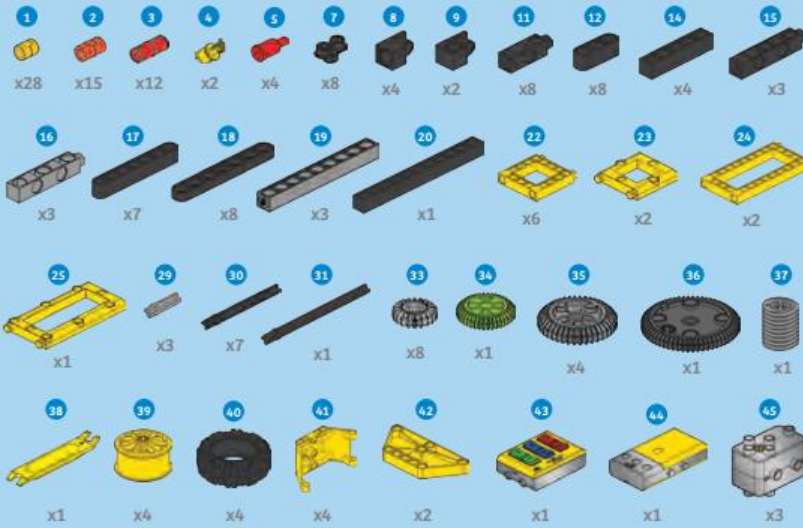
Heavy-Duty Machines to Move the Earth

Construction vehicles are designed for building structures such as buildings, bridges, and roads. This often involves moving large quantities of soil or rock and heavy building materials. Without construction vehicles, structures such as the Hoover Dam and the Empire State Building might not have ever been built. Each construction vehicle looks and functions differently, because they are built to accomplish specific tasks. However, they are able to accomplish their tasks with ease because they all use physics to their advantage!

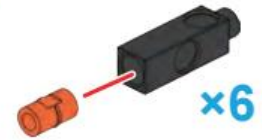


Bulldozer Model 1

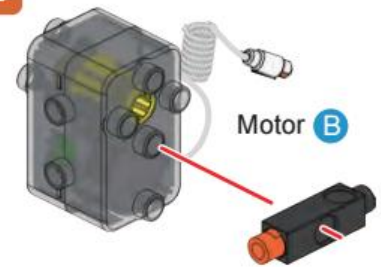
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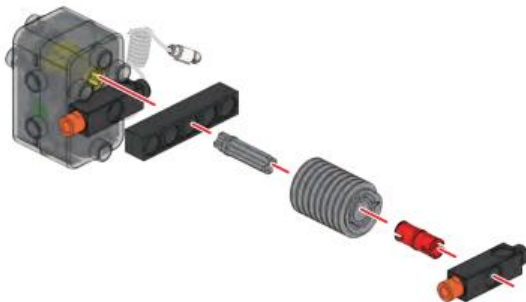
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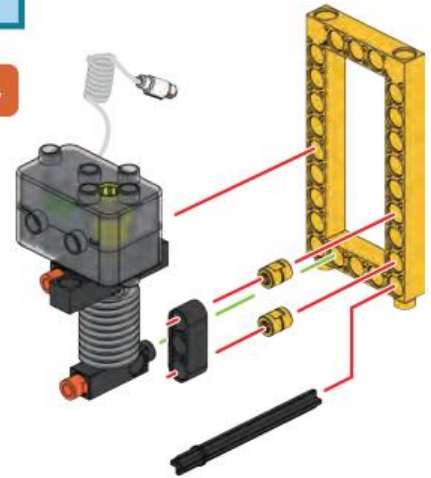
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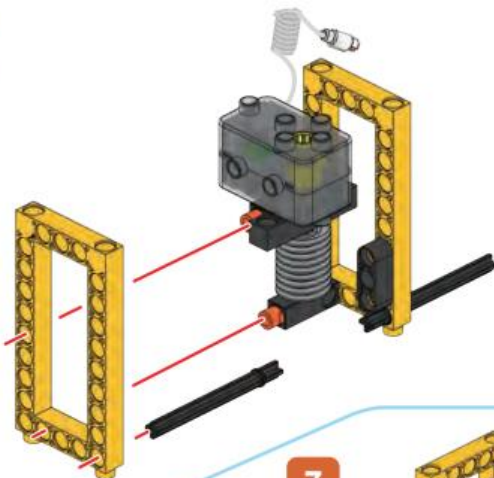
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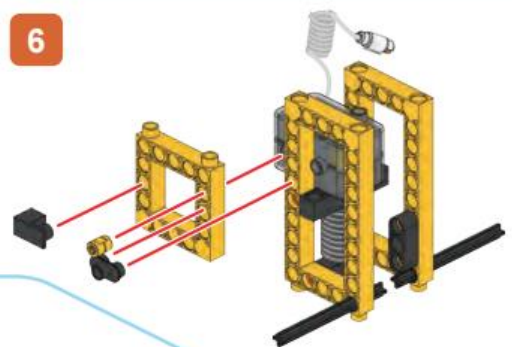
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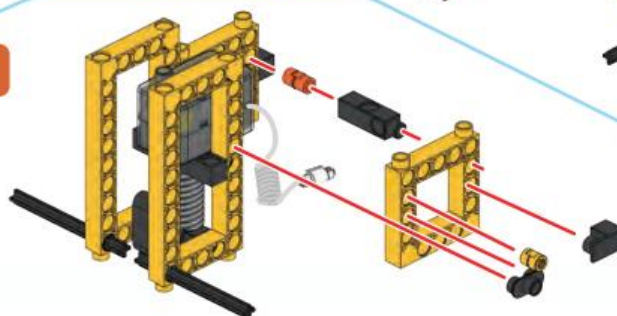
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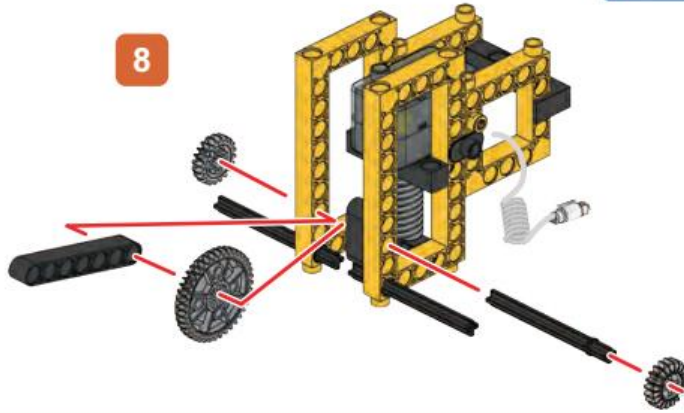
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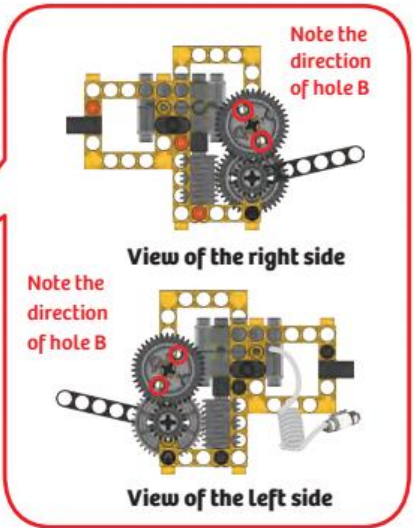
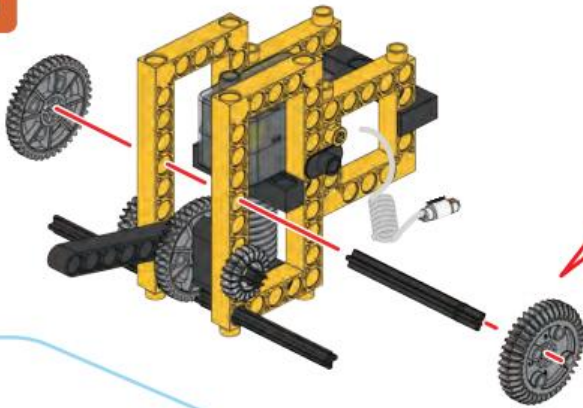
BULLDOZER

Model 1 Bulldozer

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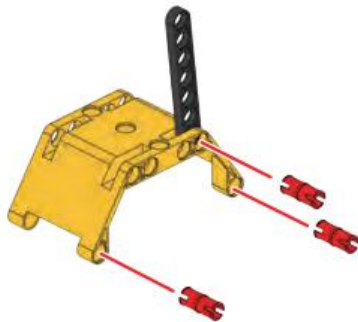
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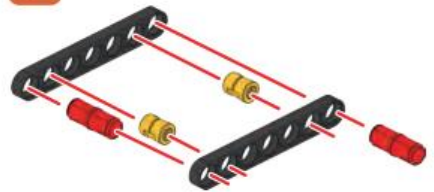
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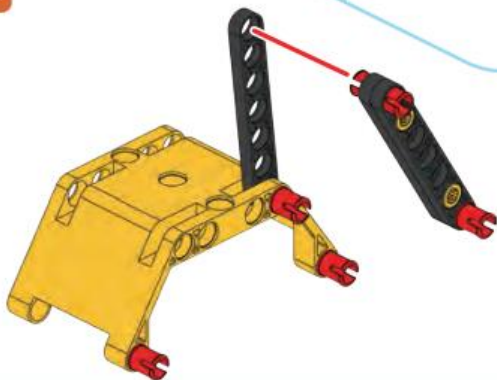
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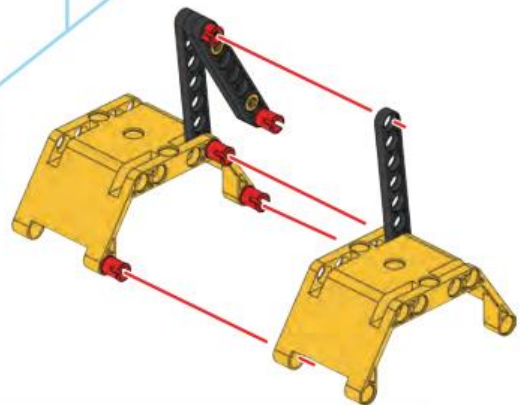
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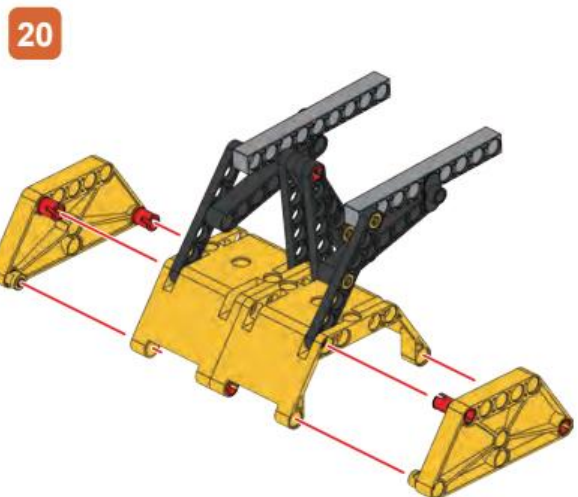
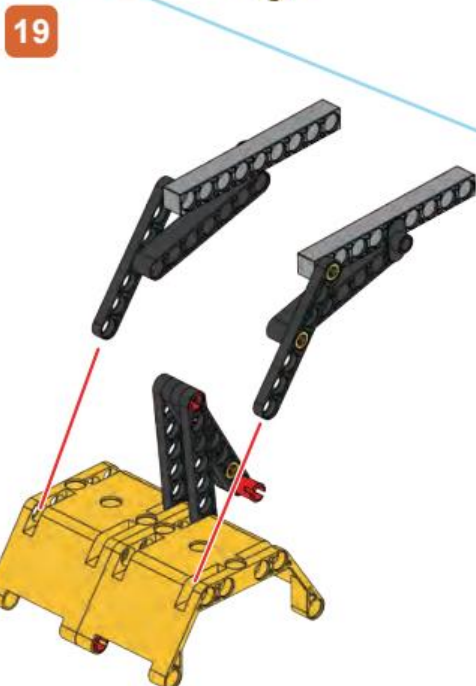
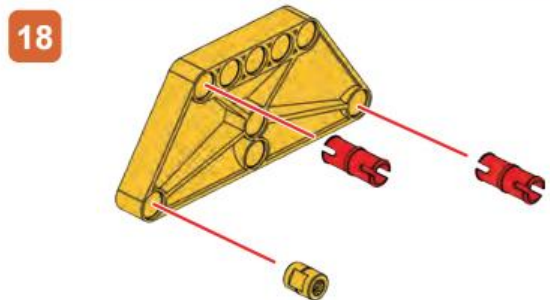
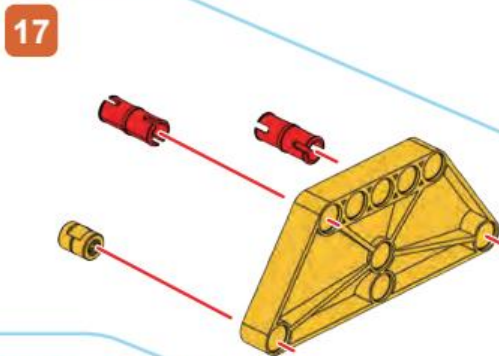
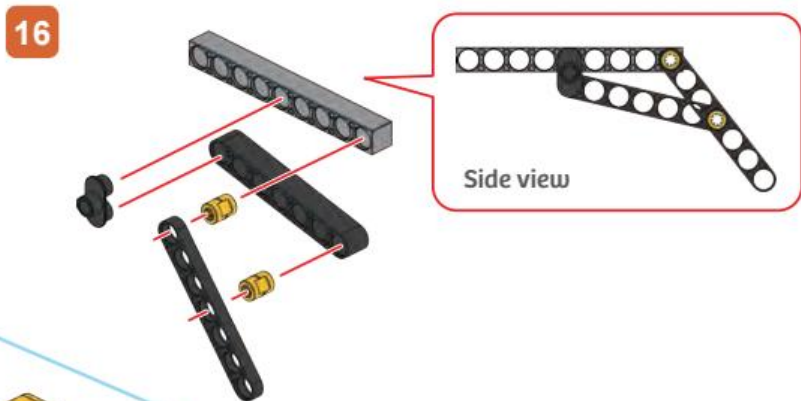
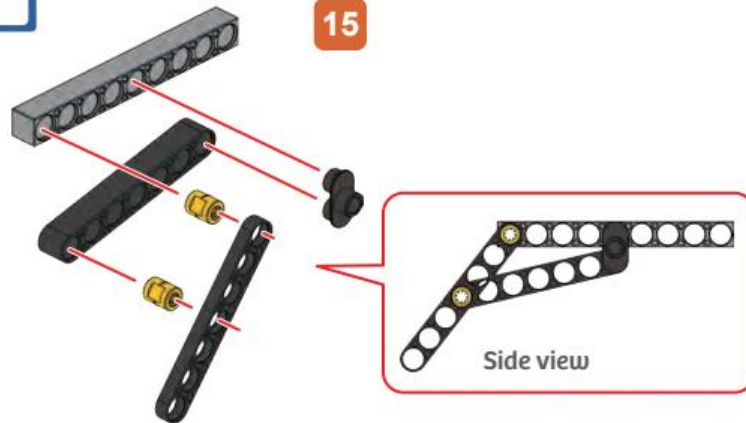
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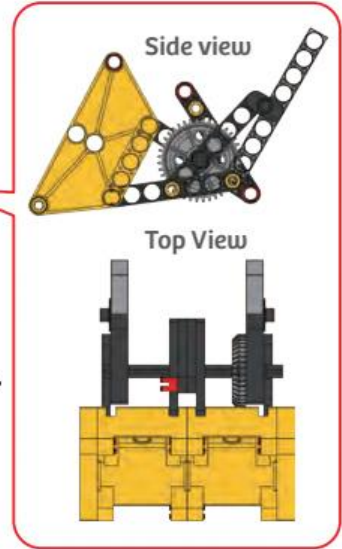
Bulldozer Model 1



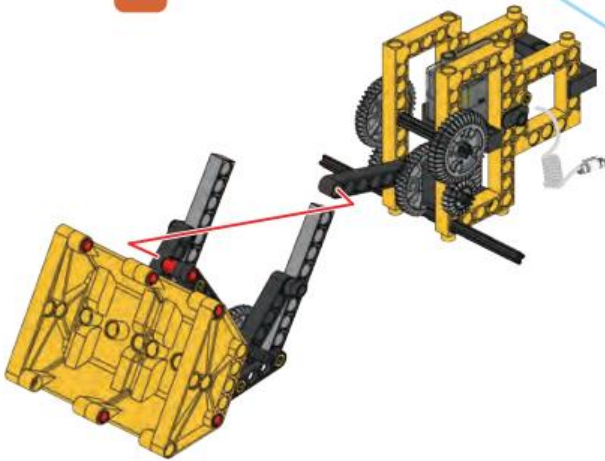
●●● BULLDOZER

Model 1 Bulldozer

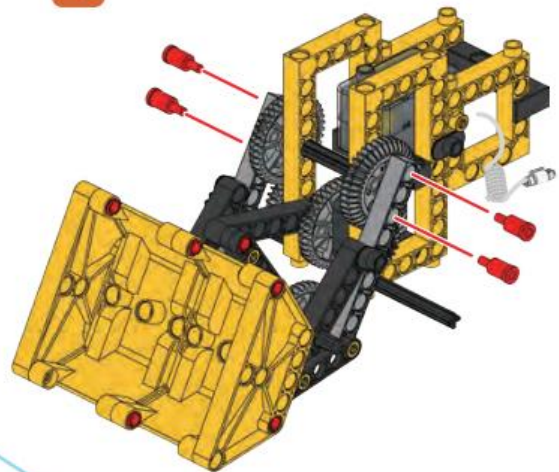
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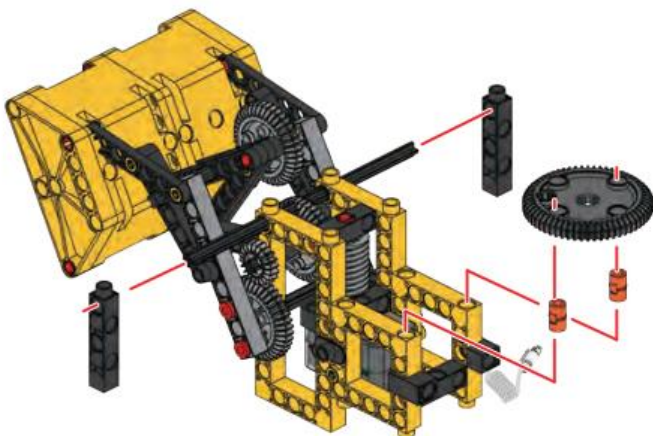
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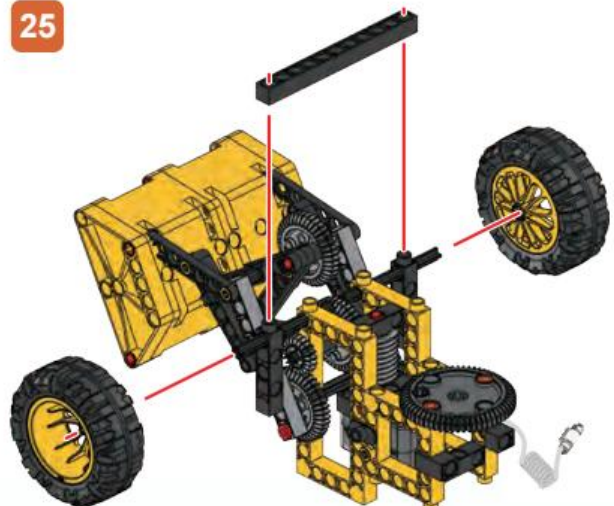
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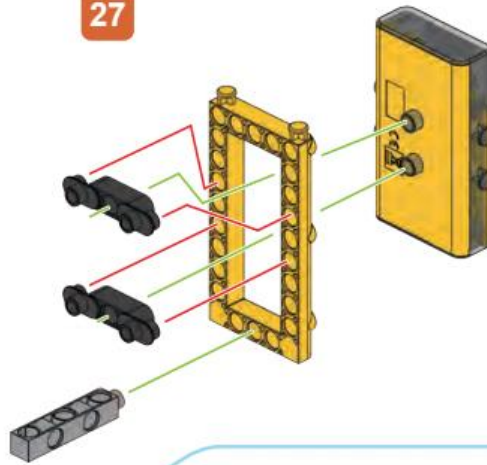


Bulldozer Model 1

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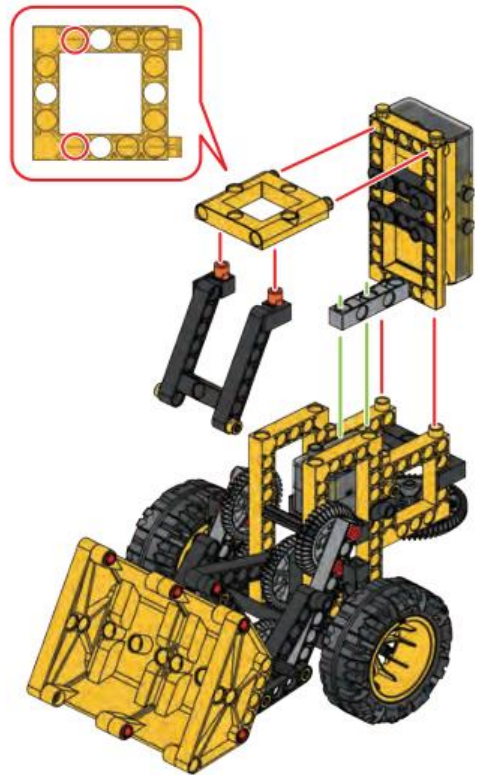
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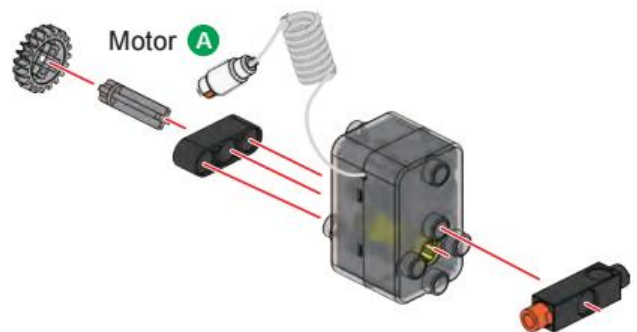
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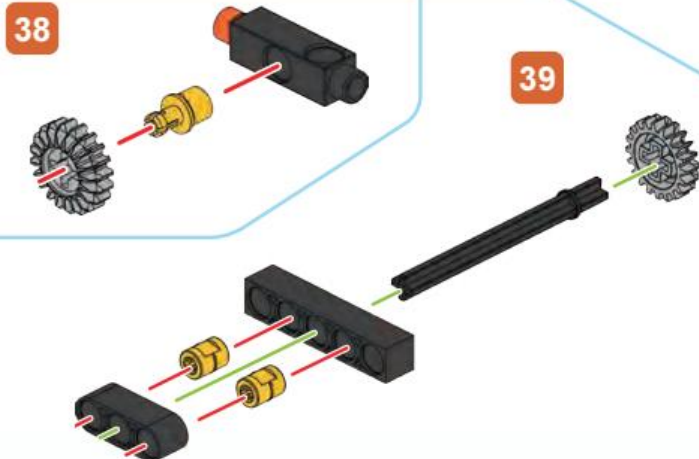
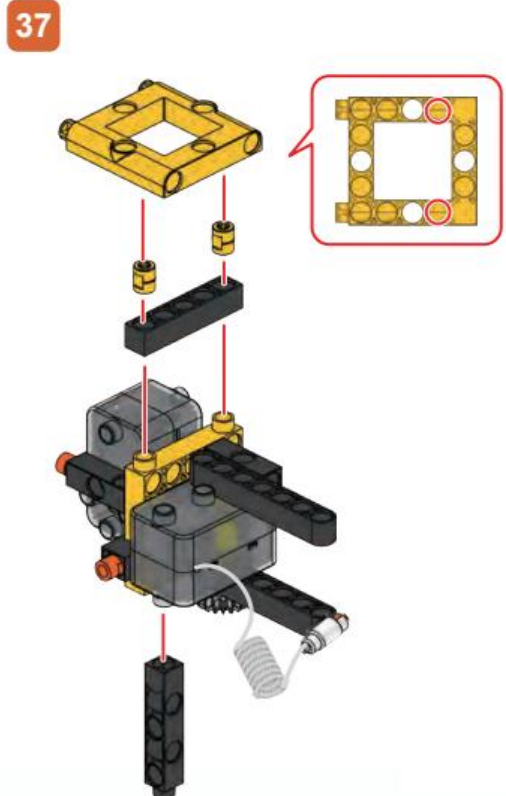
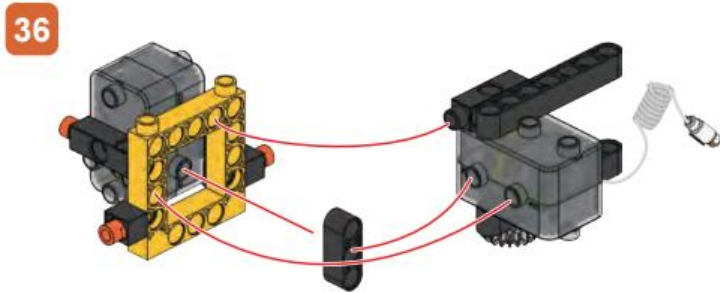
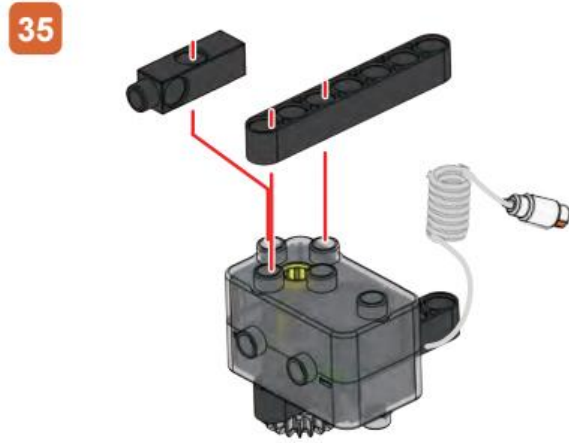
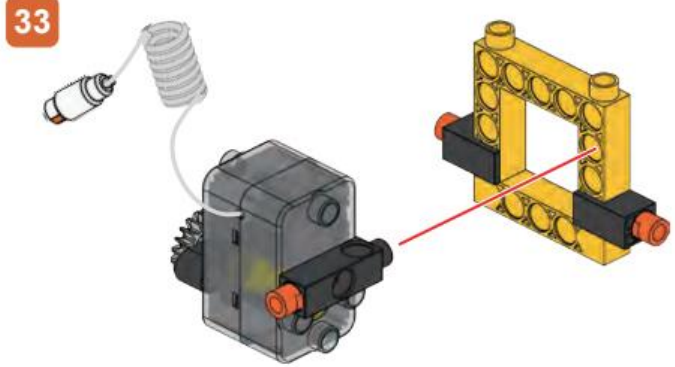
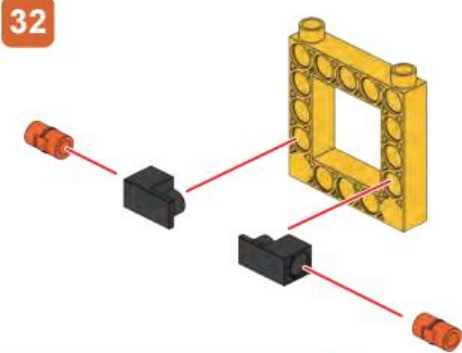


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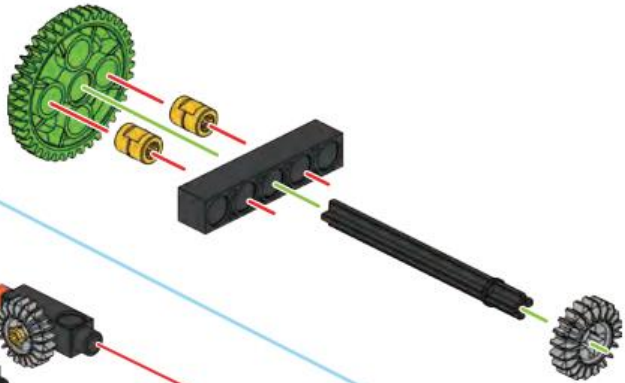
●●● BULLDOZER

Model 1 Bulldozer

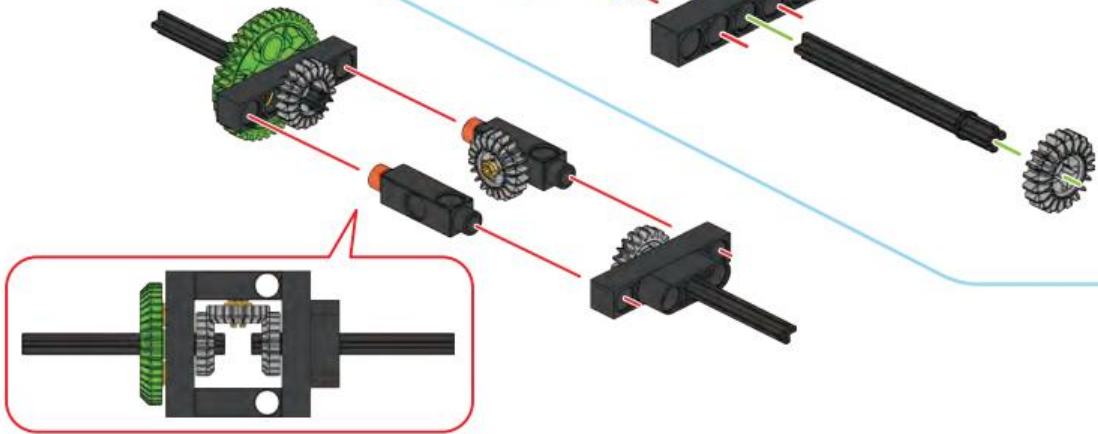


Bulldozer Model 1

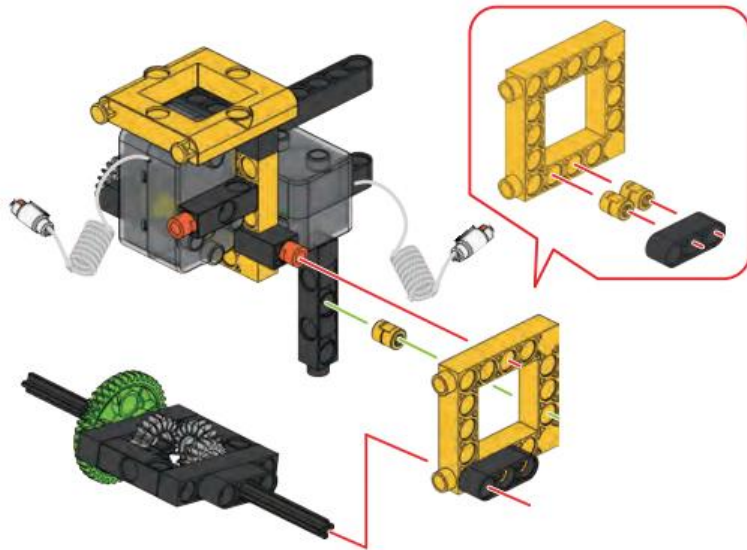
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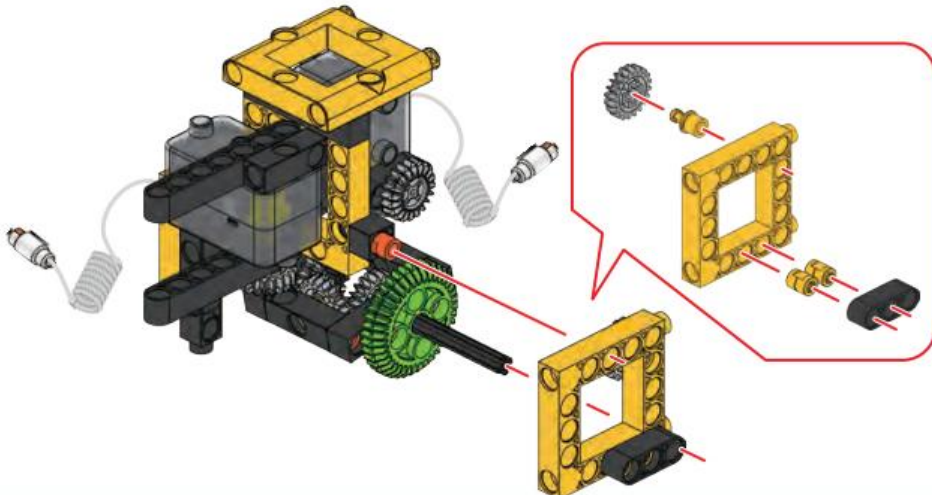
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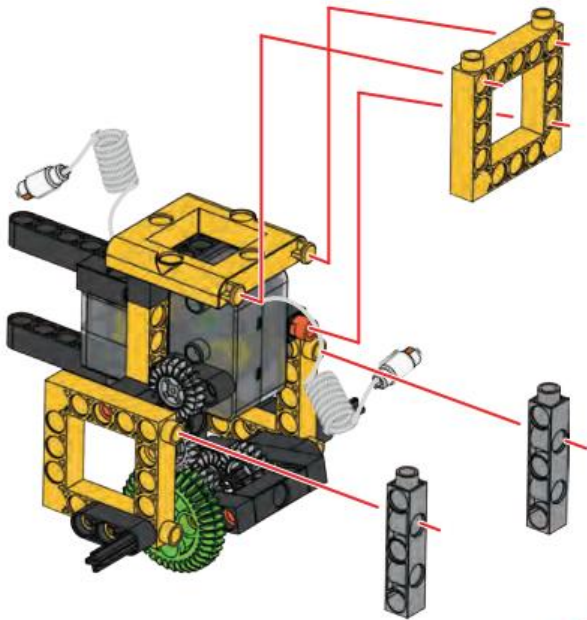
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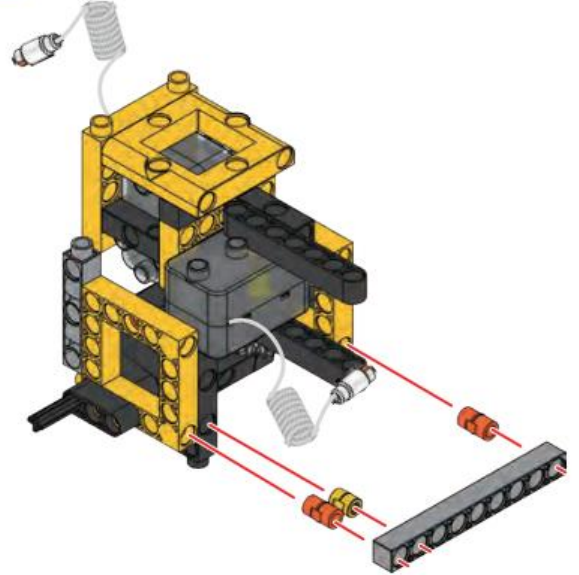
●●● BULLDOZER

Model 1 Bulldozer

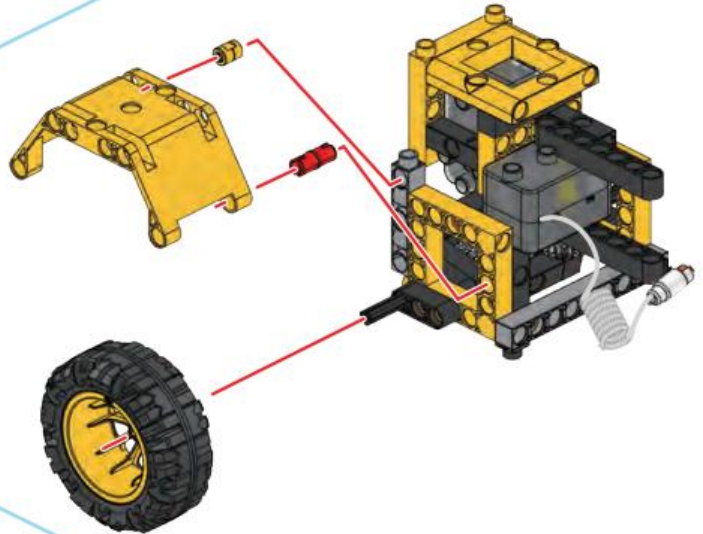
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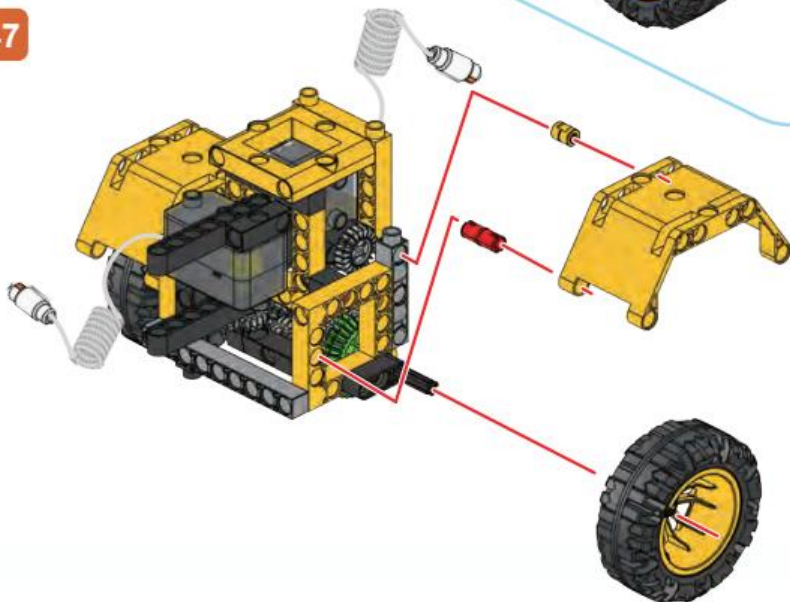
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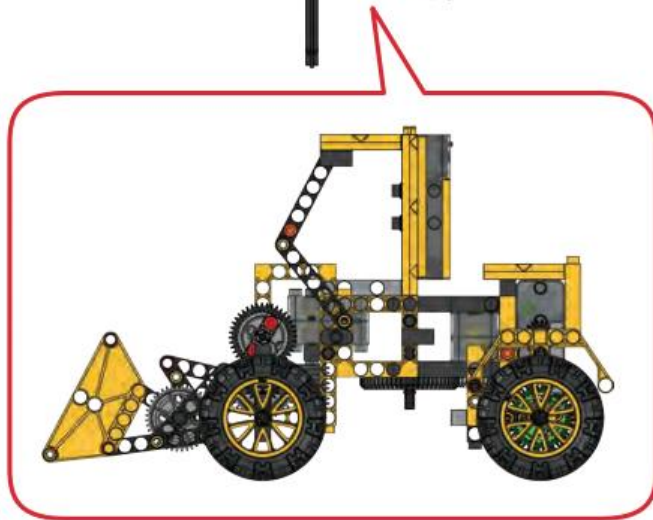
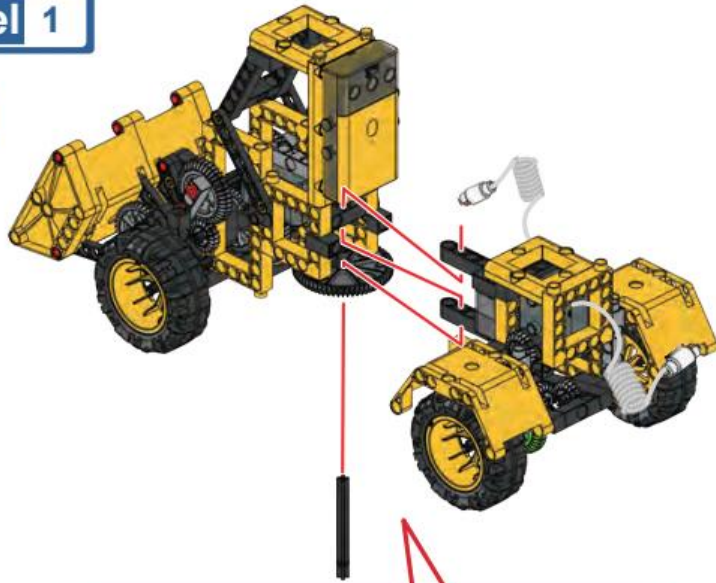


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Bulldozer Model 1

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EXPERIMENT 1

Can you move it?

HERE'S HOW

Find various materials such as small toy blocks, small rocks, crumpled up pieces of paper, or foam packing peanuts. Lay the materials around a room. Then drive the bulldozer around and try to collect the materials. Can you pick up some items and not others?

49

Done!



CHECK IT OUT



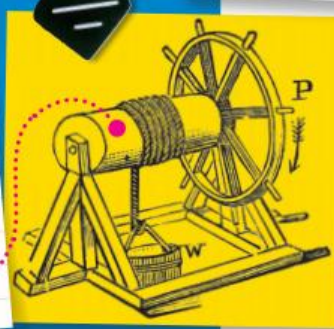
Simple Machines

Construction vehicles are complex machines. To analyze and better understand them, you can break them down into combinations of many **simple machines** that all work together.



WHAT IS A SIMPLE MACHINE?

A simple machine is a mechanical device that changes the direction or magnitude of a force. A **force** is simply a push or a pull. A simple machine takes one input force and produces an output force, which is used to do work. For example, when the **wheel** in the diagram is turned the **bucket** is raised. This is an example of a simple machine called a **wheel and axle**.



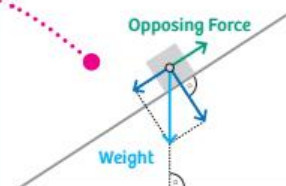
MECHANICAL ADVANTAGE

The efficiency with which a simple machine amplifies a force is measured through its **mechanical advantage**. Mechanical advantage is the ratio of the input force to the output force. The mechanical advantage of a complex machine can be found by multiplying the mechanical advantages of the simple machines that make up the complex machine.

There are six classical simple machines as originally defined by Renaissance scientists: **the lever, the wheel and axle, the pulley, the inclined plane, the wedge, and the screw**. On the Check It Out pages, there are examples of simple machines that can be found in construction vehicles. Can you find more examples in the models you build?

THE INCLINED PLANE

Another example of a simple machine is an **inclined plane** or ramp. An inclined plane is a flat surface with one end that is higher than the other. Moving an object up an inclined plane requires less force than lifting the object up vertically. However, the object has to be moved over a longer distance. In simple machines, there is often a trade-off between force and distance. Inclined planes are used at construction sites to make it easier to move materials around.



THE WEDGE: A BULLDOZER'S BLADE

A bulldozer is equipped with a large metal plate on its front, known as a **blade**. It is used to move large quantities of dirt or rocks. The blade is an example of a **wedge**, another type of simple machine that works like a portable inclined plane.

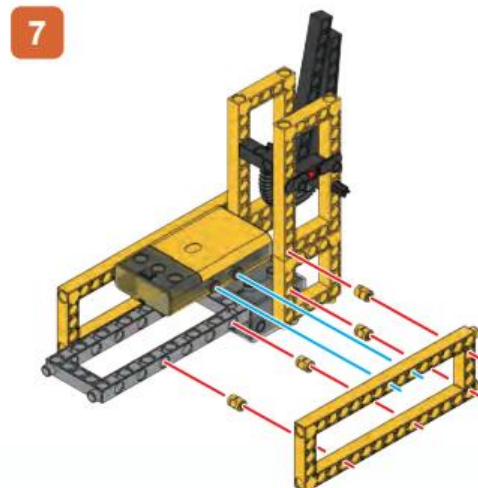
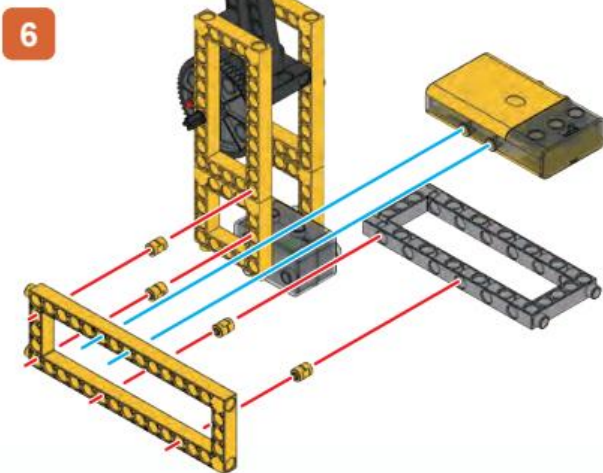
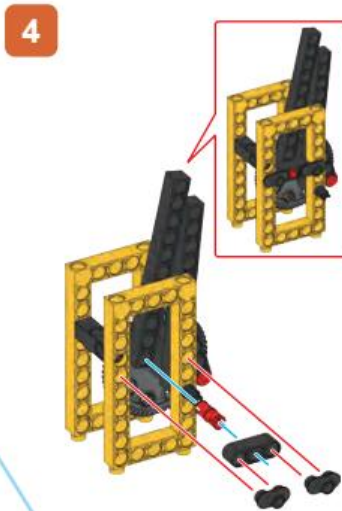
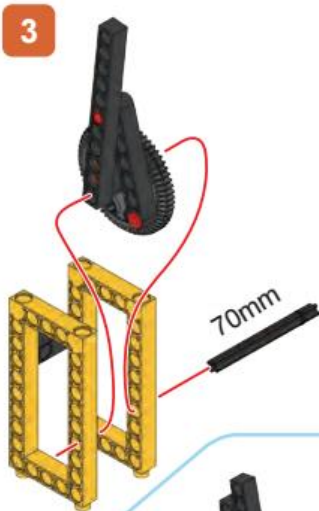
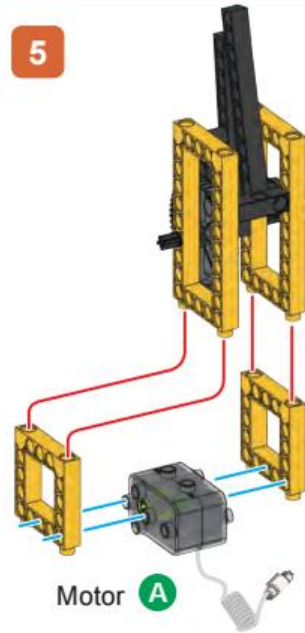
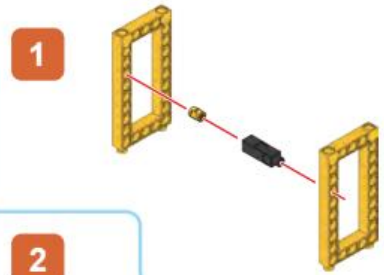
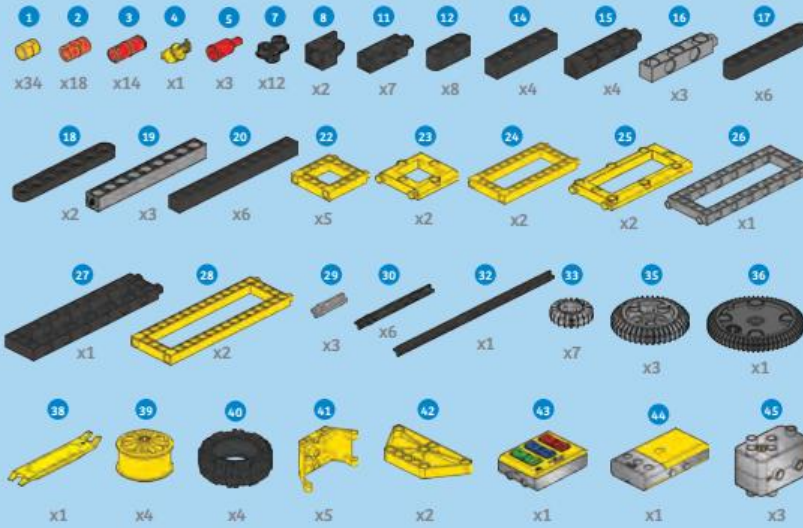
There are different types of bulldozer blades. The straight blade ("**S blade**") is very shallow and is used for fine grading. A universal blade ("**U blade**") is tall and very curved so that it can carry more material. There are also blades that have a combination of the properties of U and S blades ("**SU blades**").





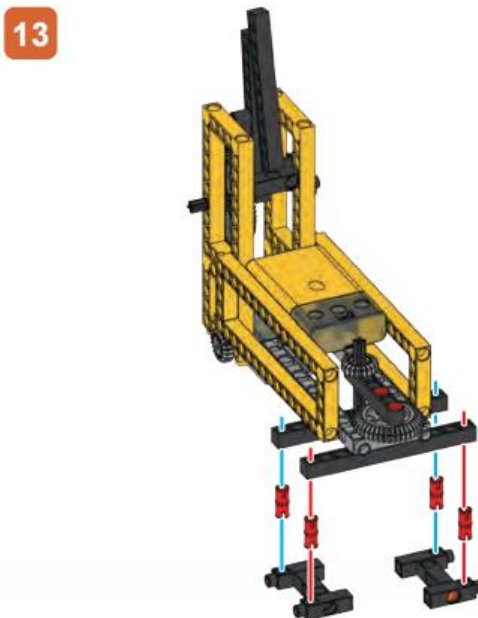
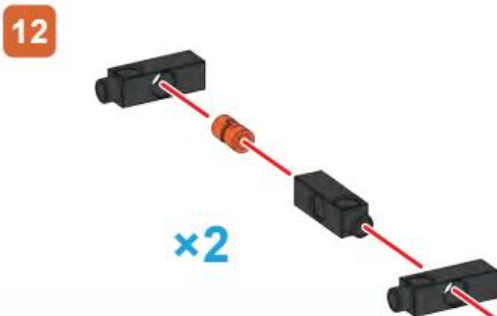
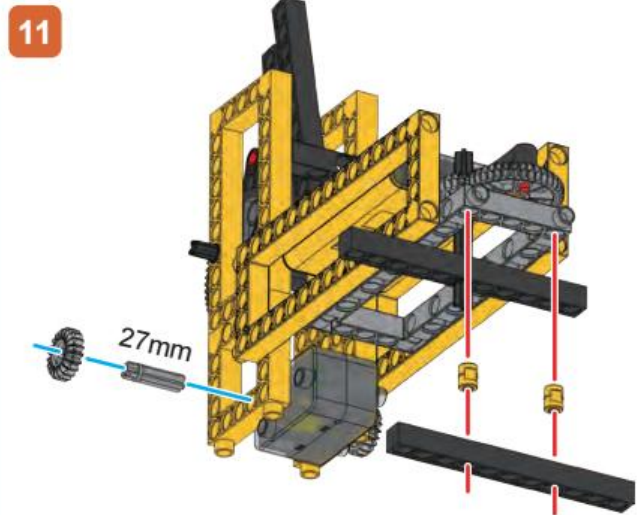
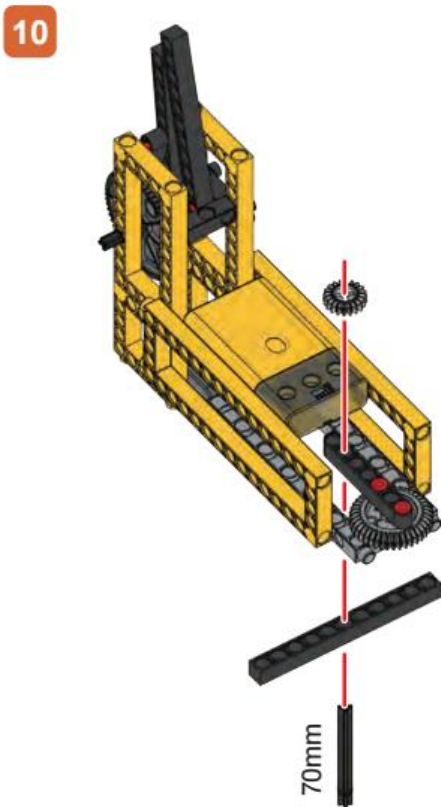
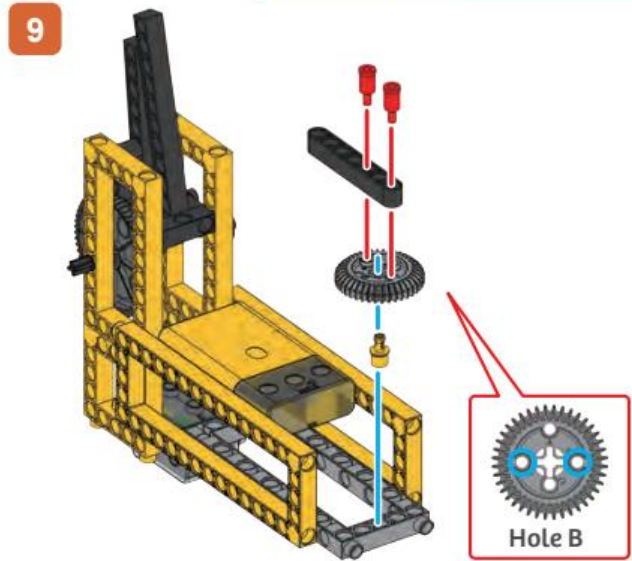
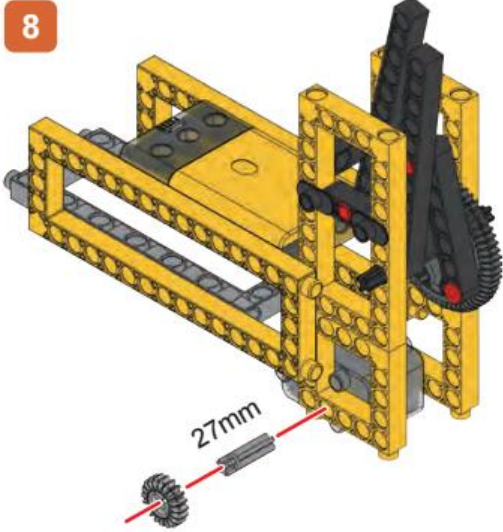
Backhoe Model 2

Parts Needed



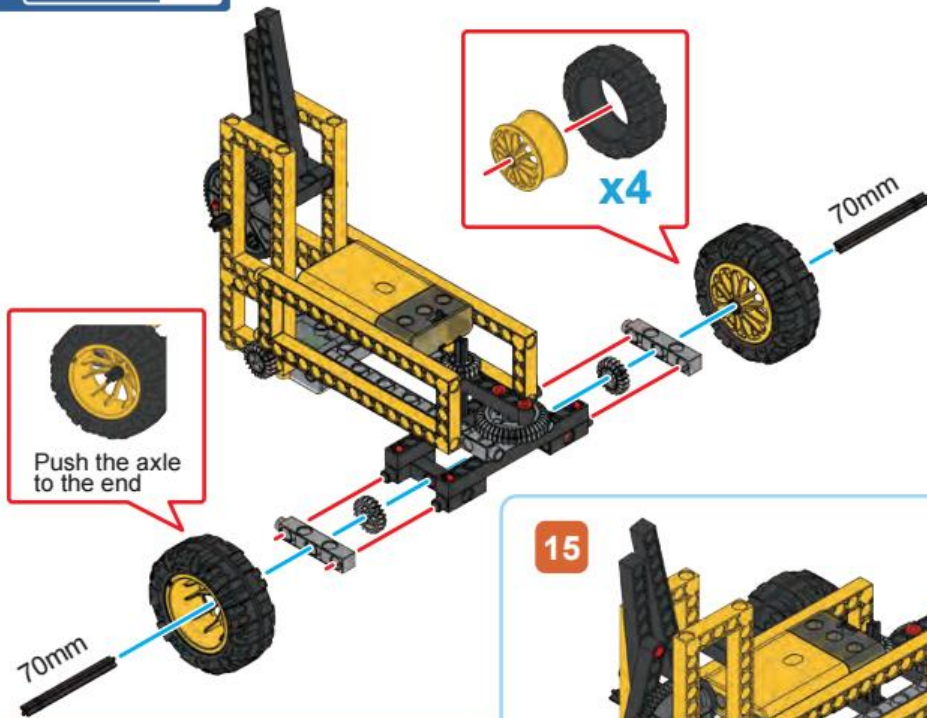
BACKHOE

Model 2 Backhoe

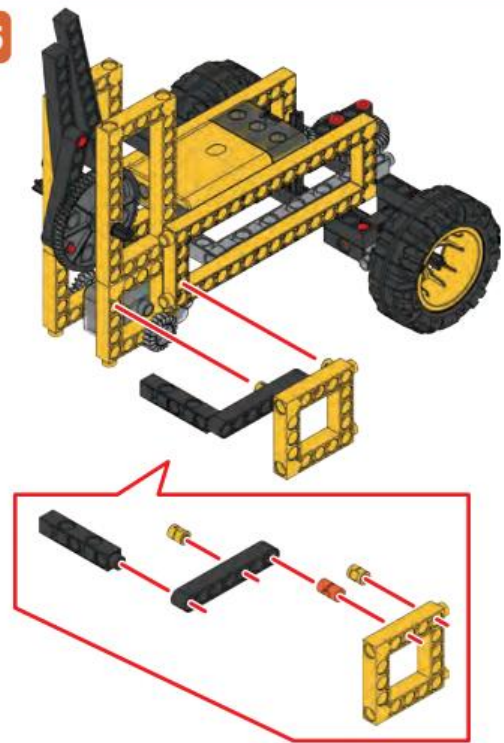


Backhoe Model 2

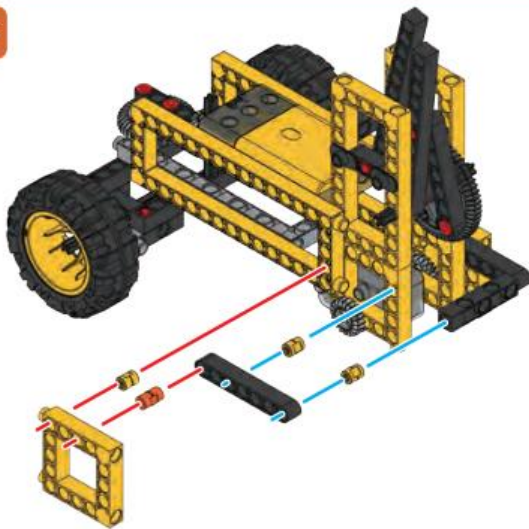
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15



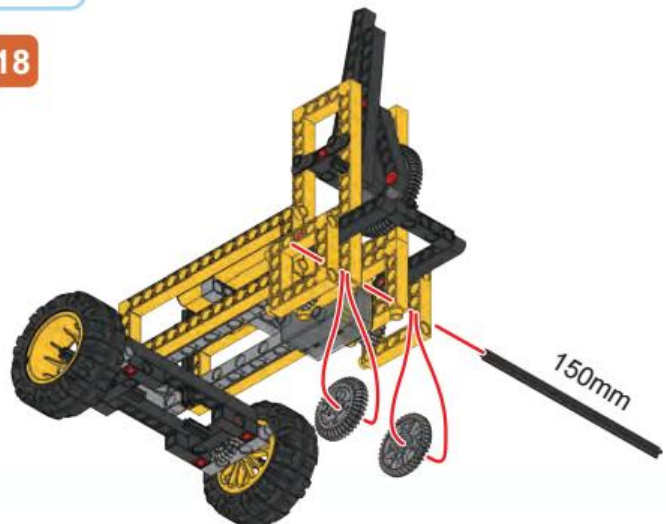
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17



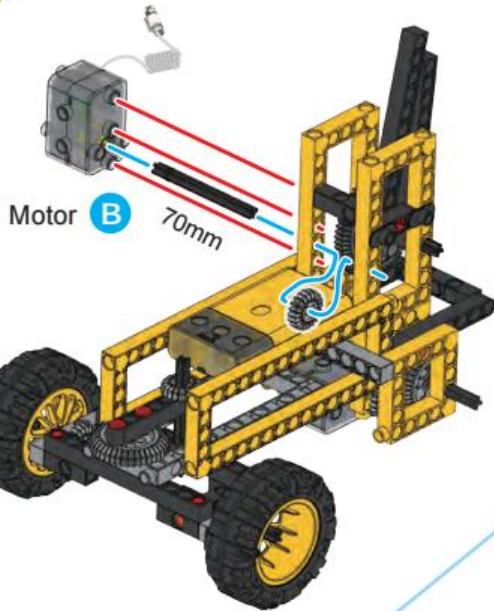
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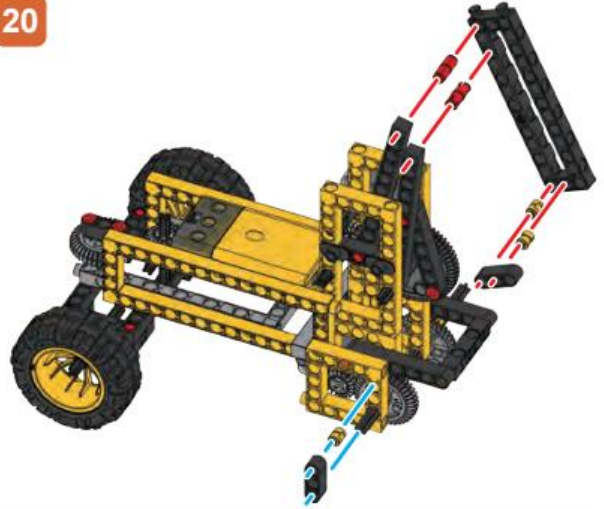
BACKHOE

Model 2 Backhoe

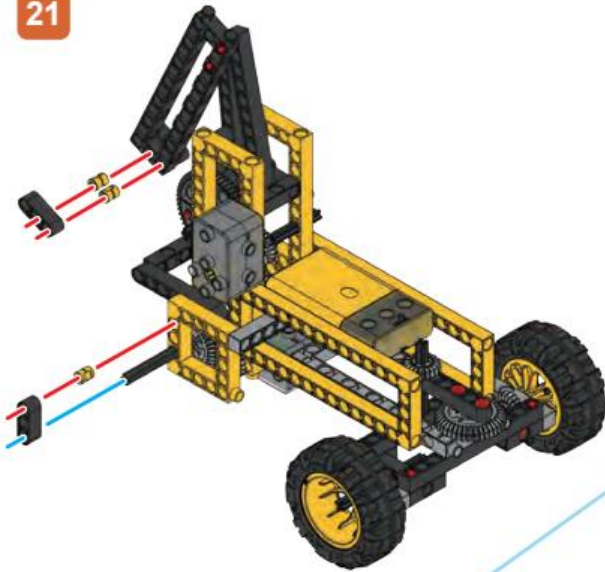
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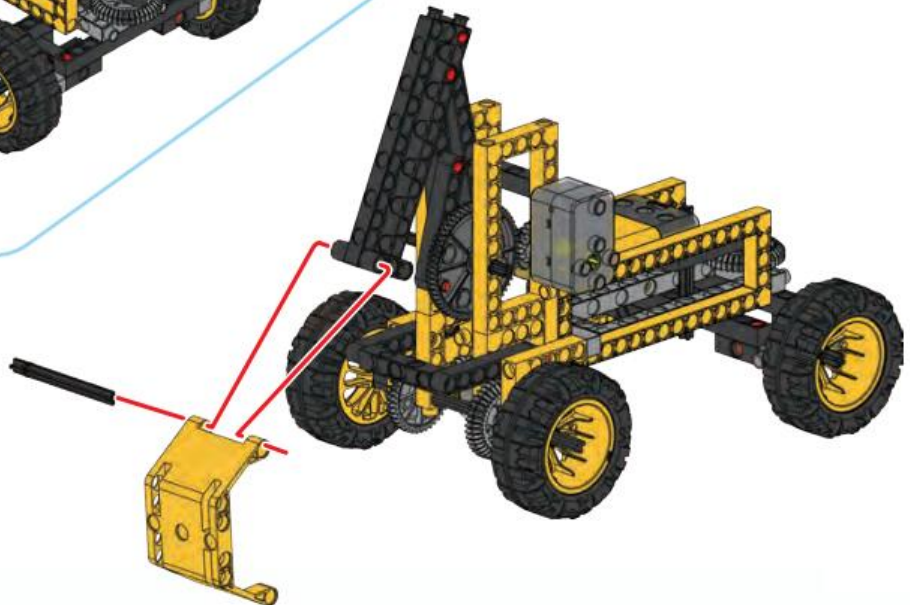
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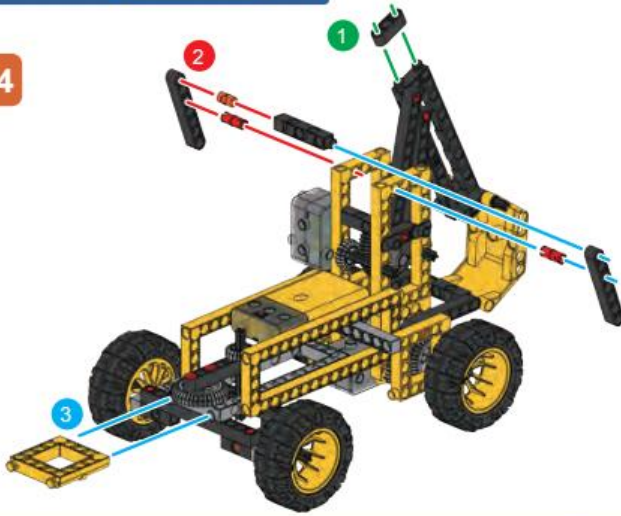


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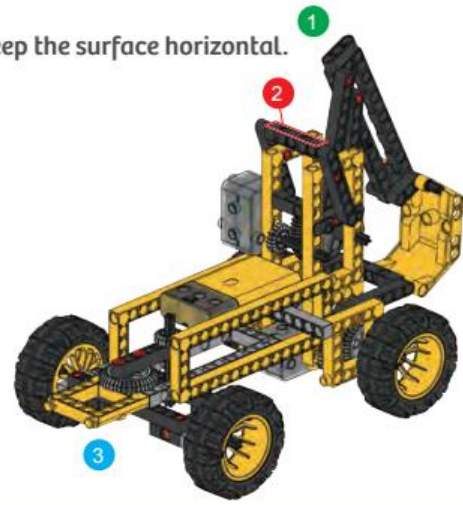


Backhoe Model 2

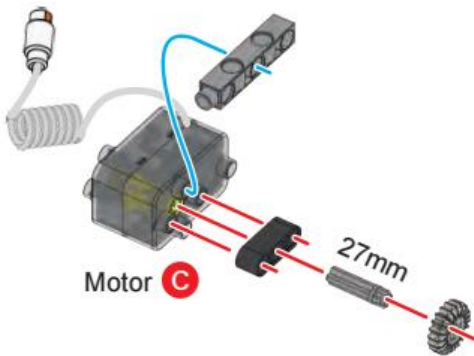
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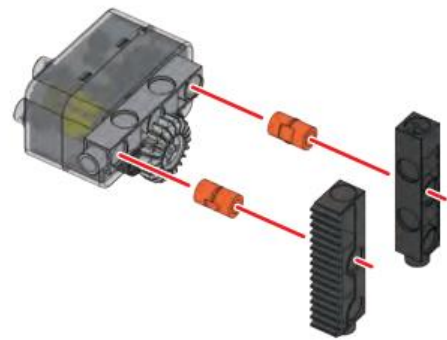
Keep the surface horizontal.



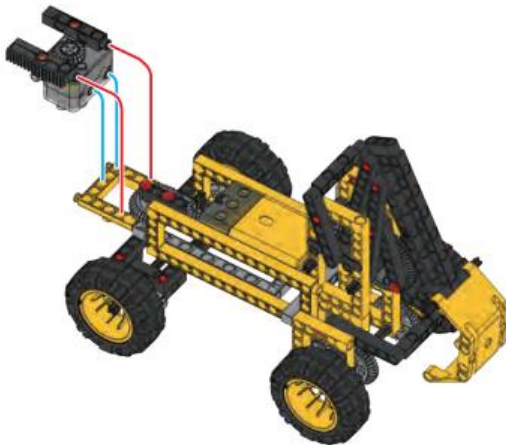
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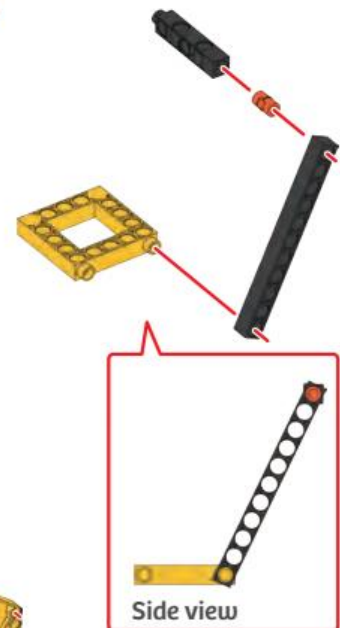
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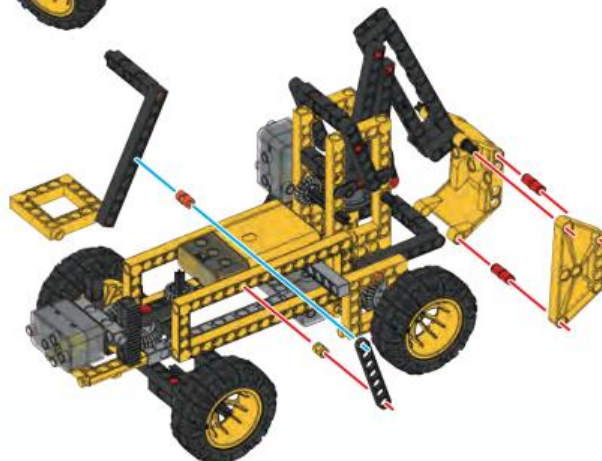
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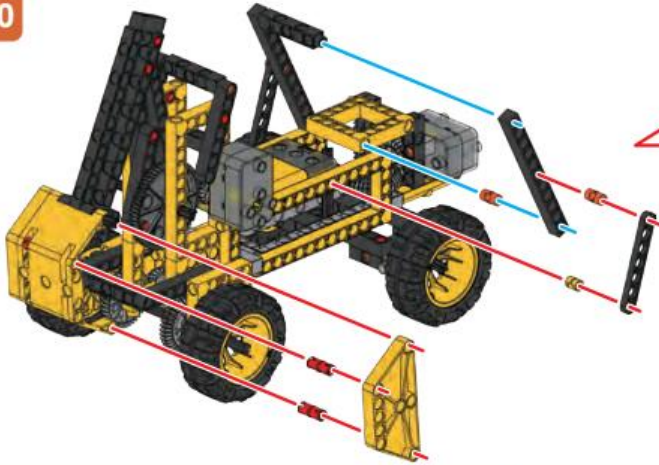
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BACKHOE

Model 2 Backhoe

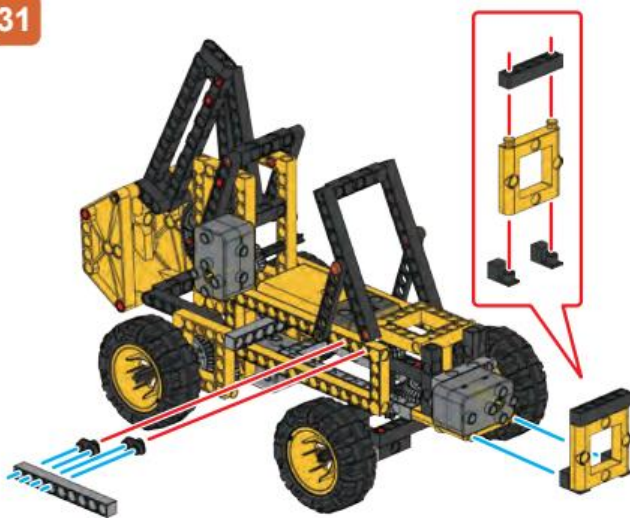
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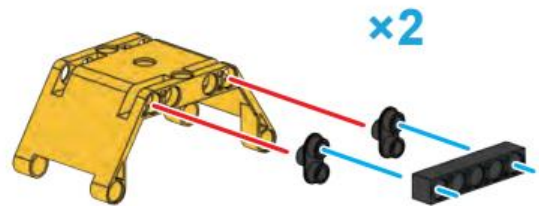
Follow the diagram below to correctly orient the parts.



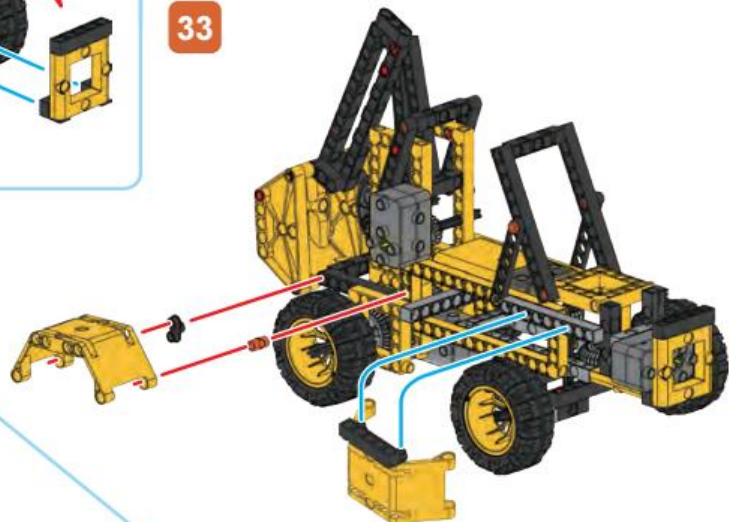
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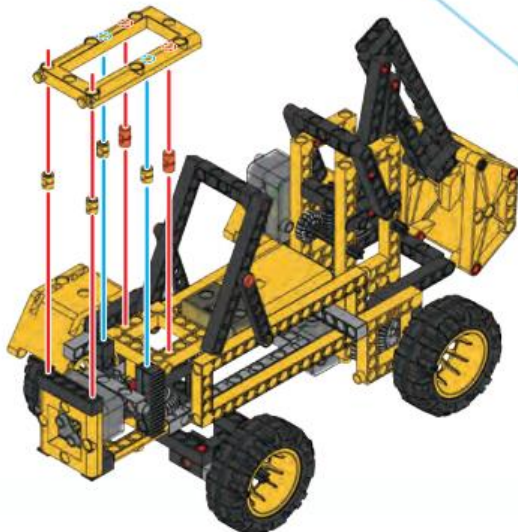
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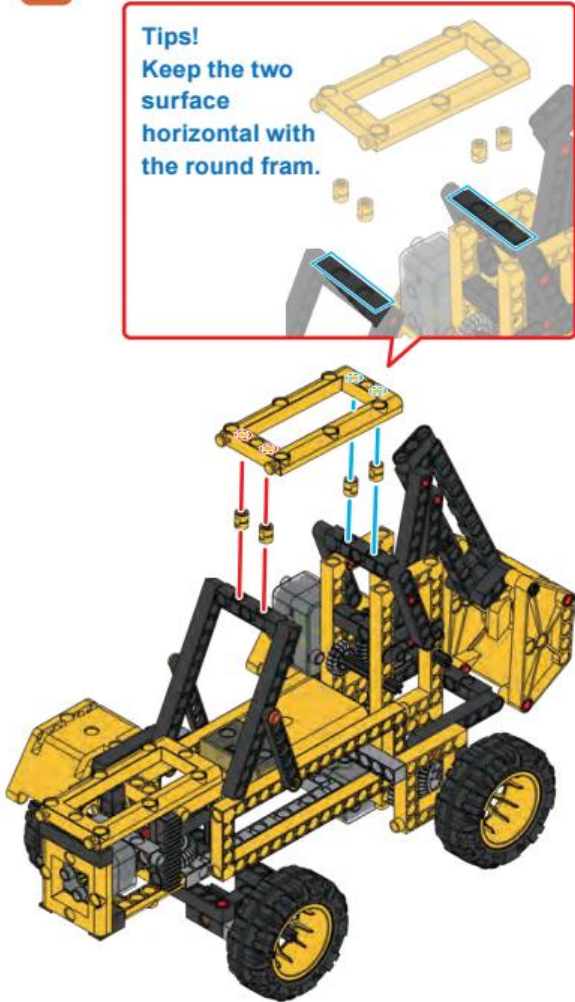
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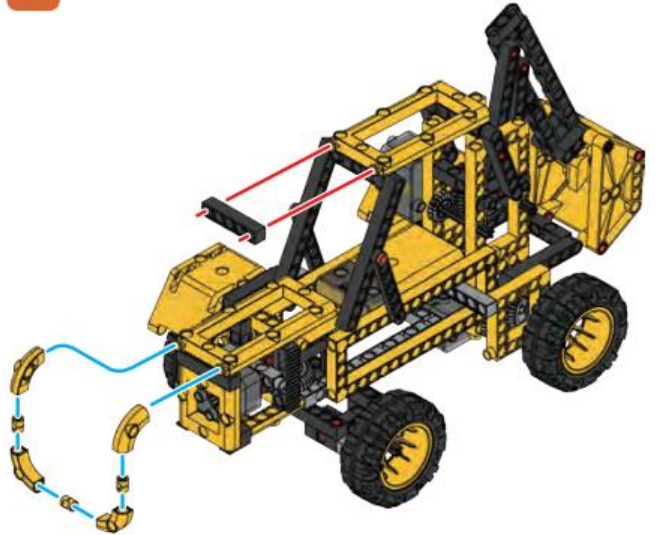
Backhoe Model 2

35

Tips!
Keep the two
surface
horizontal with
the round fram.



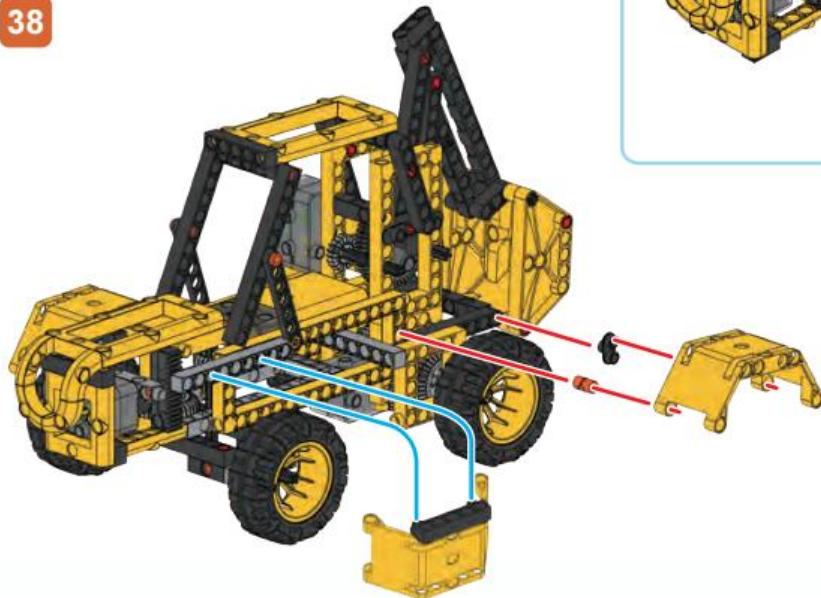
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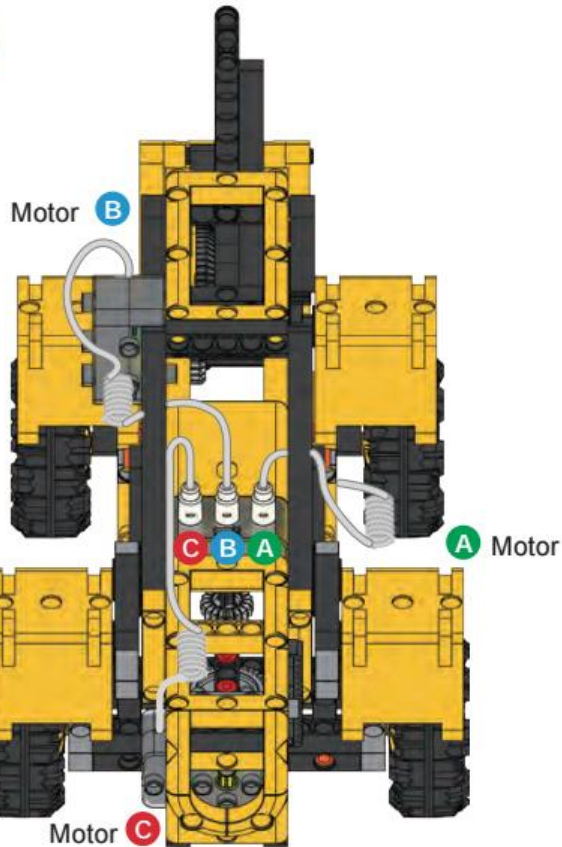
37



38



39



DID YOU KNOW?

GEARS VS. HYDRAULICS

In the models in this kit, many gears are used. **Gears** are wheels with meshing teeth on them that allow the turning motion of one wheel to be transferred to another wheel. When gears of different sizes are used, mechanical advantage can be gained.

In the real-life versions of the construction vehicles in this kit, hydraulic systems are often used instead of the gears. A **hydraulic** system uses a liquid under pressure inside tubes and pistons to transmit forces from one place to another, and also to gain mechanical advantage. Hydraulic machines consist of three parts: A pump driven by a motor that creates the pressure in the fluid; a system of valves and tubes; and an actuator, or an output that controls the machinery. Hydraulic machines can take relatively small torques and turn them into very large torques — which comes in handy in heavy-duty construction equipment.

EXPERIMENT 2

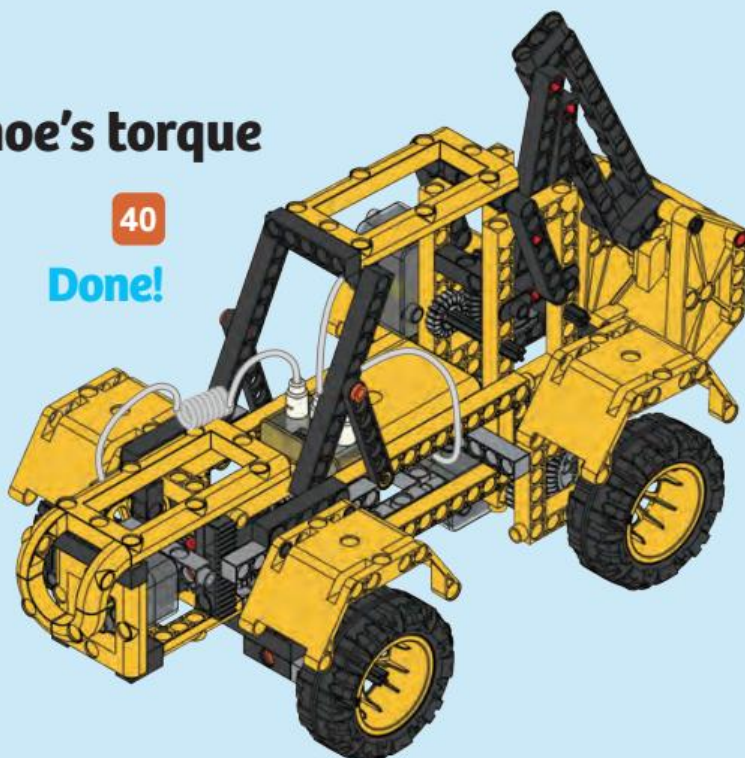
Testing the backhoe's torque

HERE'S HOW

Set up a ramp that the backhoe can drive up using books, a board, and other objects. Drive the backhoe up the ramp. Repeat this several times, increasing the angle (slope) of the ramp each time. How does the speed of the backhoe change as the slope of the ramp gets steeper?

40

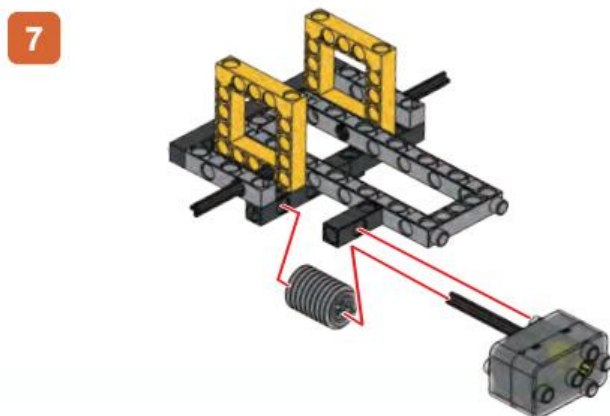
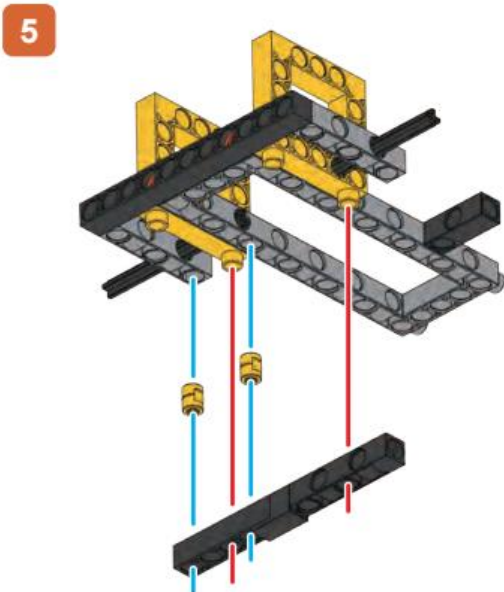
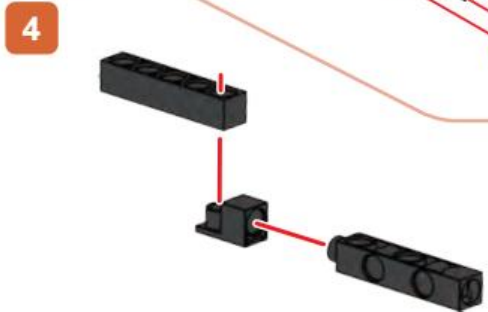
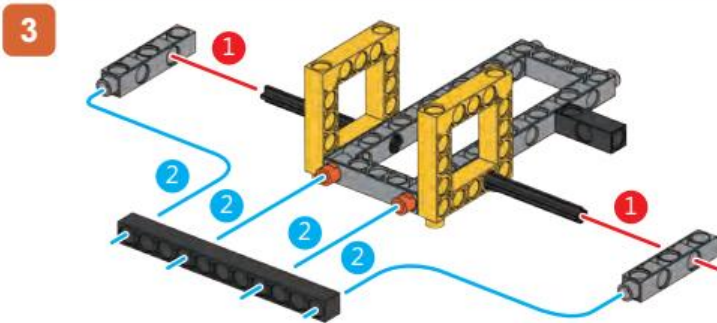
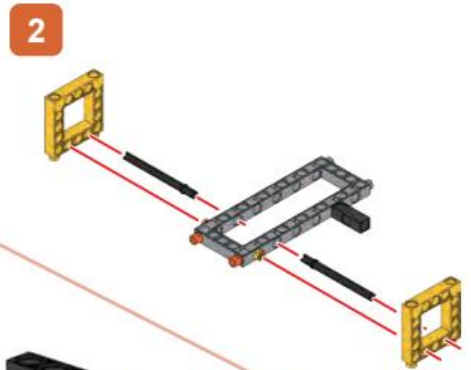
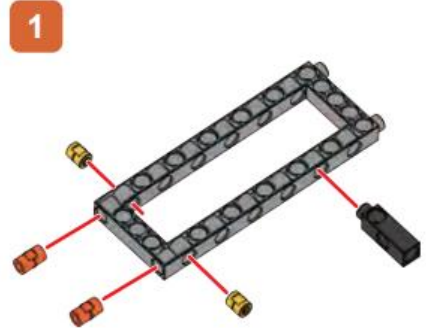
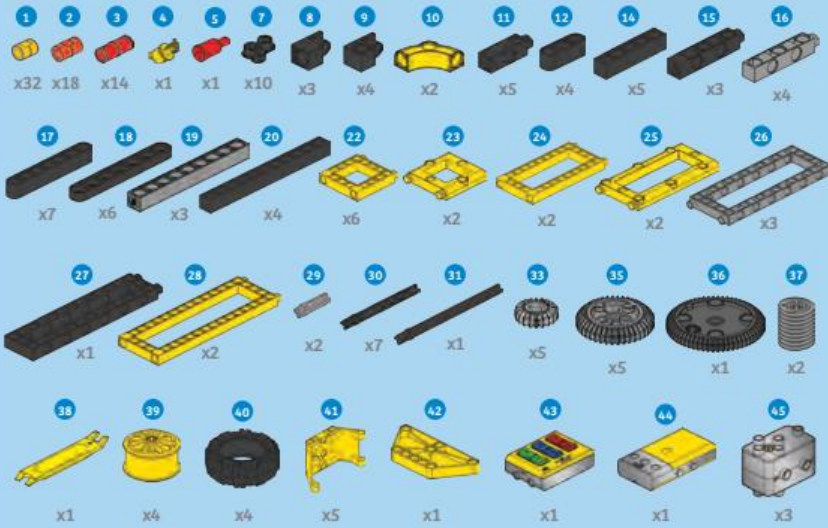
Done!





Dump Truck Model 3

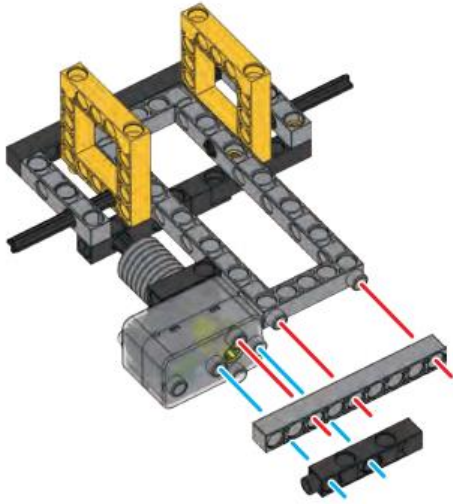
Parts Needed



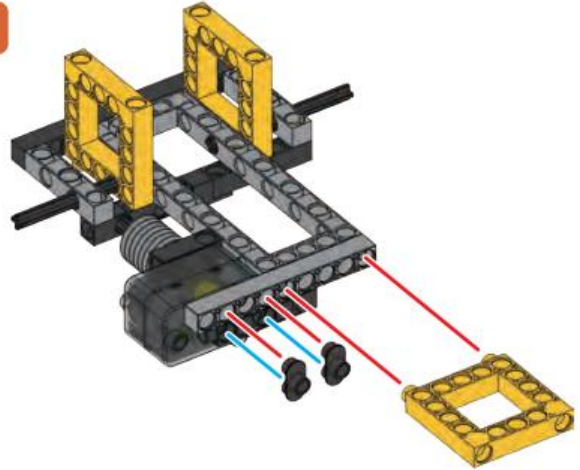
●●● DUMP TRUCK

Model 3 Dump Truck

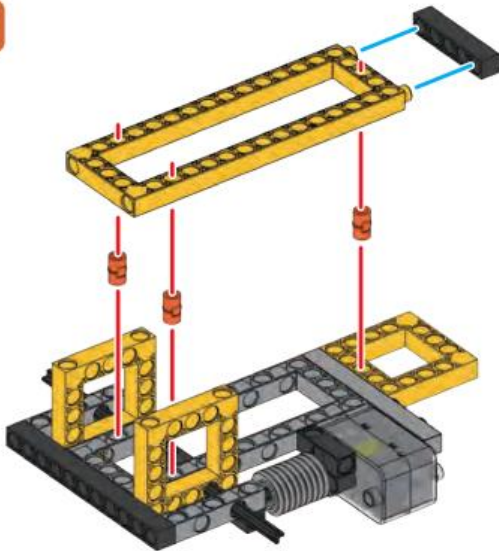
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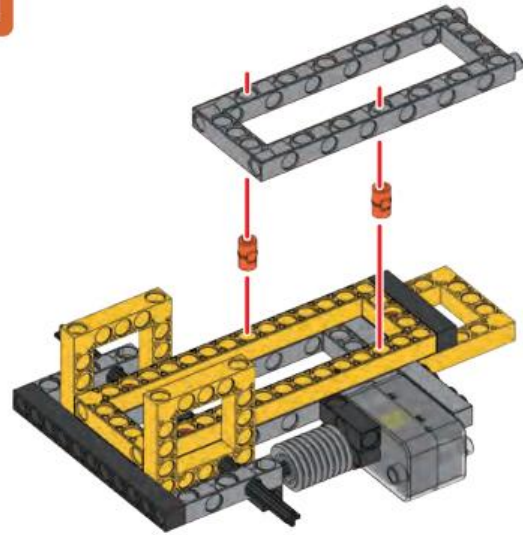
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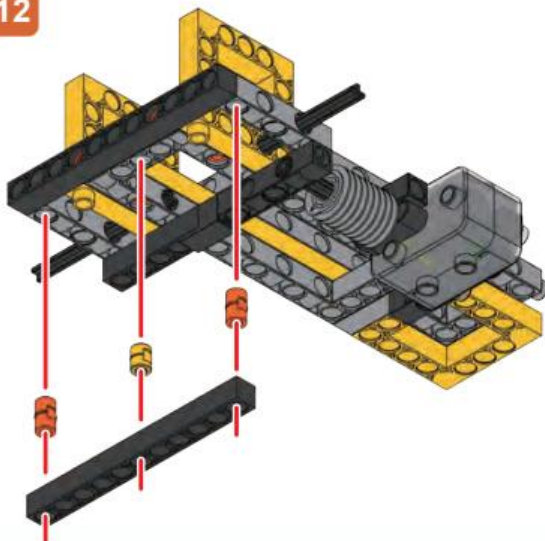
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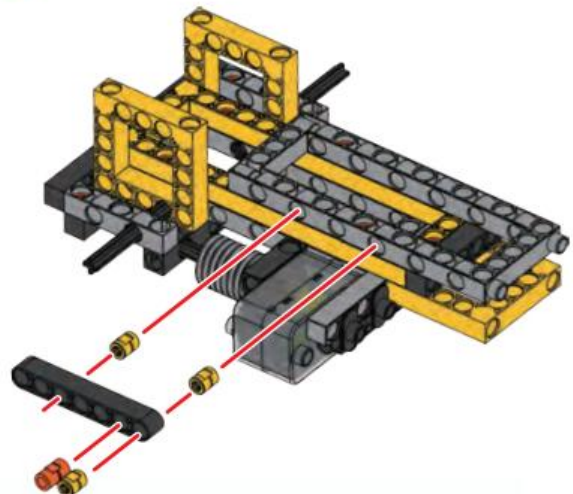
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12

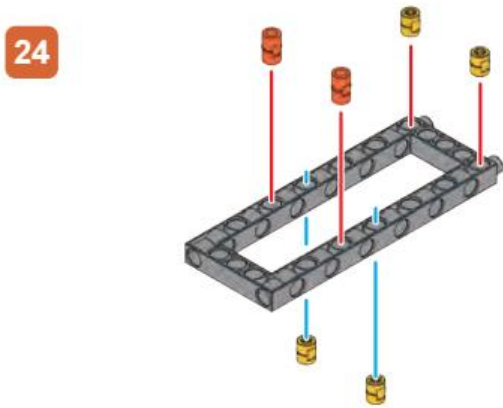
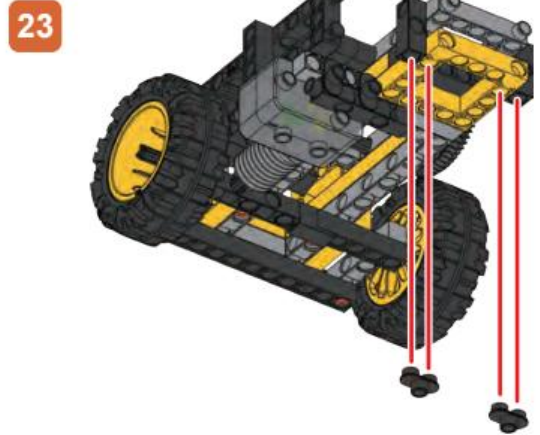
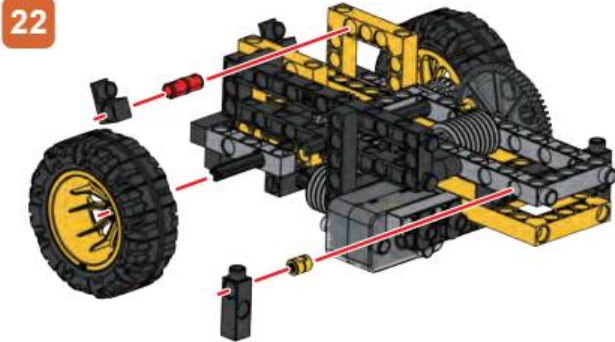


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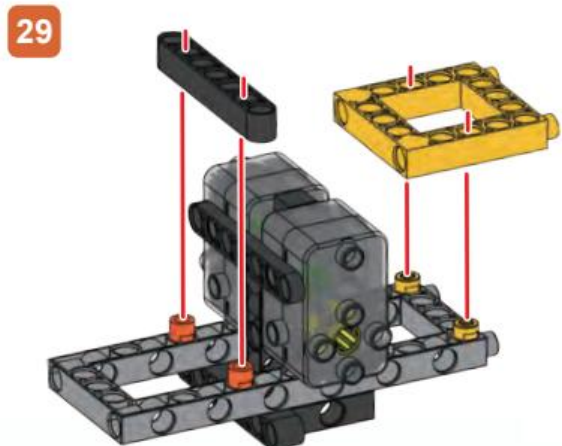
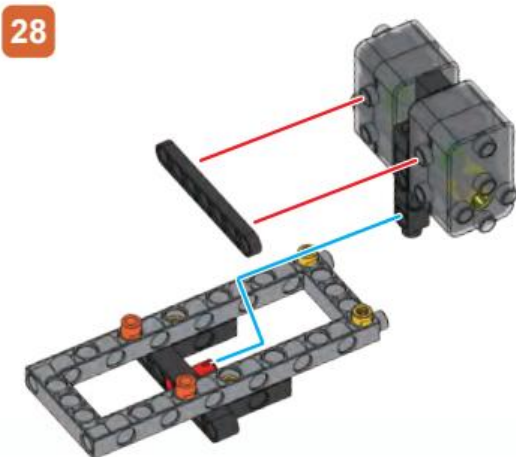
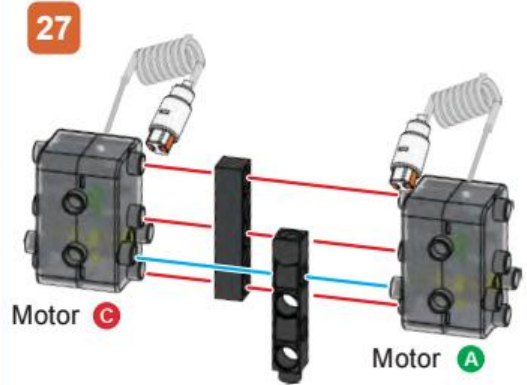
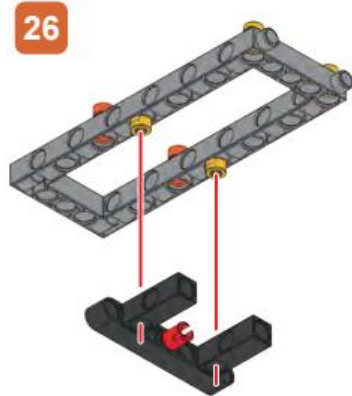
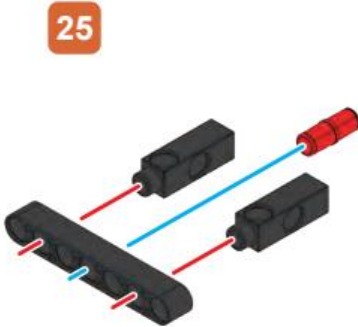


DUMP TRUCK

Model 3 Dump Truck



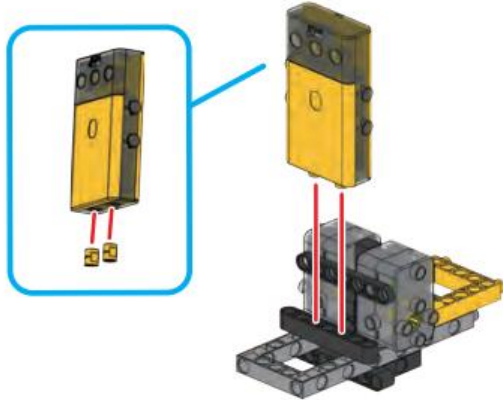
PART A



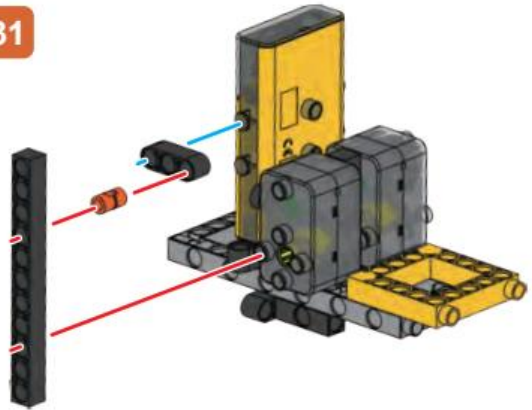


Dump Truck Model 3

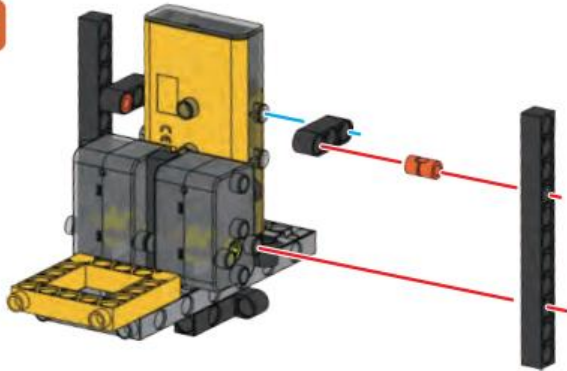
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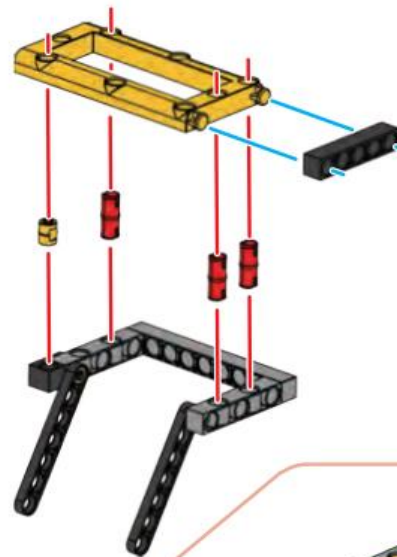
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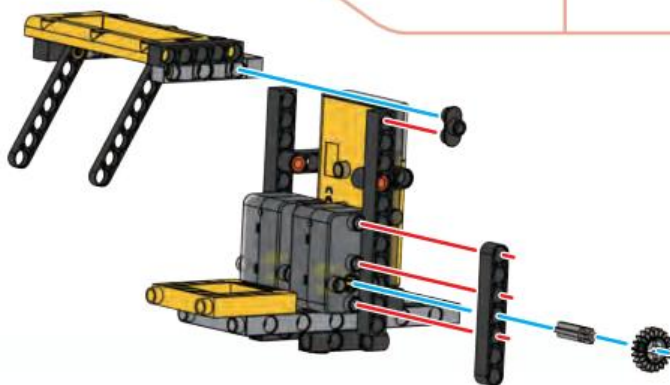
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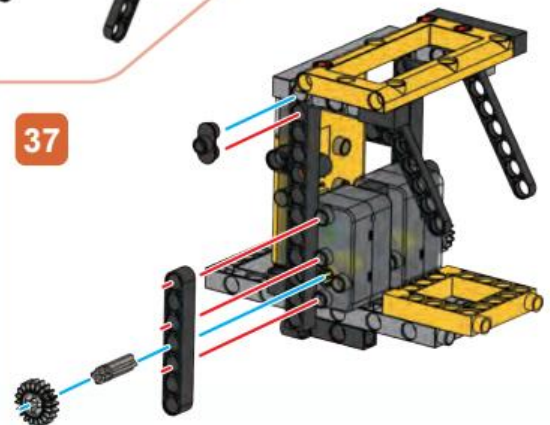
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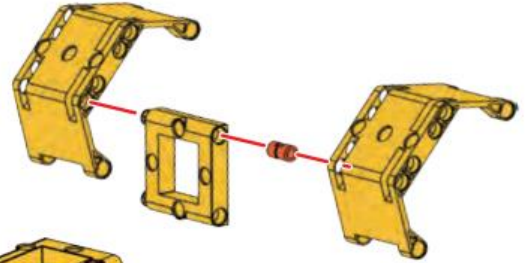
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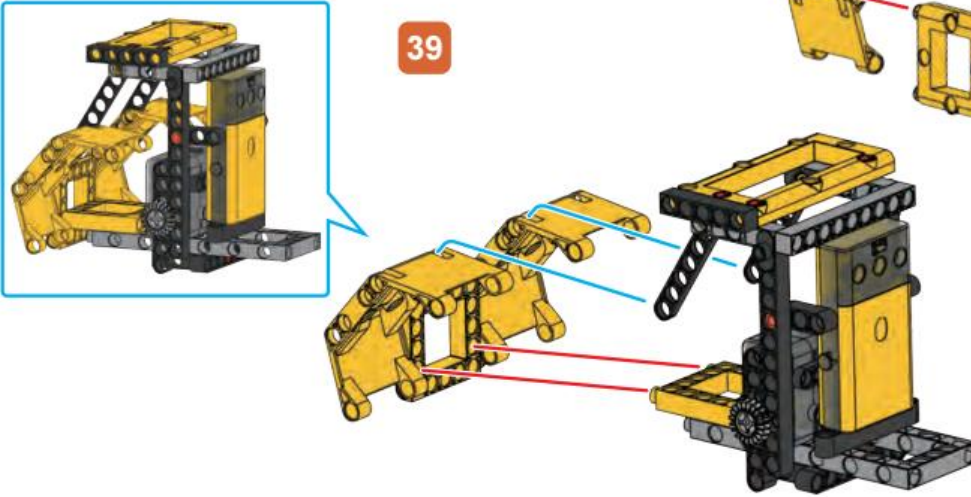
●●● DUMP TRUCK

Model 3 Dump Truck

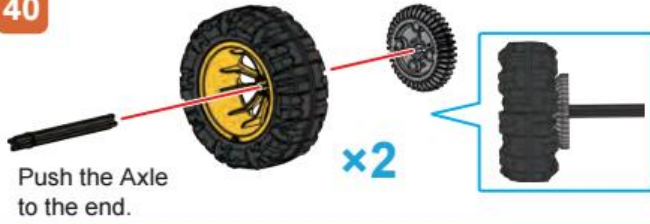
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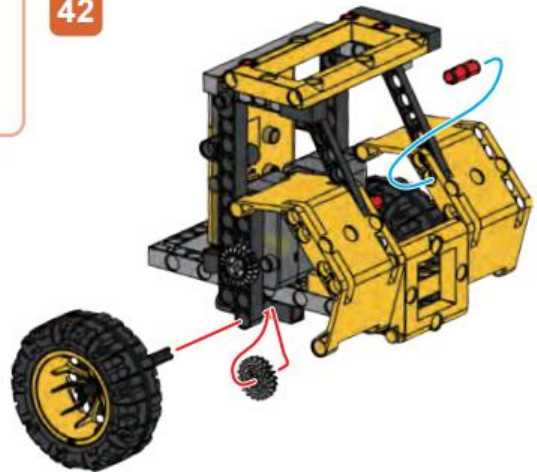
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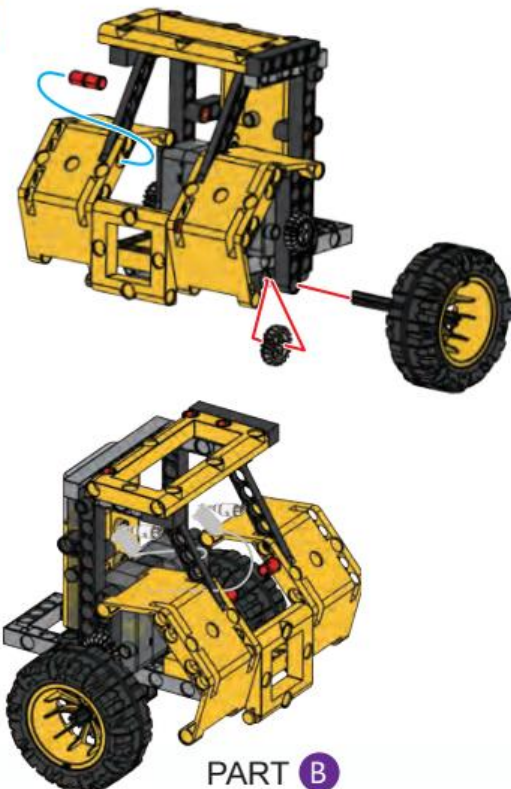
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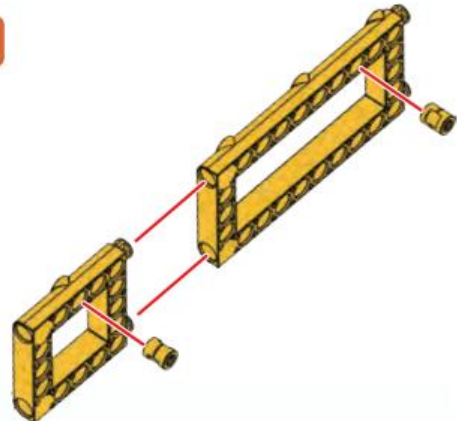
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41



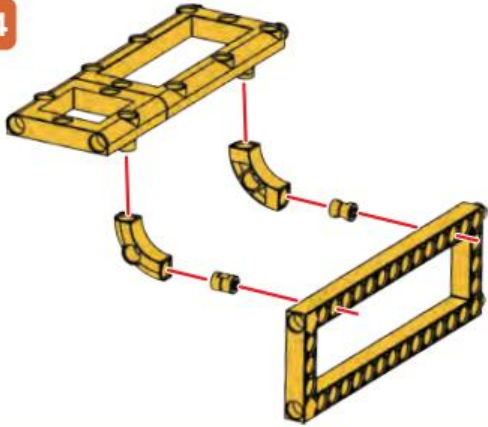
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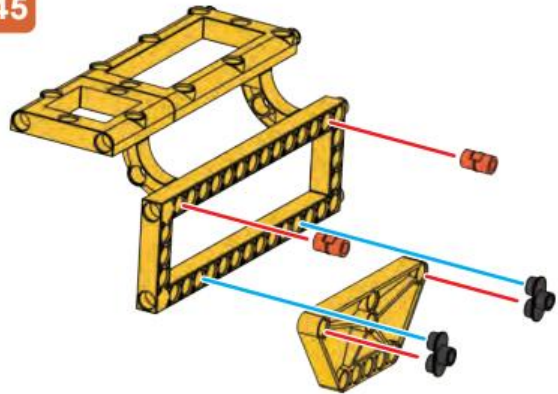


Dump Truck Model 3

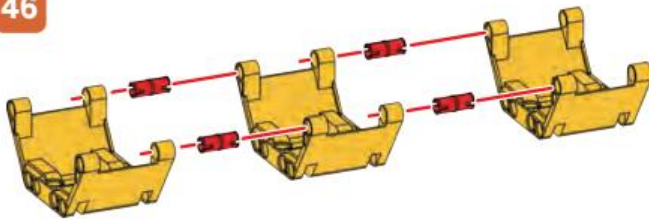
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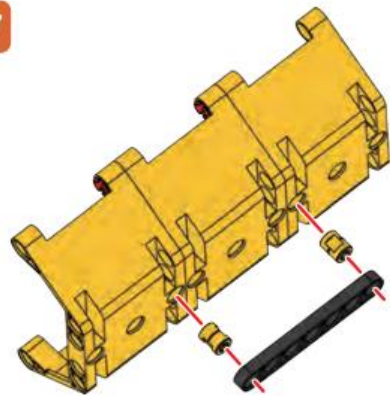
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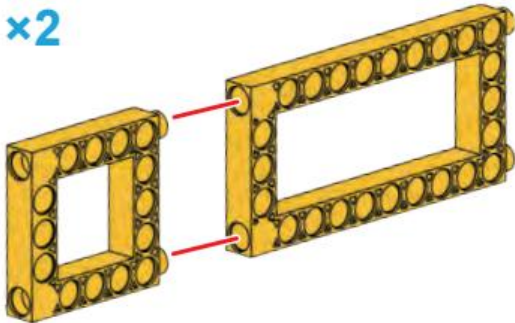
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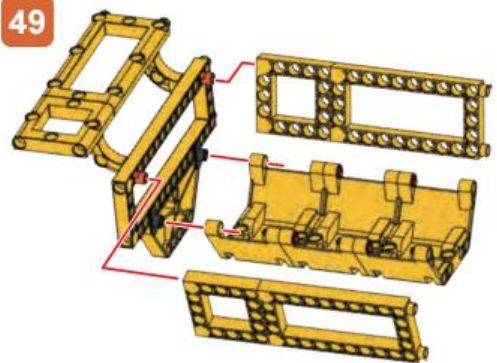
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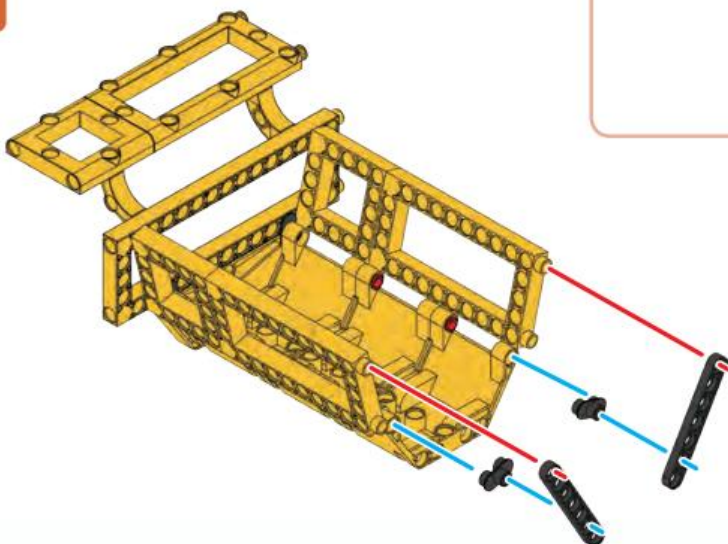
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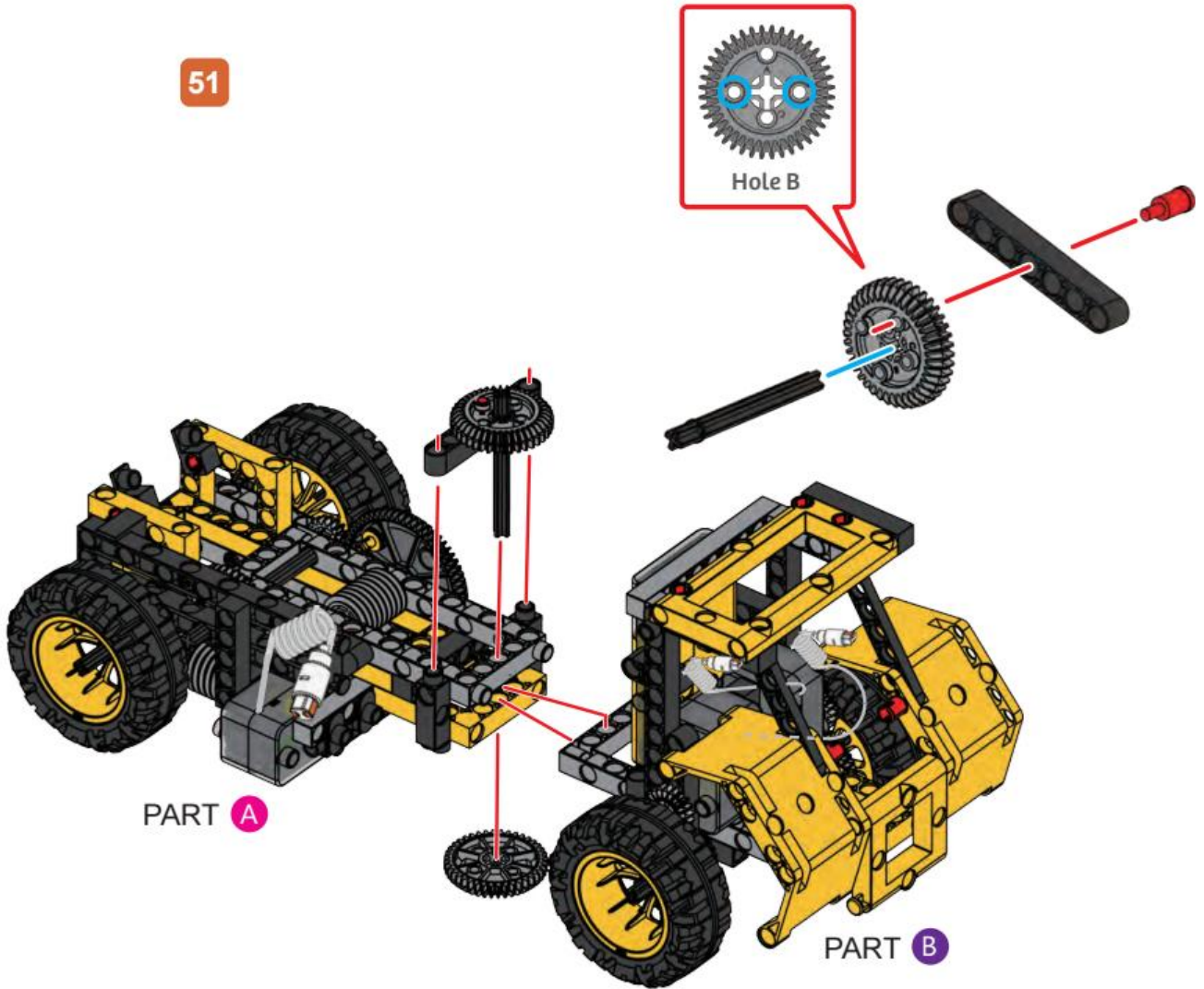


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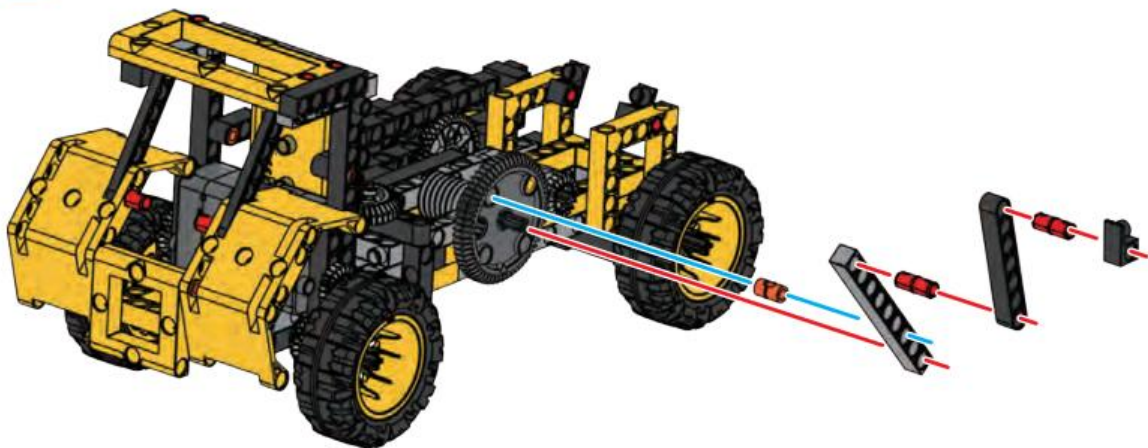


PART C

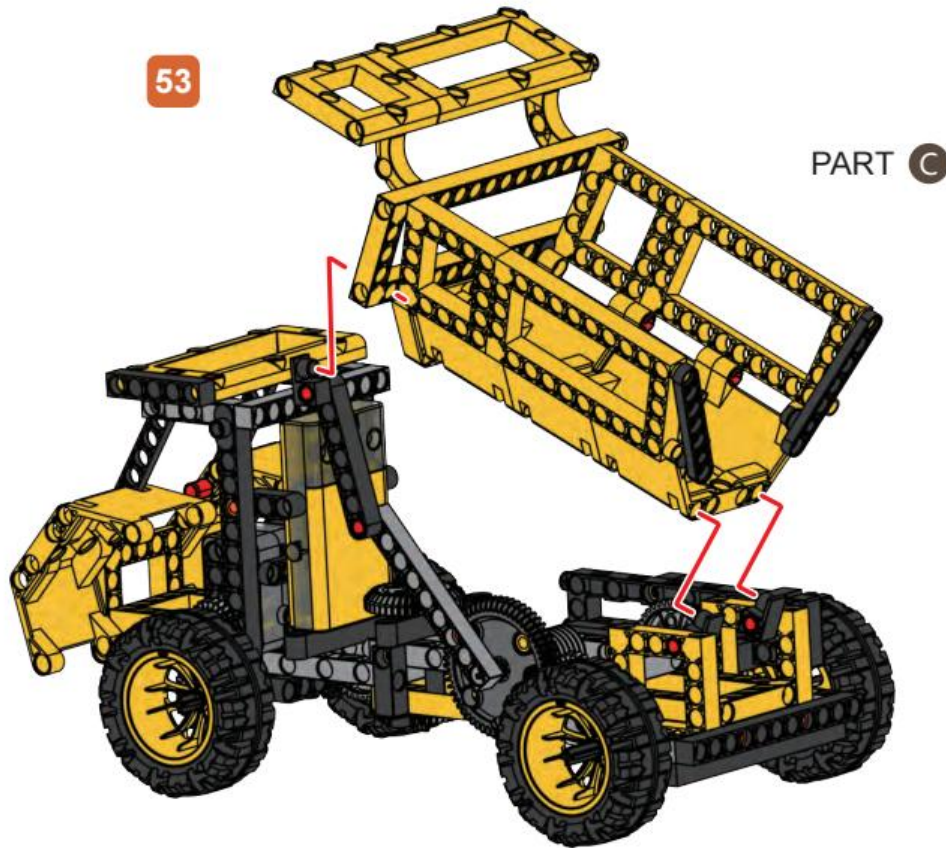
51



52



Dump Truck Model 3



EXPERIMENT 3

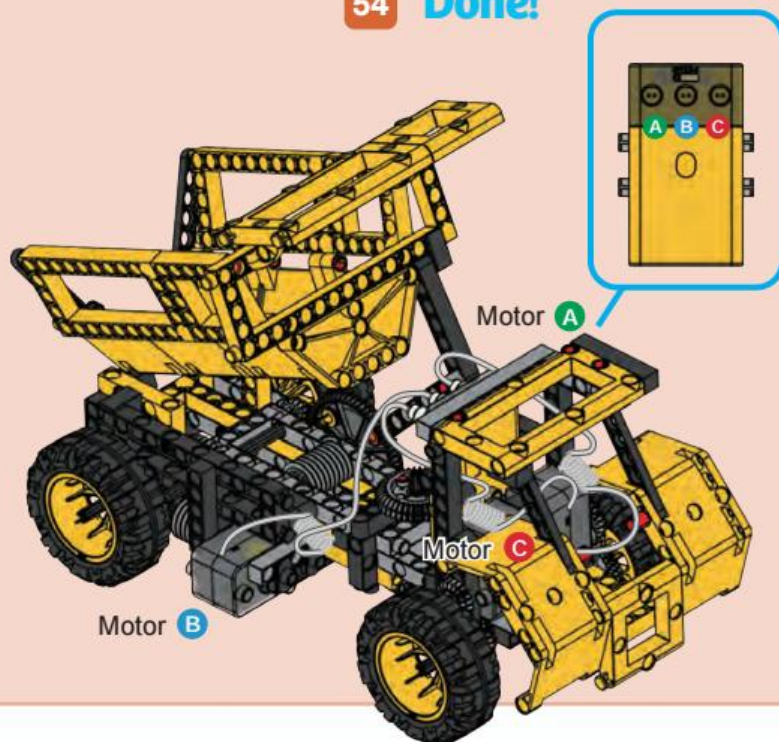
Hauling cargo

HERE'S HOW

Put a light object, such as an empty water bottle, into the dump truck bed. How well does the model drive around?

Now, fill the truck bed with heavier objects, such as several full bottles of water, and then try to drive the model around. What happens to the speed of the dump truck?

54 Done!



CHECK IT OUT

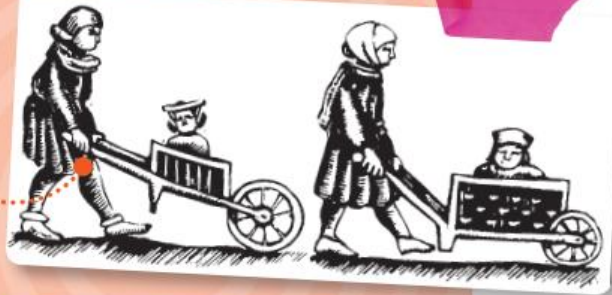


Work, Power, and Torque

These three important concepts from physics are very useful in measuring and comparing the ability of construction vehicles to perform their various tasks.

WORK

As explained on page 14, the output of a simple machine is a force that is used to do work. But what is work? The way that physicists define work is different from the common usage of the word. In physics, **work** is done when a force applied to an object causes the object to move. For example, if you are holding a bottle of water straight out in front of you, you are not actually performing work even though gravity is acting on the bottle and it may become difficult to keep your arm stretched out after a while. But if you lift the bottle up, then you are performing work, because you are moving the bottle against the force of gravity.



POWER

Why is it harder to carry a heavy box while you are running up a flight of stairs than it is while you are walking up the same flight of stairs? It is because it requires more power to move the box when you are running. **Power** in physics means the amount of work that is done over time.

You may have heard the term **horsepower** used to describe a construction vehicle. In the late 1700s, the Scottish engineer James Watt wanted a way to compare the amount of power that a steam engine could produce with that of a draft horse. Watt found that a horse could lift about 33,000 pounds of coal a distance of one foot in one minute. Thus, Watt set one horsepower equal to 33,000 foot-pounds per minute. A normal person can exert about 0.1 horsepower, while a backhoe can exert 50 or more horsepower.



TORQUE

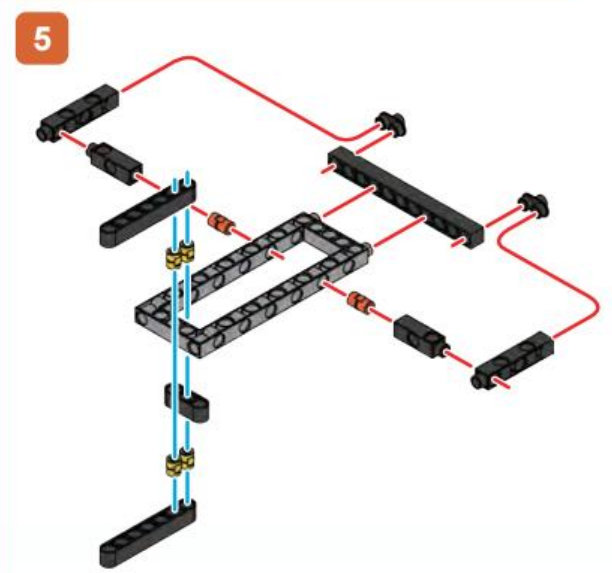
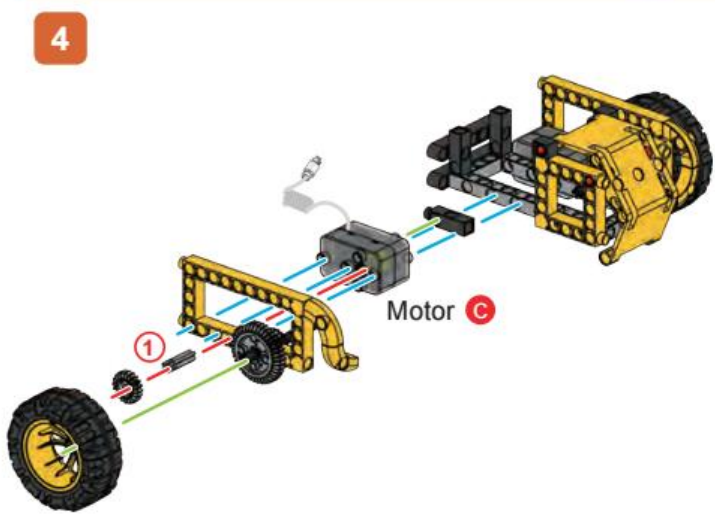
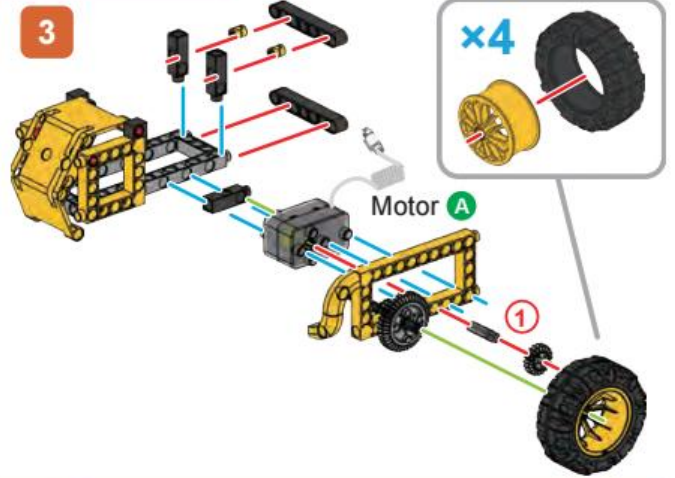
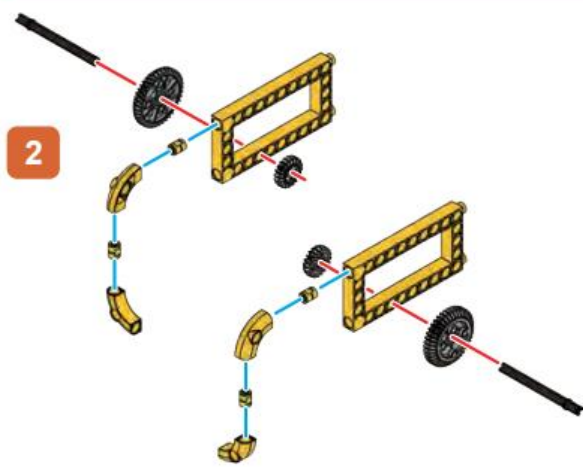
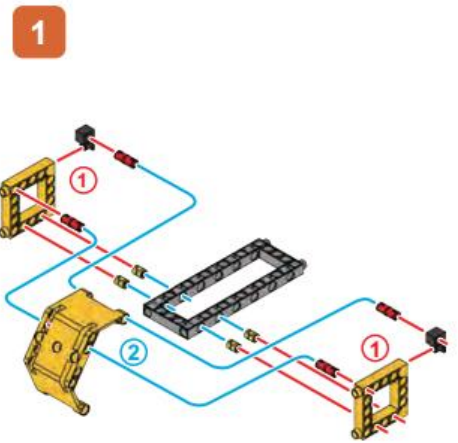
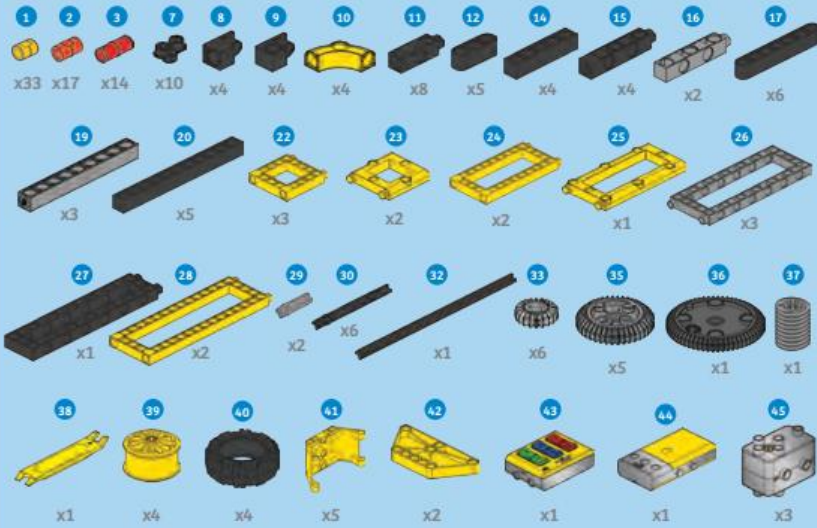
Torque is a measure of the force applied to an object that causes the object to turn around an axis, such as when you are turning a wrench. The torque of a vehicle is a measure of how hard the engine can turn the wheels. Construction vehicles like backhoes are designed to yield a high amount of torque at slow speeds. A higher torque allows them to move around on soil that a car would normally get stuck in, and helps with performing their tasks such as plowing a field or lifting heavy rocks.





Concrete Mixer Model 4

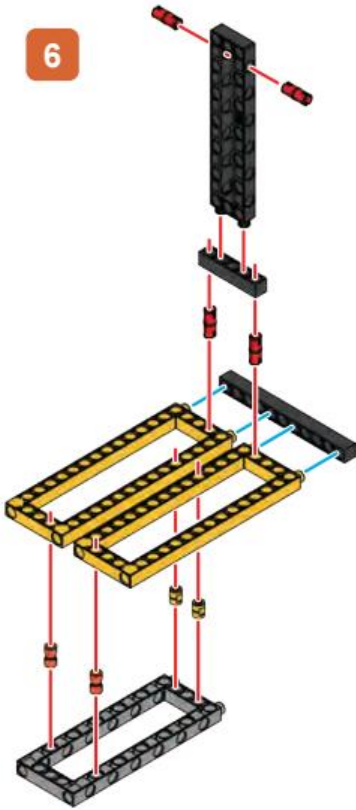
Parts Needed



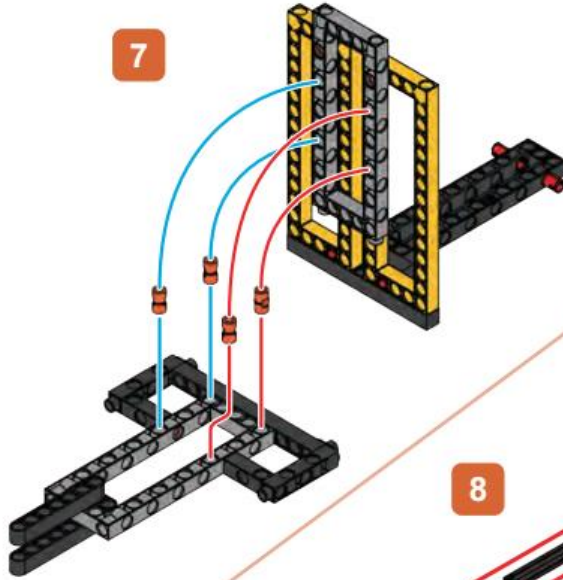
CONCRETE MIXER

Model 4 Concrete Mixer

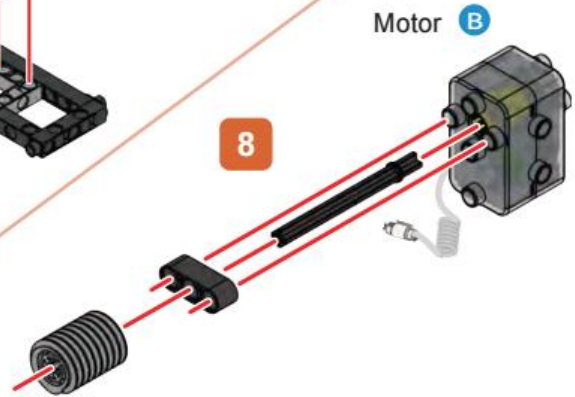
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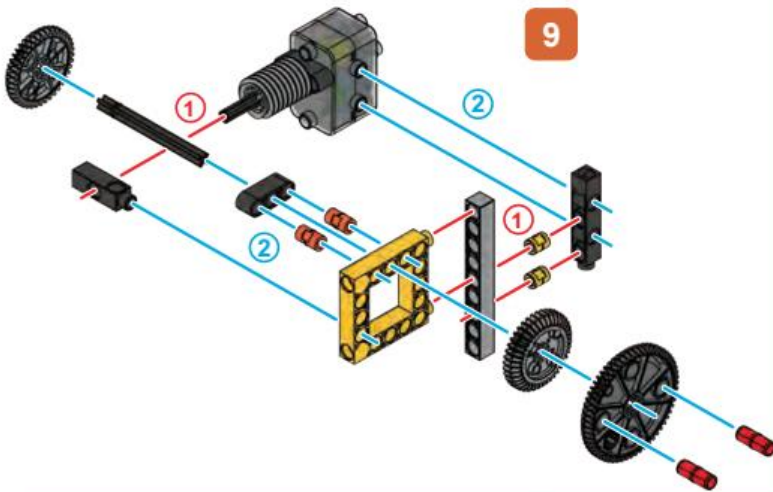
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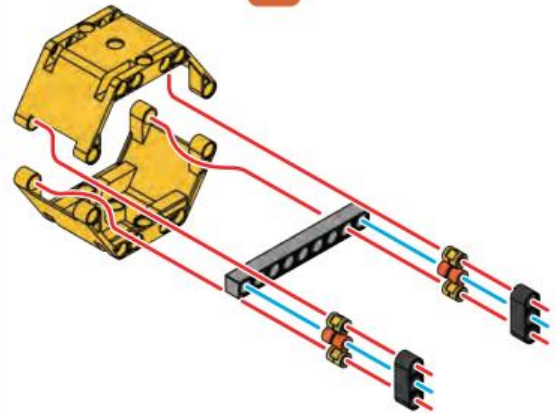
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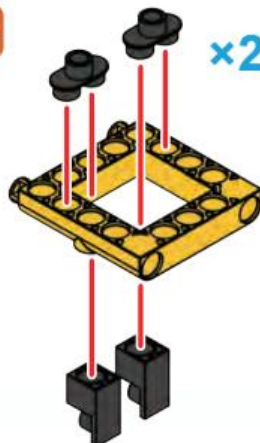
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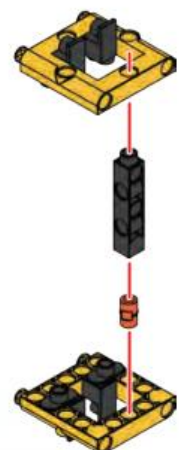
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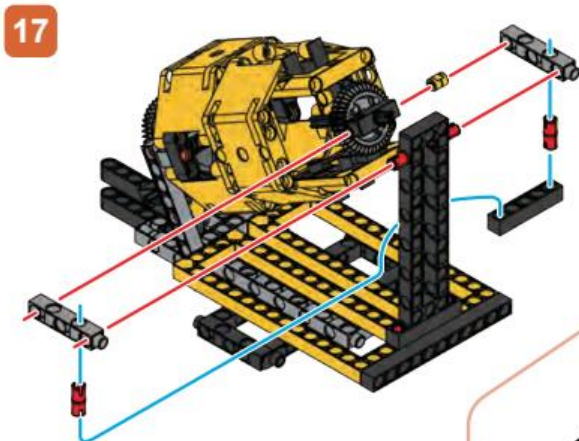
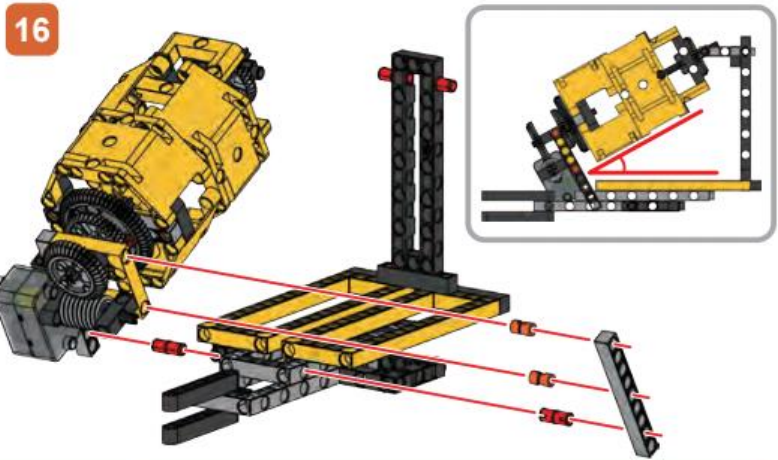
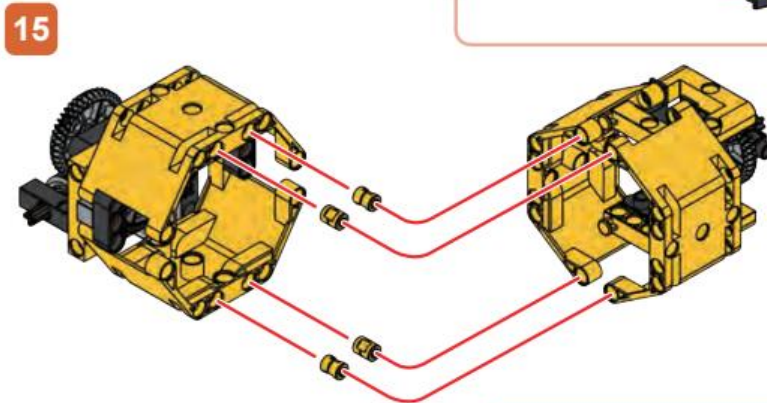
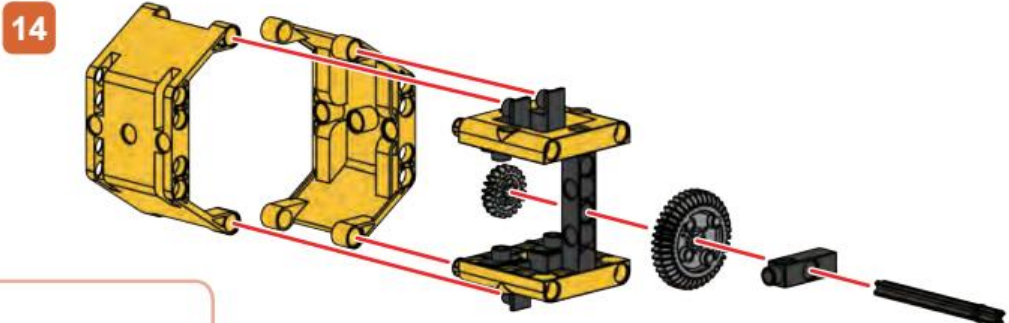
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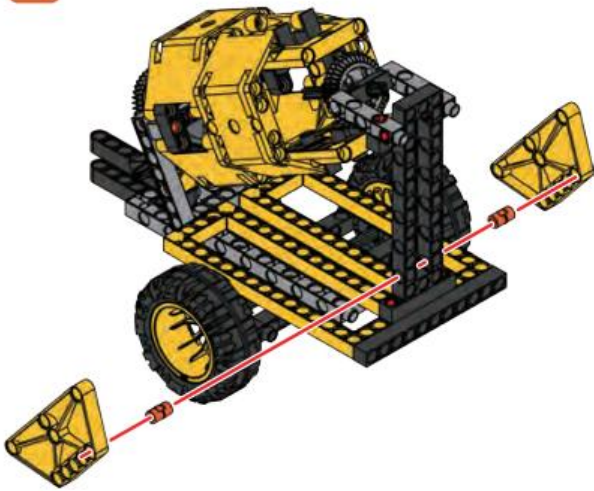
Concrete Mixer Model 4



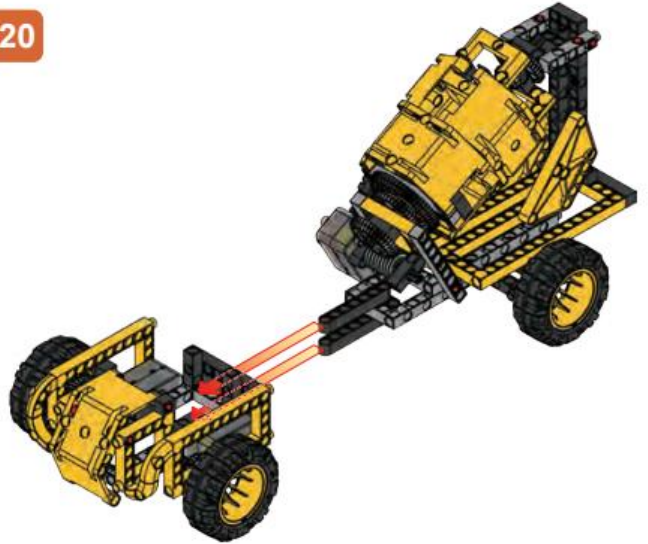
CONCRETE MIXER

Model 4 Concrete Mixer

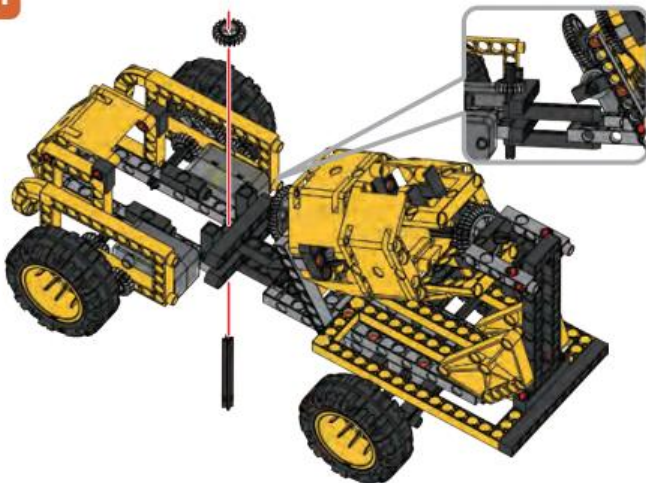
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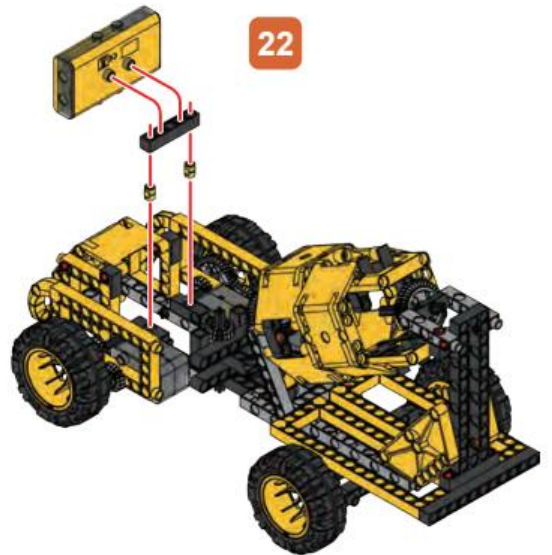
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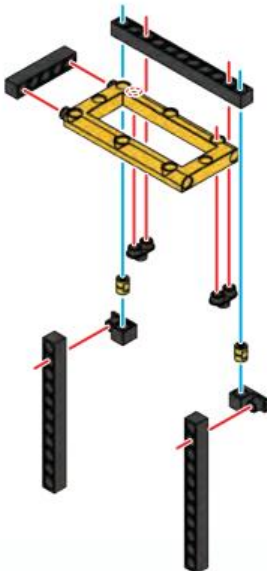
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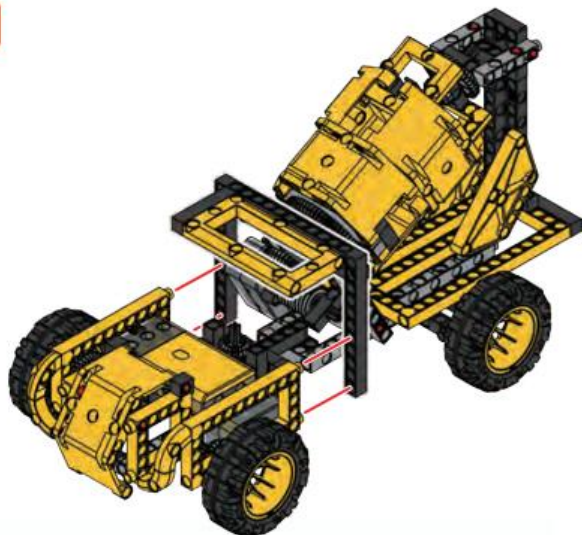
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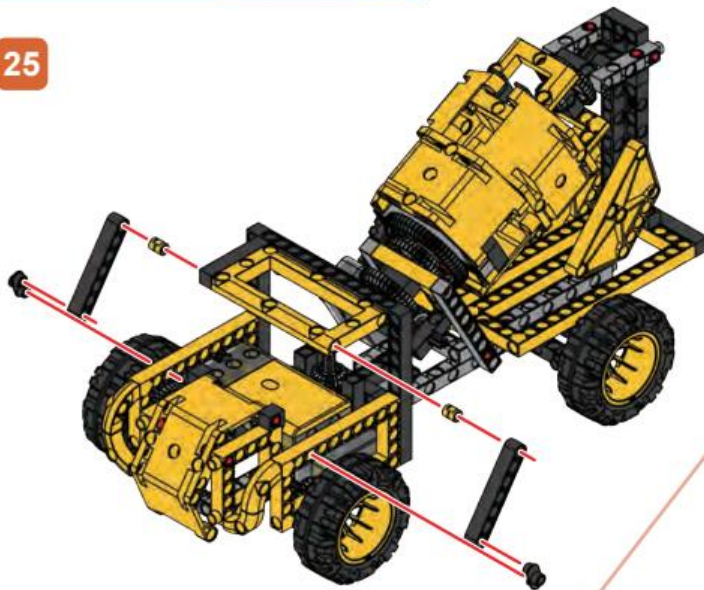


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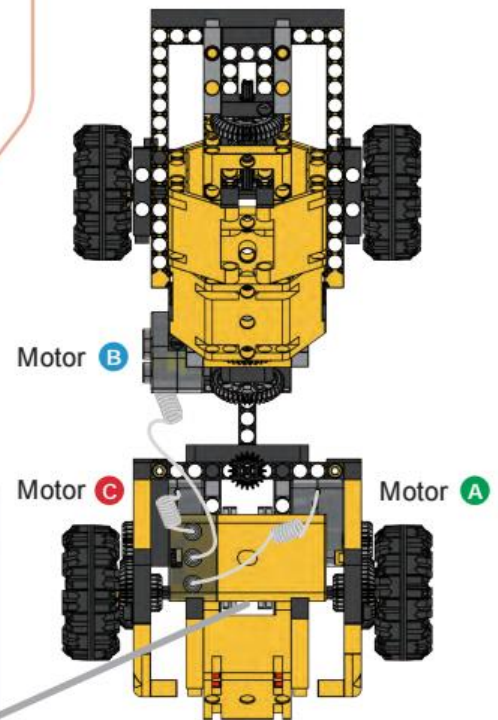


Concrete Mixer Model 4

25



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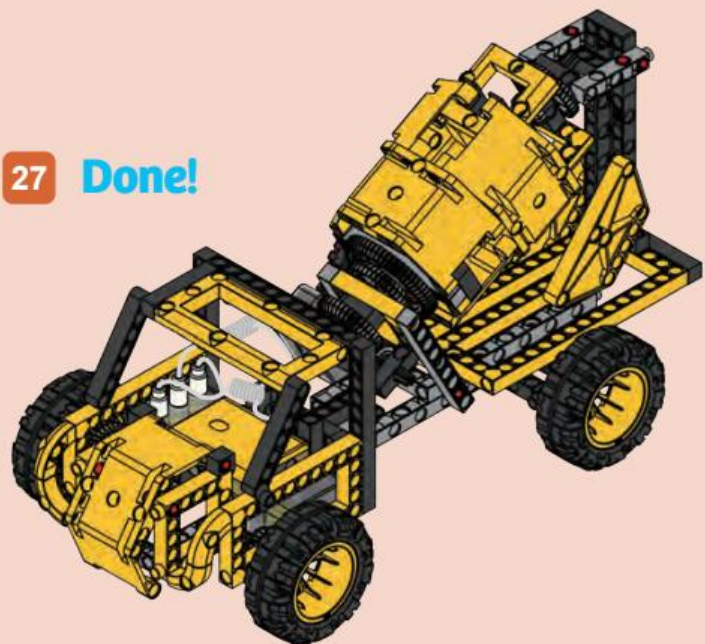
EXPERIMENT 4

Measuring RPMs

HERE'S HOW

Using a stopwatch or timer, count the number of times the drum of the concrete mixer rotates completely around in one minute. This number describes how fast the drum is rotating in the units of revolutions per minute (RPM).

27 Done!



CHECK IT OUT

Concrete and Cement

On this page, you can learn about two of the most important building materials that are manipulated by heavy construction equipment.

CONCRETE TRANSPORT

Concrete transport trucks are made to transport and mix concrete while the vehicle is traveling to a construction site. They can be filled with dry materials and water, or concrete that has already been mixed at a plant. The concrete mixing truck keeps the concrete liquid by continuously mixing the concrete in the rotating drum.



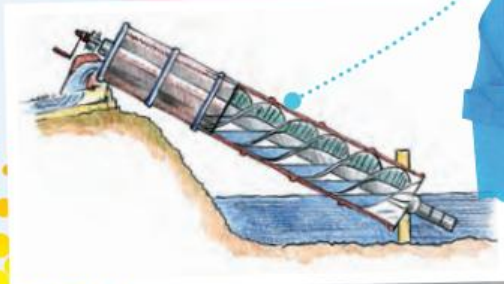
CEMENT

Cement binds materials together to form one cohesive material. There are two categories of cement: **hydraulic** and **non-hydraulic cement**. Non-hydraulic cement will not set under wet or underwater conditions because it needs to react with carbon dioxide in the air to harden. However, hydraulic cement can set in water, because the cement reacts with water, forming **mineral hydrates** that don't dissolve well in water. The most common type of cement is a non-hydraulic cement called Portland Cement.



THE SCREW

Inside the drum of a concrete transport truck is a spiral blade that when rotated one way, pushes the liquid concrete deeper into the drum. But, when the drum is rotated in the opposite direction, it pushes the concrete out of the drum. The blade acts like an **Archimedes' screw**. A screw is just an inclined plane that has been twisted around an axis!



CONCRETE

Concrete is a mixture of a "coarse aggregate," water, and cement that hardens over time. The aggregate portion is made of large chunks of materials, generally gravel along with finer materials such as sand.



REINFORCED CONCRETE

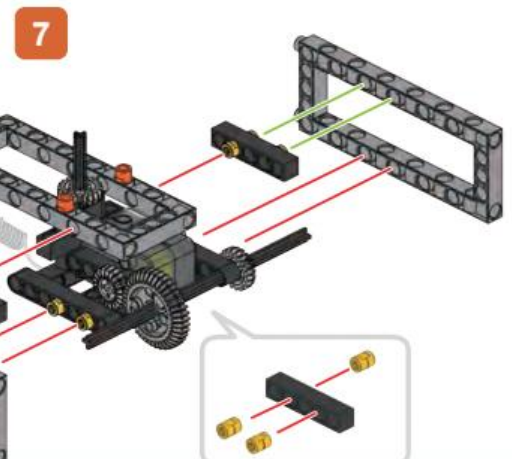
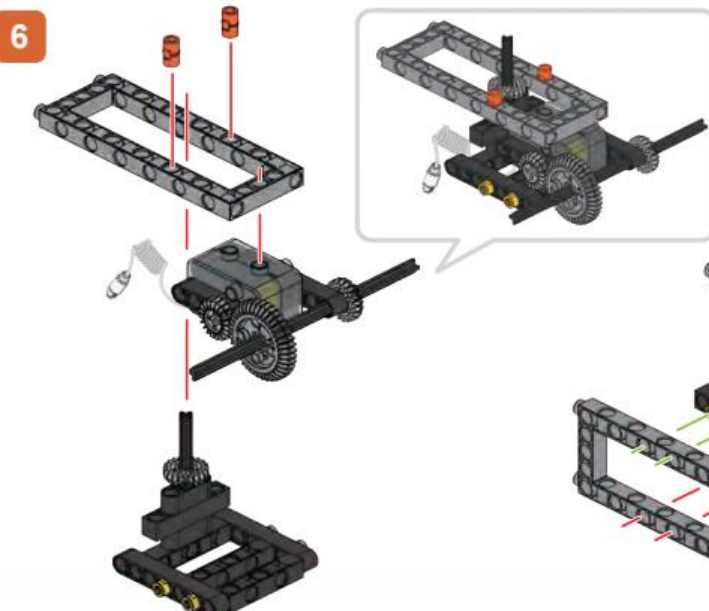
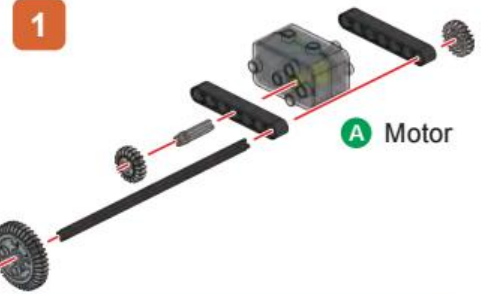
Most concrete is poured around reinforcing materials (such as reinforcing steel bars, or rebar) to increase its **tensile strength**, which is a measure of how well a material resists being pulled apart. Concrete has a relatively high **compressive strength**, which is a measure of how well a material resists being squished or compressed. Buildings and structures experience both tension and compression, which is why concrete often needs to be reinforced with metal bars.



Crane Model 5

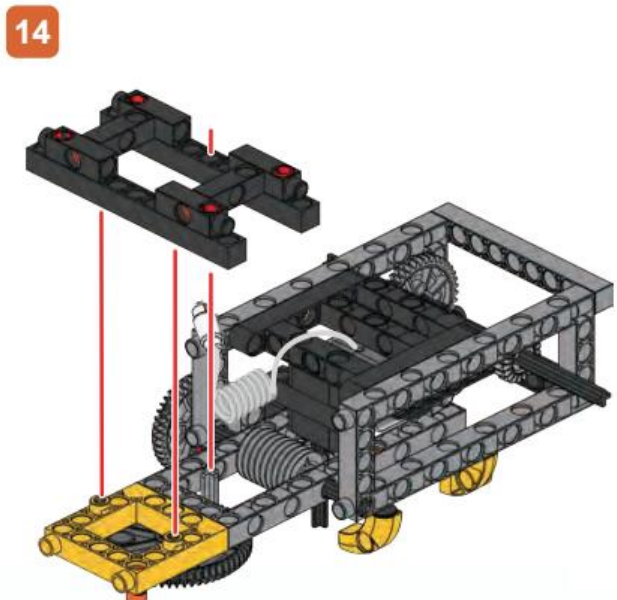
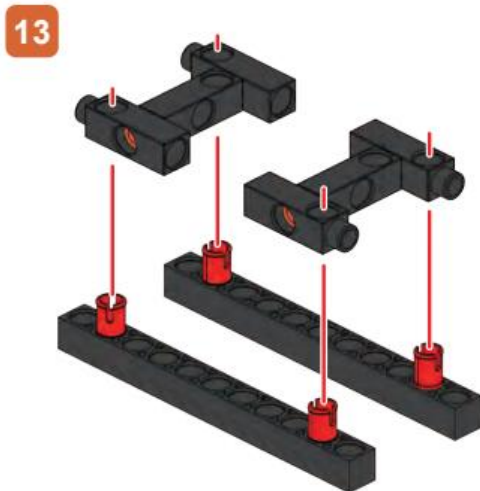
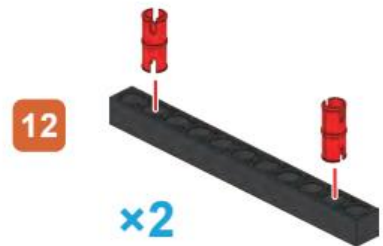
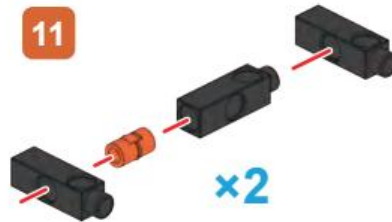
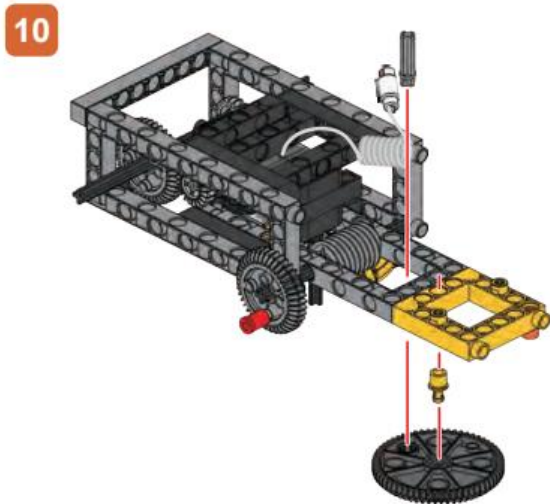
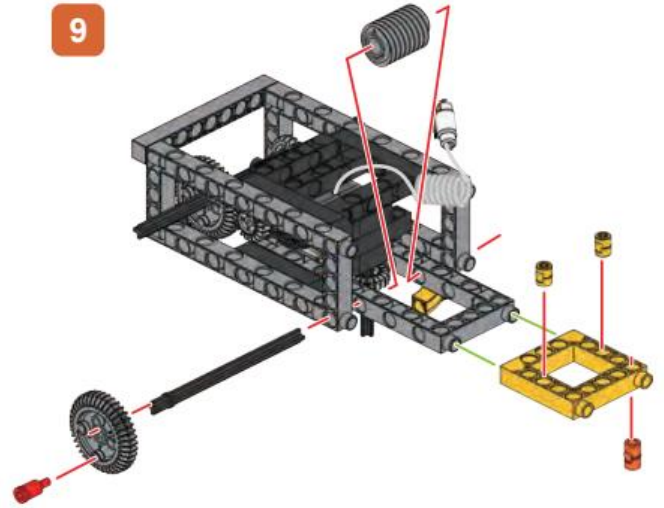
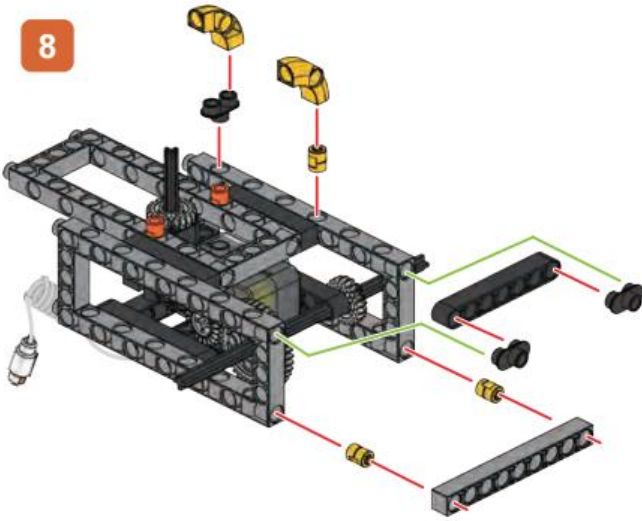
Parts Needed

1	2	3	4	5	7	8	9	10	11	12	13	14	15
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16	17	18	19	20	21	22	23	24					
x4	x8	x7	x3	x4	x1	x6	x2	x1					
25	26	27	28	29	30	31	32						
x2	x3	x2	x2	x3	x6	x1	x1						
33	35	36	37	38	39	40	41	42					
x7	x6	x1	x2	x1	x4	x4	x1	x1					
43	44	45											
x1	x1	x3											



CRANE

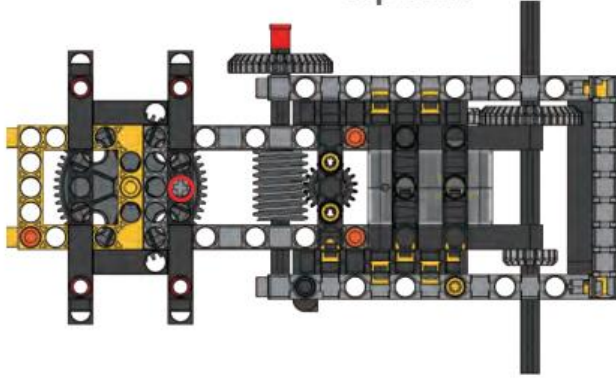
Model 5 Crane



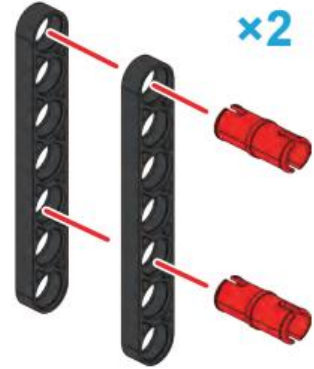


Crane Model 5

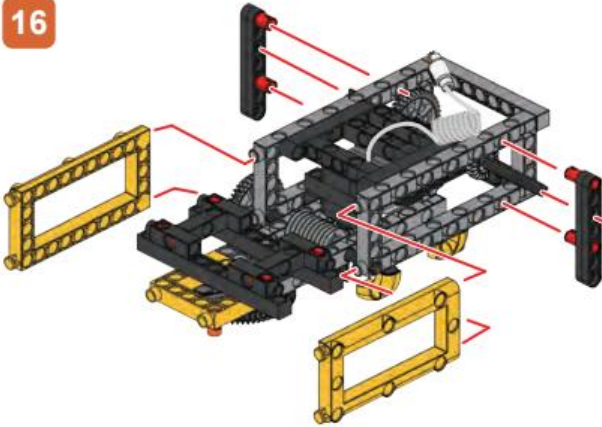
Top View



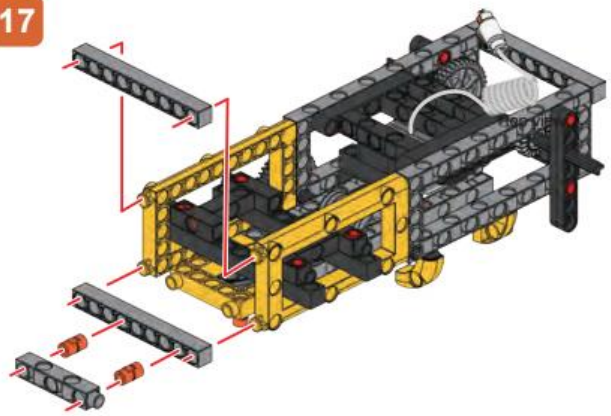
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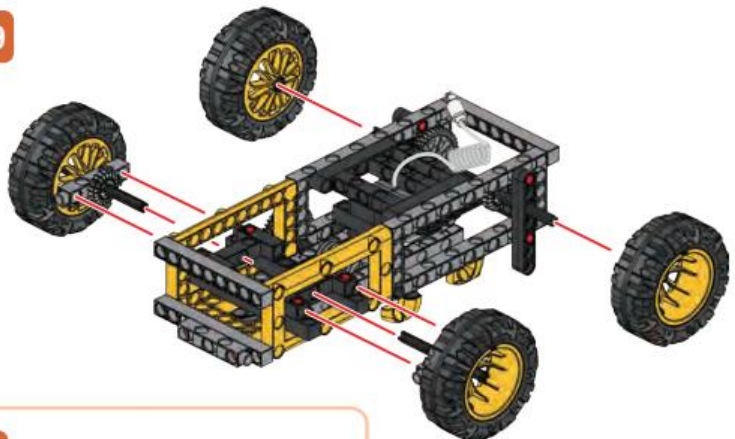
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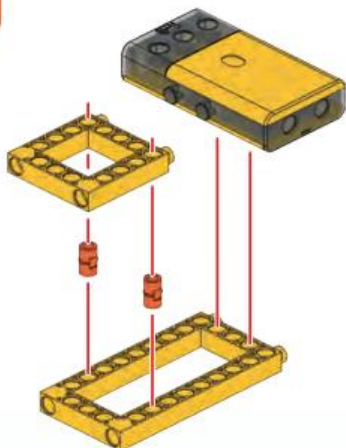
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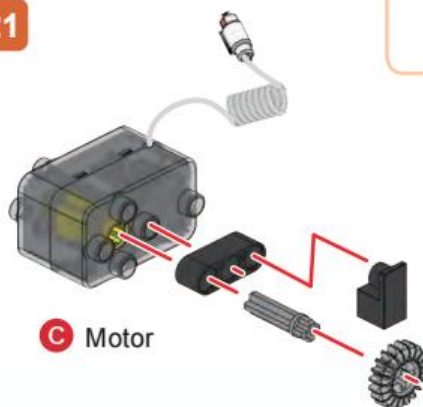
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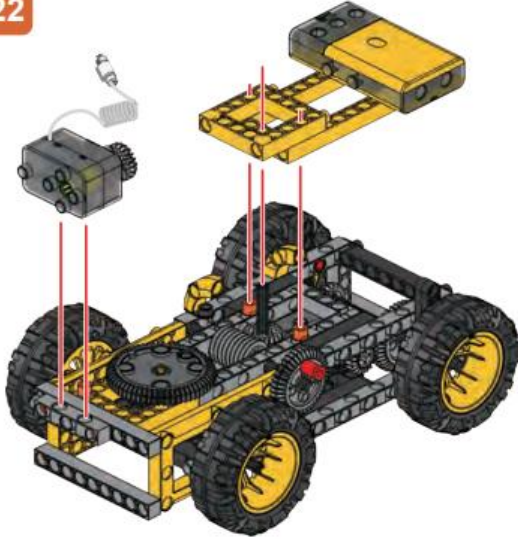
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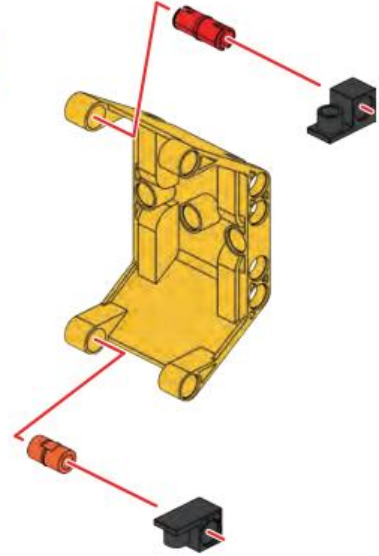
CRANE

Model 5 Crane

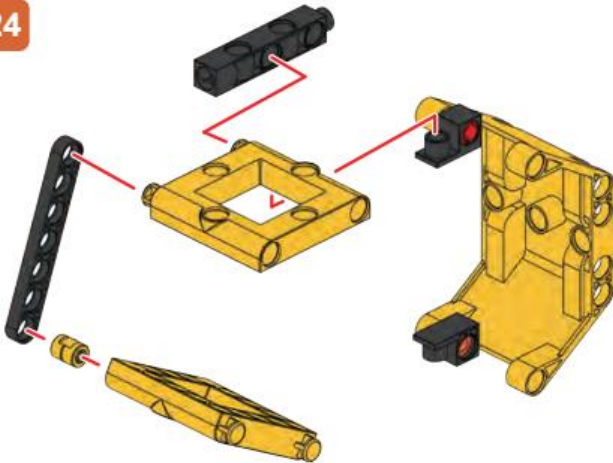
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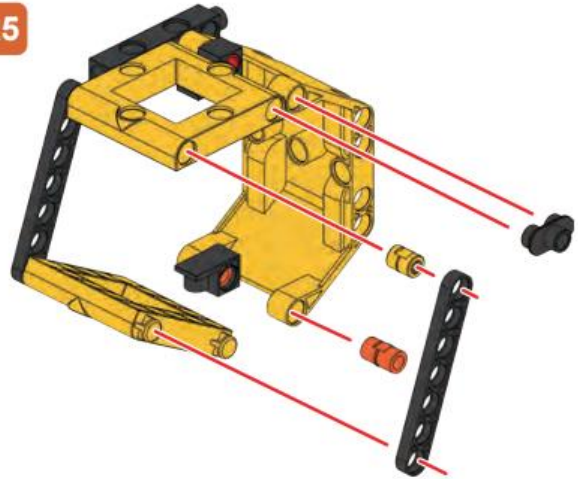
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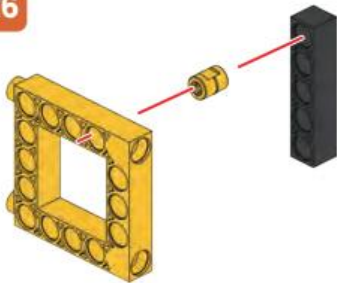
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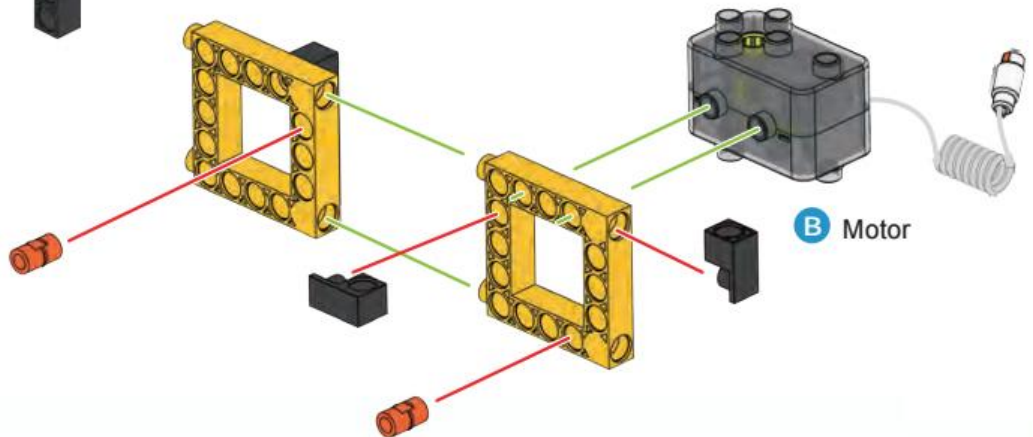
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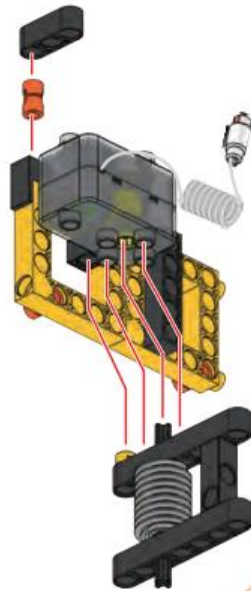


Crane Model 5

28



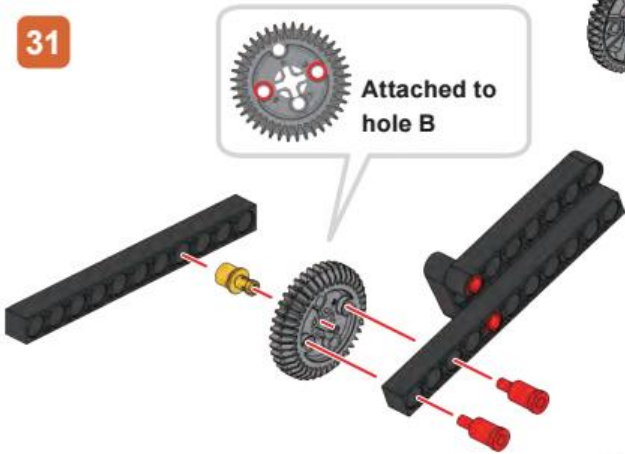
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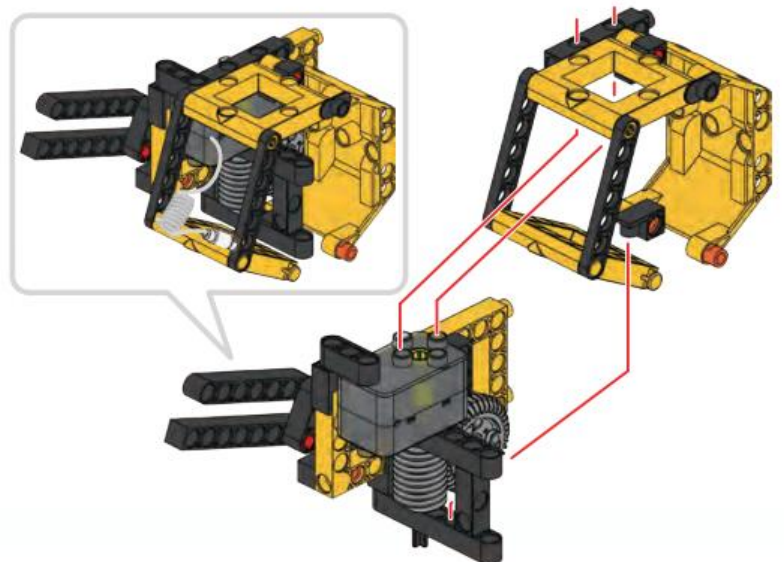
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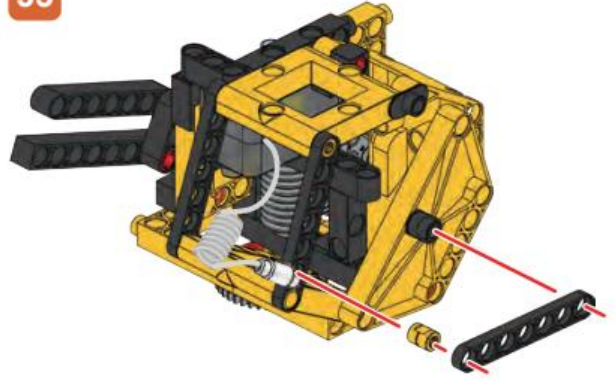
CRANE

Model 5 Crane

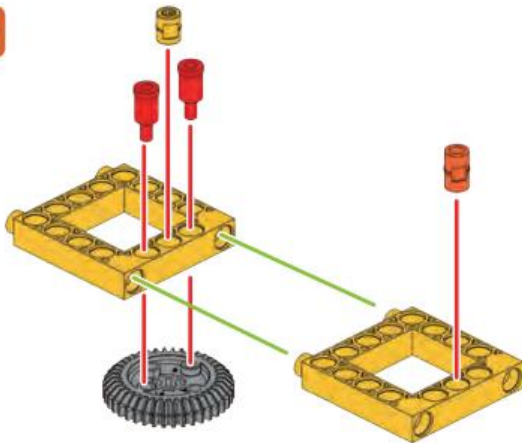
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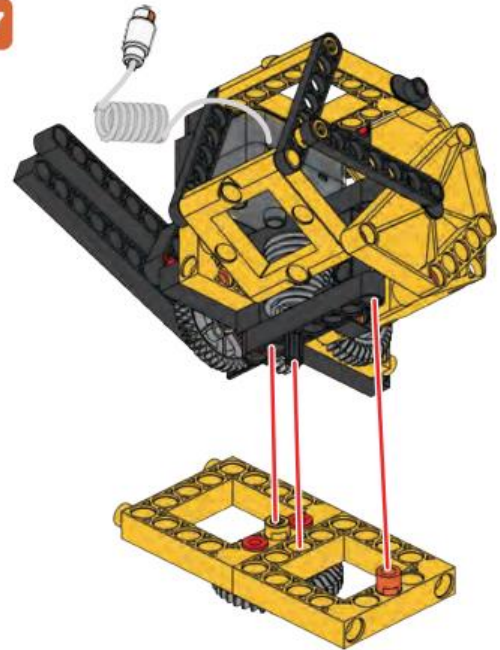
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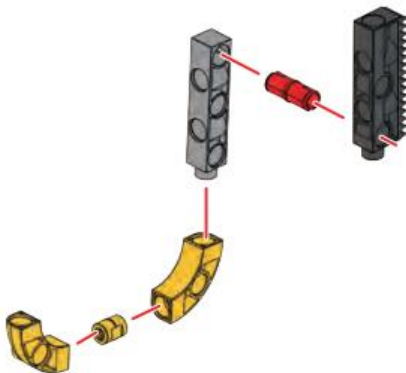
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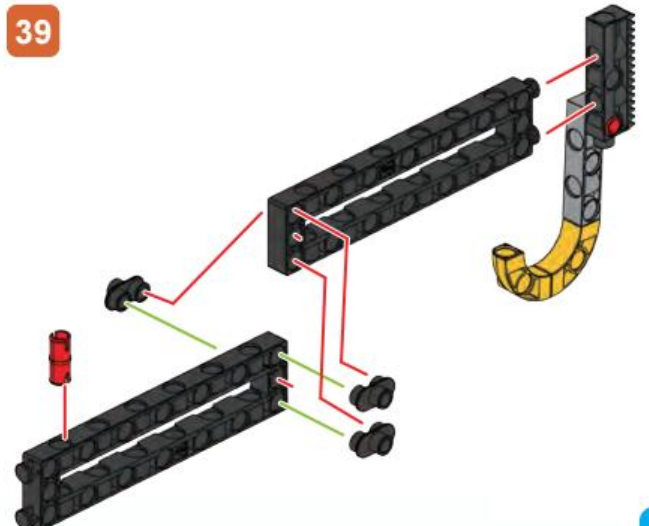
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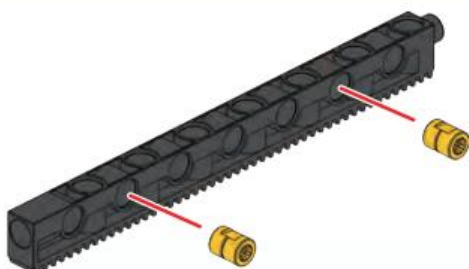
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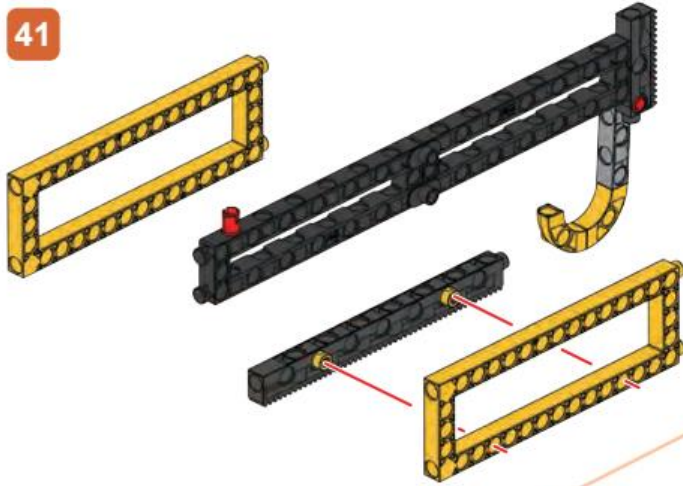


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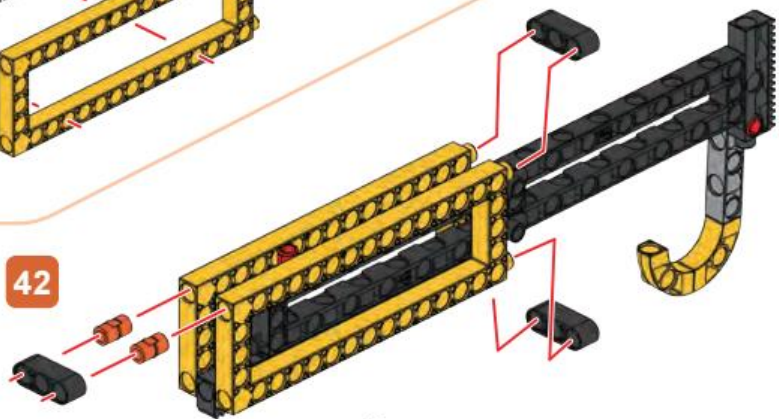


Crane Model 5

41



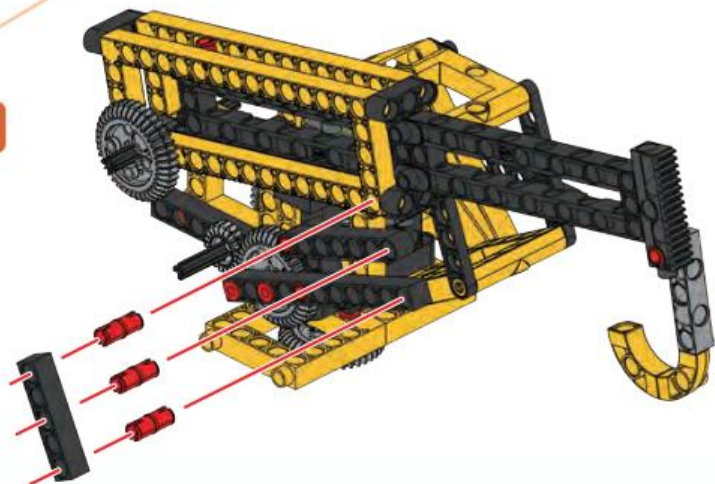
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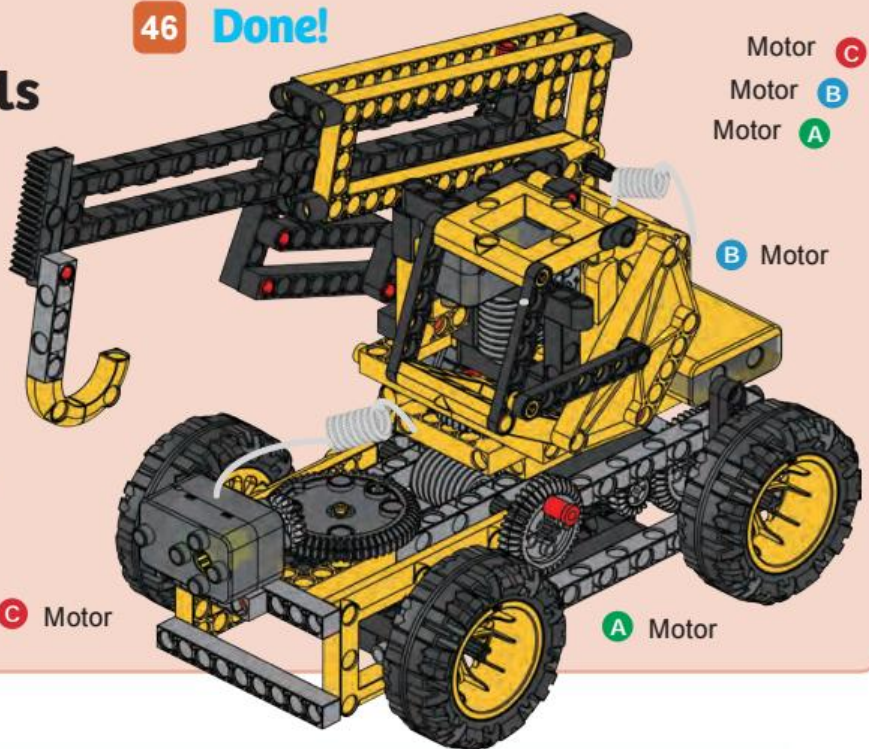
EXPERIMENT 5

46 Done!

Lifting materials

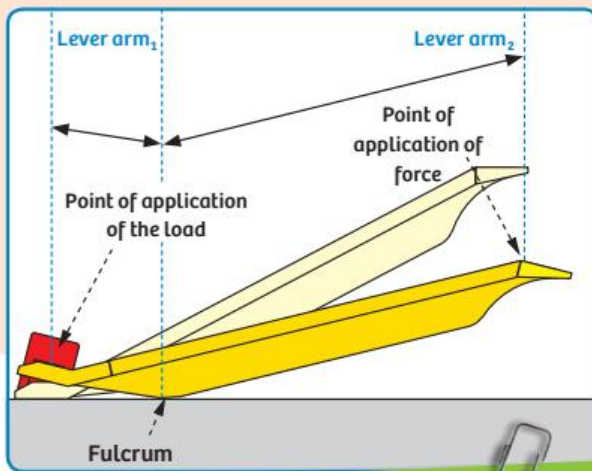
HERE'S HOW

Try lifting a light object like an empty water bottle. You can tie a string around the neck of the water bottle to lift it with the hook. Then try lifting a slightly heavier object, like a half-full water bottle. What do you notice?



Levers and Pulleys

Cranes are often equipped with **pulleys** and cables that are used to lift and lower materials and move them horizontally. The pulleys in a crane minimize the amount of work needed to lift the object off the ground. In order to lift large loads, a crane must also have a counter balancing load, so that the crane does not tip over. The load and balancing load act as a **lever**.



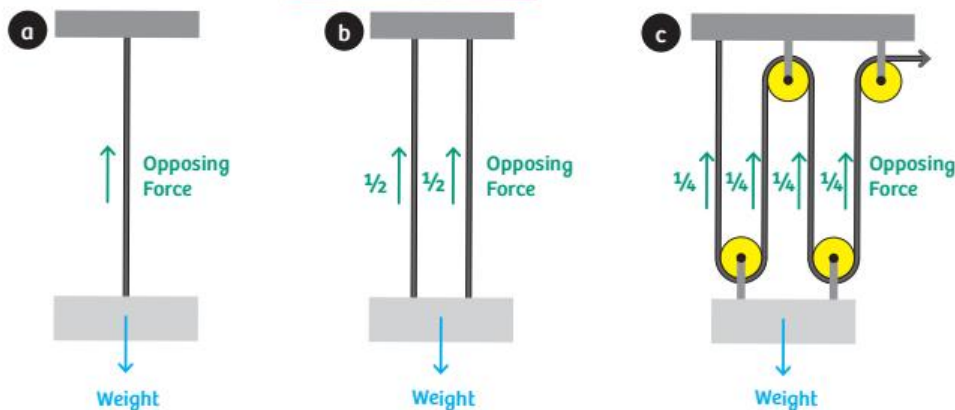
LEVER

One lever you are already familiar with is the **peg remover**! A lever consists of a rigid beam which is pivoted at a fulcrum. A lever amplifies the input force (effort) to provide a greater output force on the load. The mechanical advantage of a lever depends on the sizes of the effort and load, and their distances from the fulcrum.

PULLEY

A pulley is wheel on a fixed axle that is designed to support the movement of a cable, rope, belt, or chain. Pulleys are used to change the direction of a force or decrease the effort needed to lift a load.

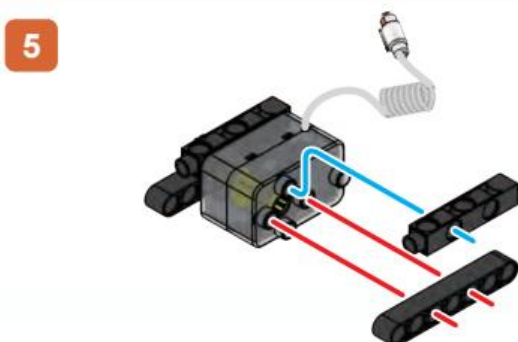
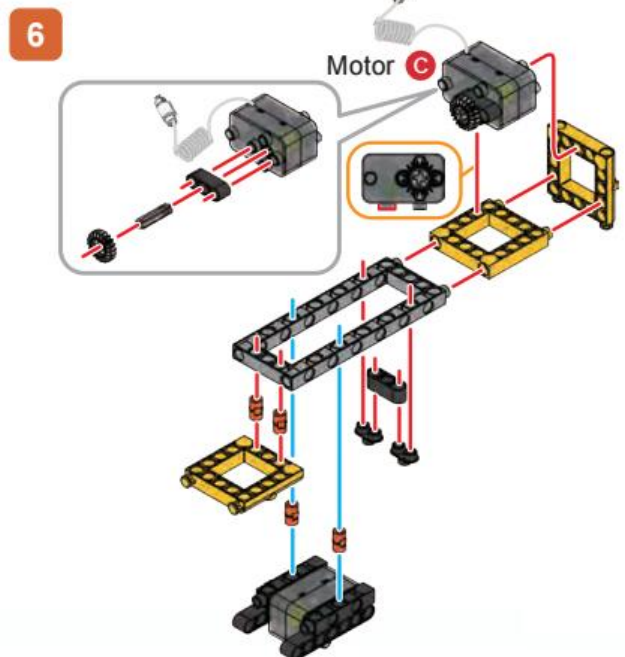
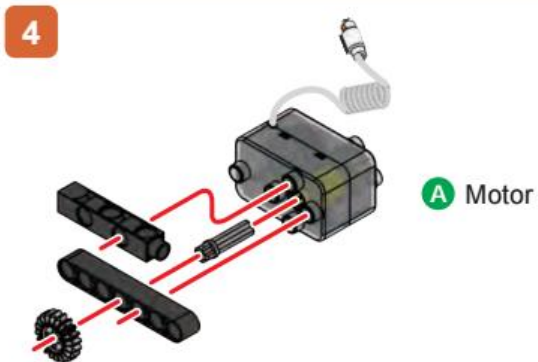
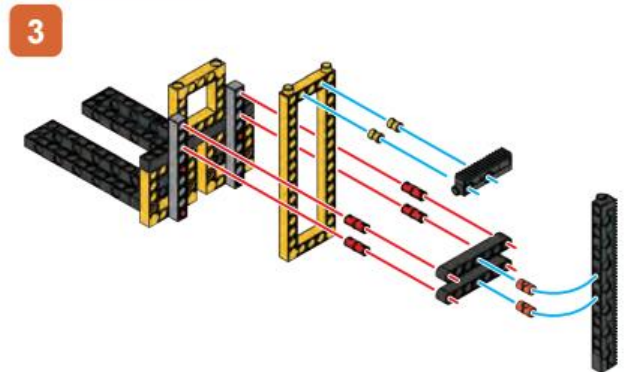
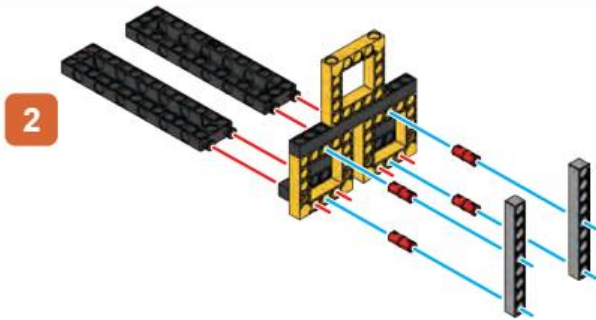
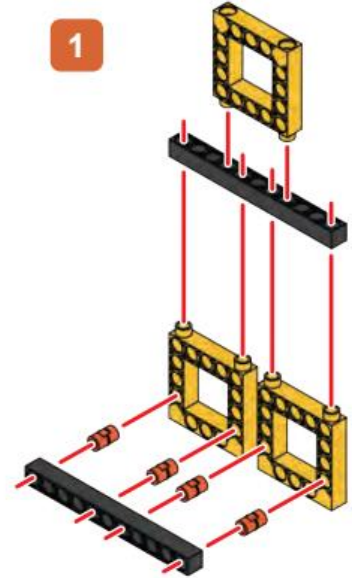
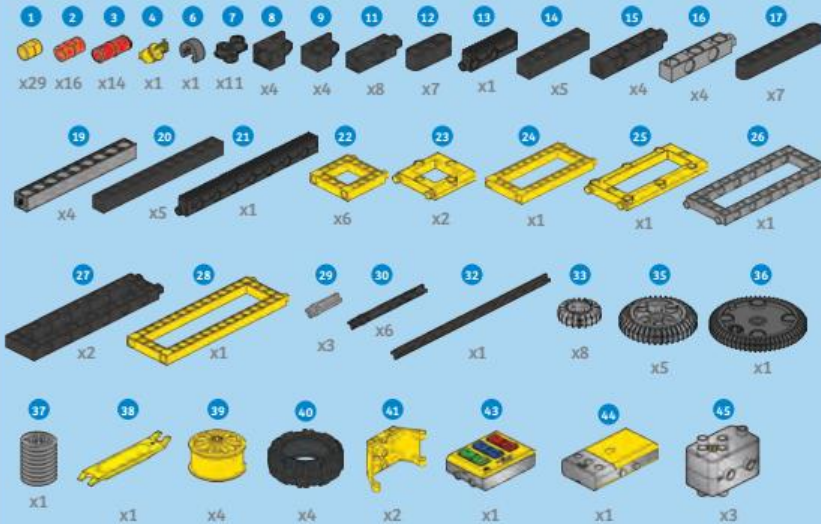
If you hang an object by one string (a), that string has to support all of the weight of the object. But if use more than one string (b), the weight is split evenly between the two strings. This is how pulleys make lifting objects easier (c).



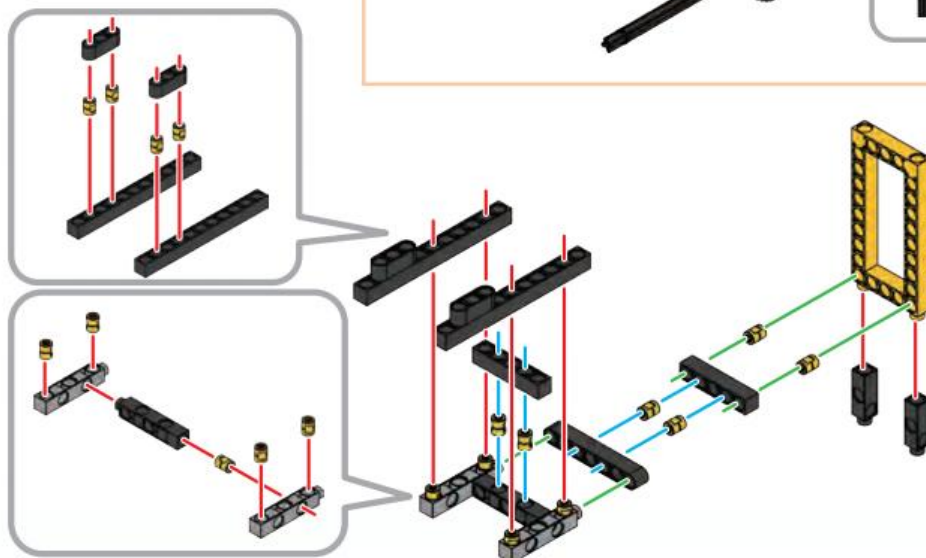
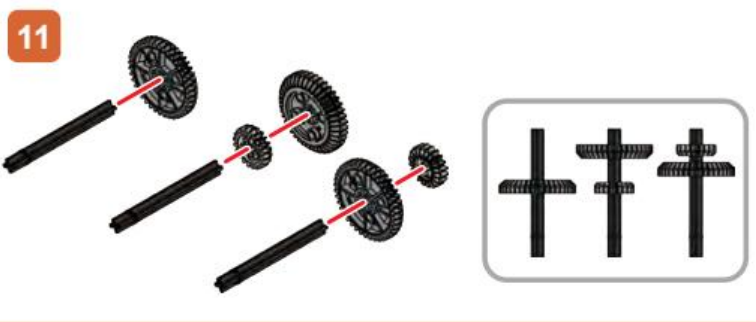
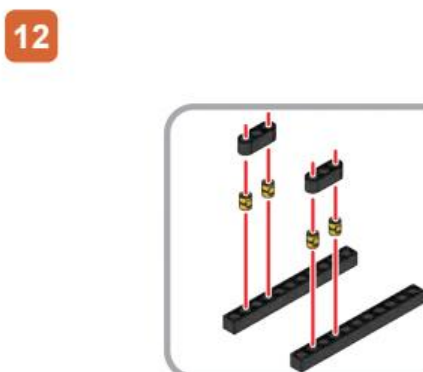
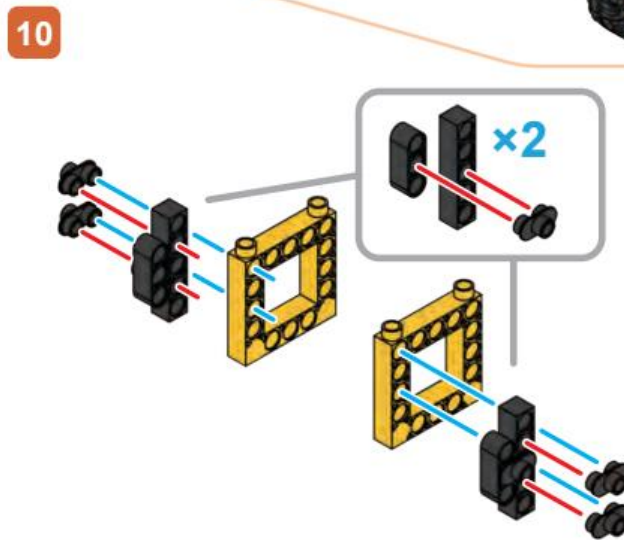
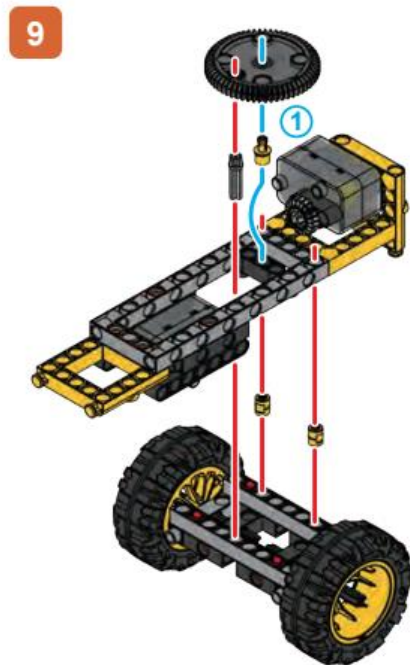
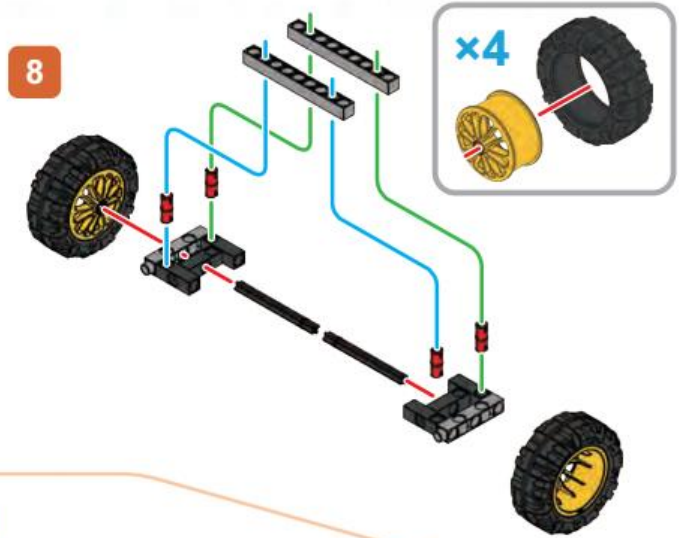
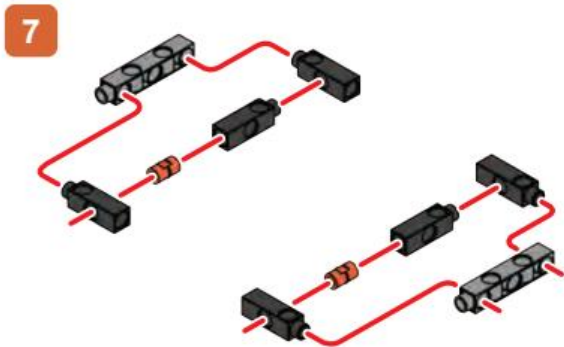
FORKLIFT

Model 6 Forklift

Parts Needed

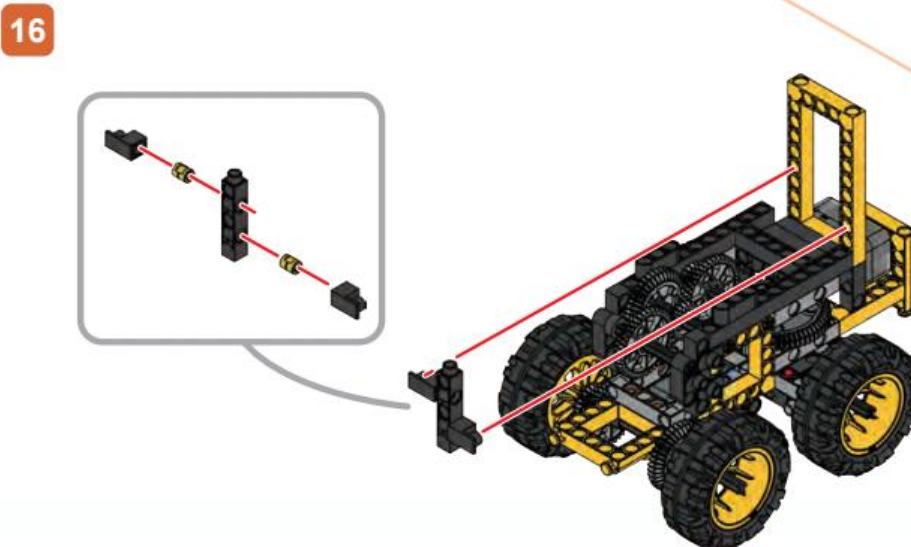
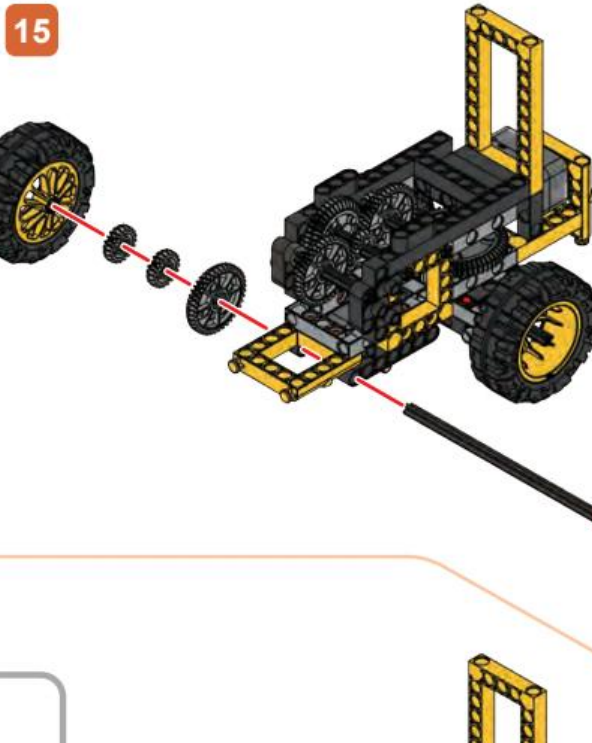
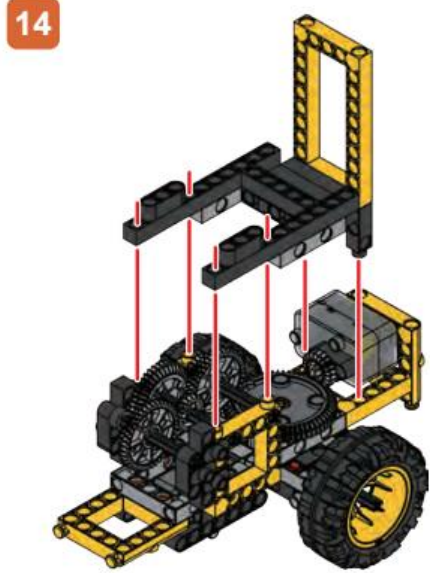
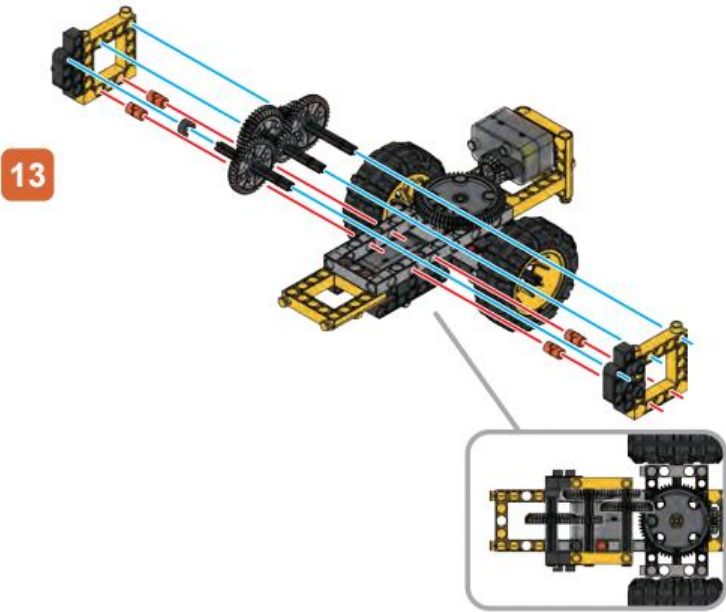


Forklift Model 6



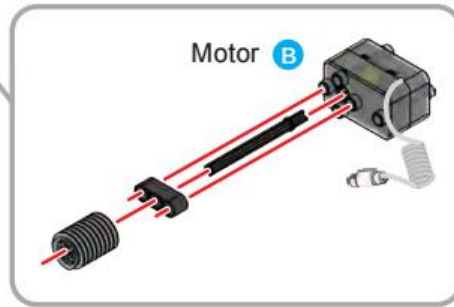
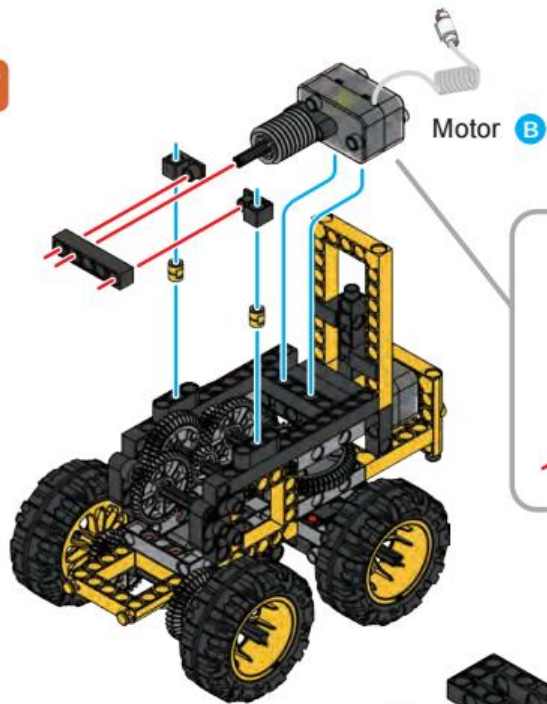
● ○ ○ FORKLIFT

Model 6 Forklift

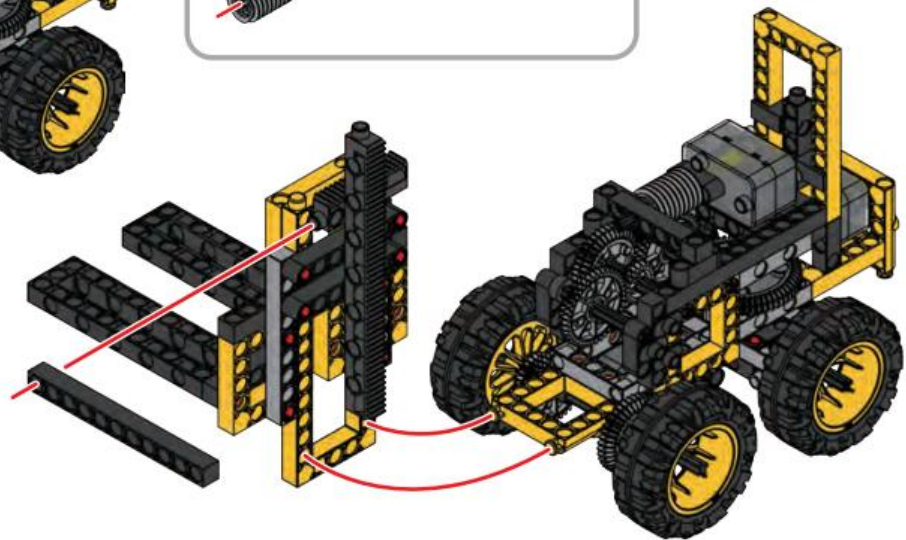


Forklift Model 6

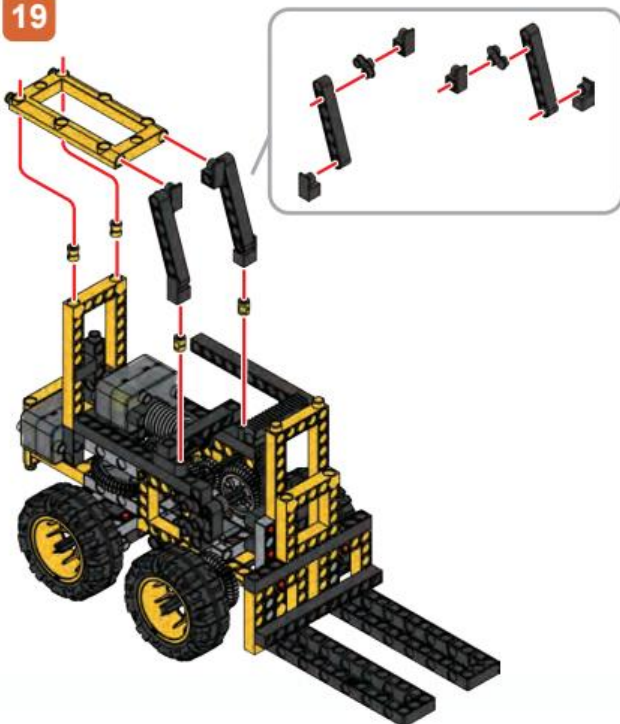
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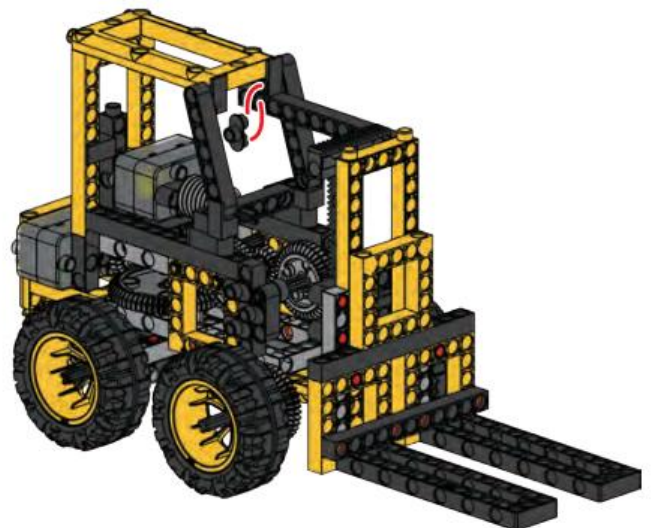
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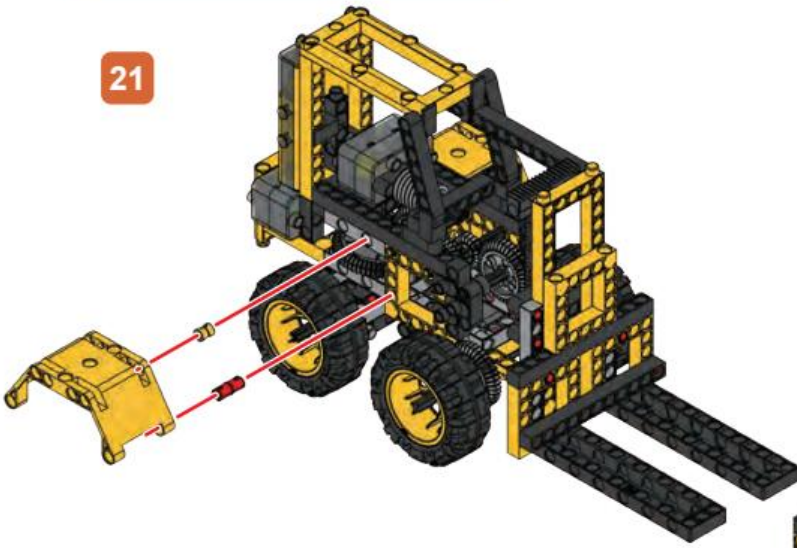
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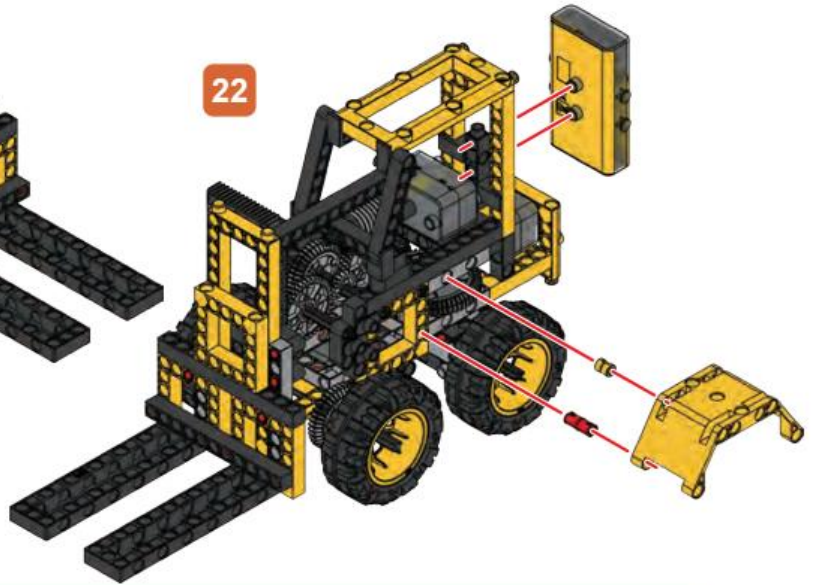
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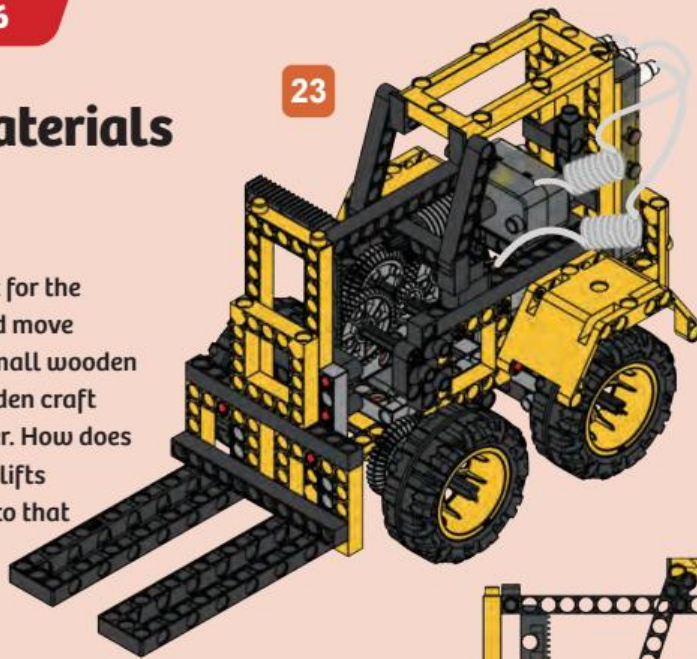
EXPERIMENT 6

Lifting materials

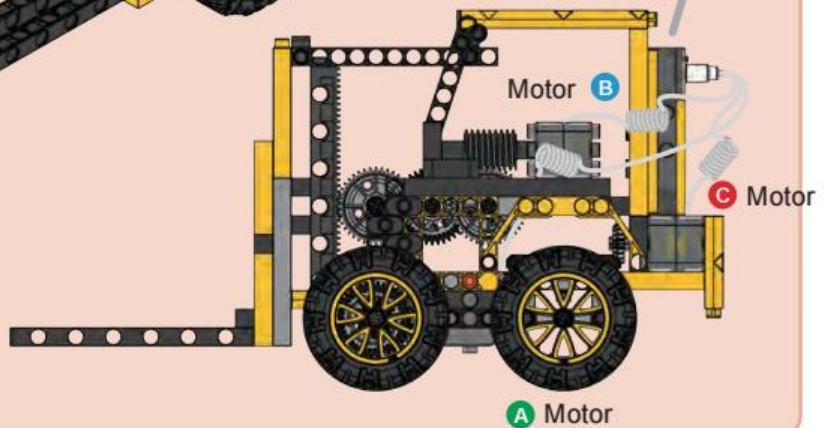
HERE'S HOW

Make a small object for the forklift to lift up and move around, such as a small wooden pallet made of wooden craft sticks glued together. How does the way the forklift lifts materials compare to that of the crane?

23



Done!

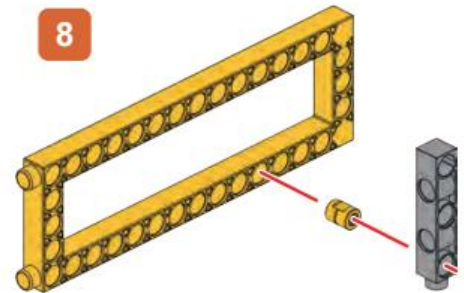
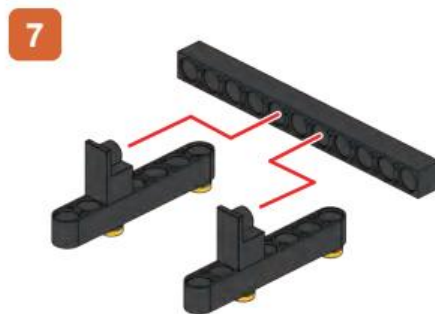
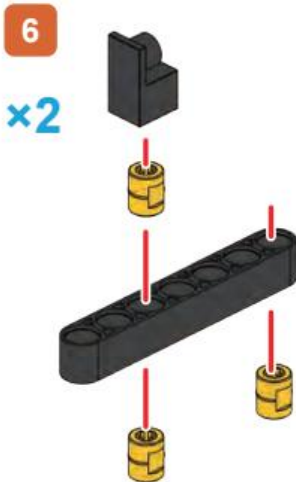
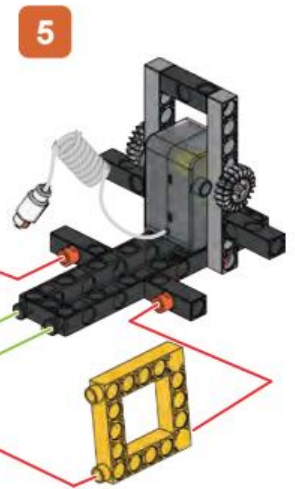
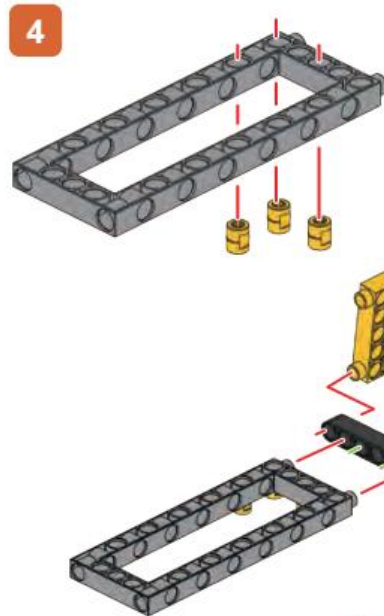
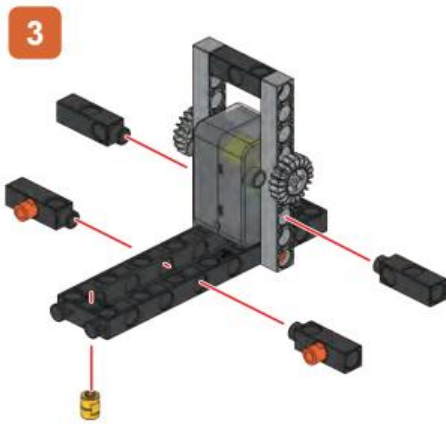
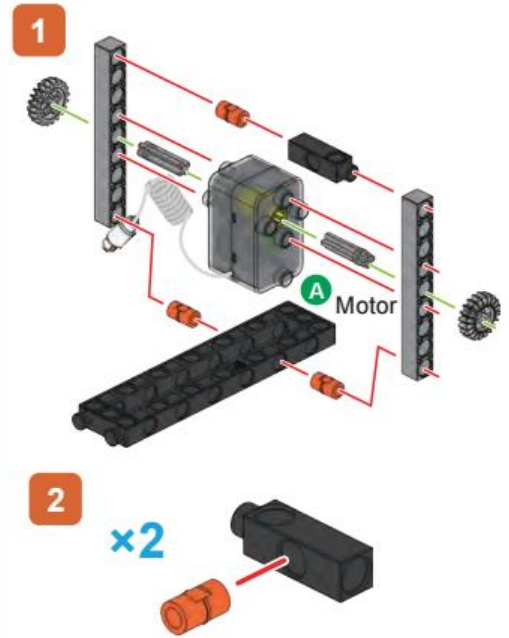




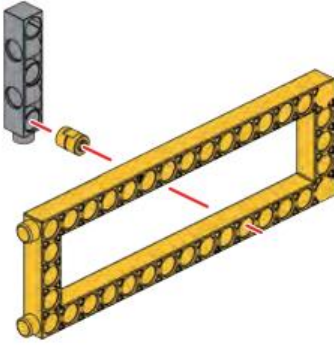
Grader Model 7

Parts Needed

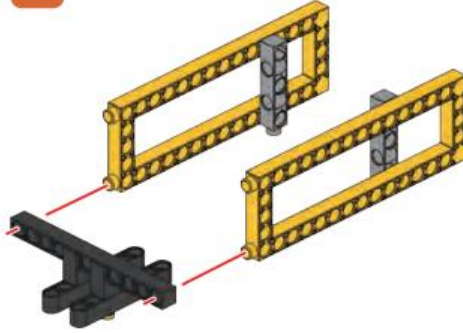
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x28	x17	x16	x3	x12	x2	x4	x4	x7	x5	x5	x3
16	17	18	19	20	22	23	24	25			
x4	x5	x3	x3	x6	x6	x2	x2	x2			
26	27	28	29	30	31	33	35				
x1	x2	x2	x3	x7	x1	x6	x5				
37	38	39	40	41	42	43	44	45			
x2	x1	x4	x4	x5	x1	x1	x1	x3			



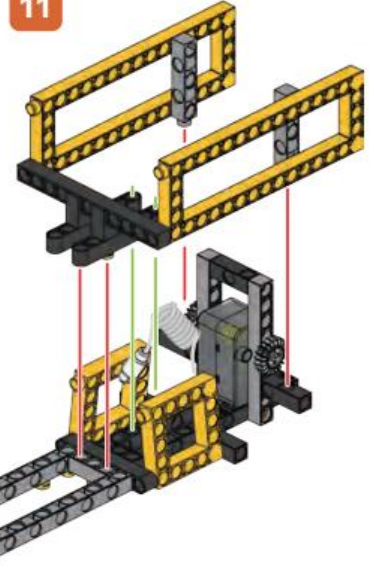
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10



11

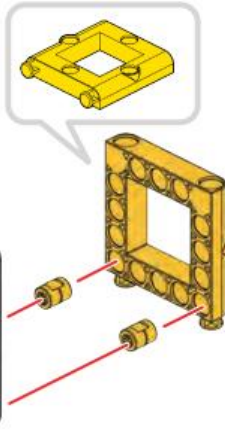


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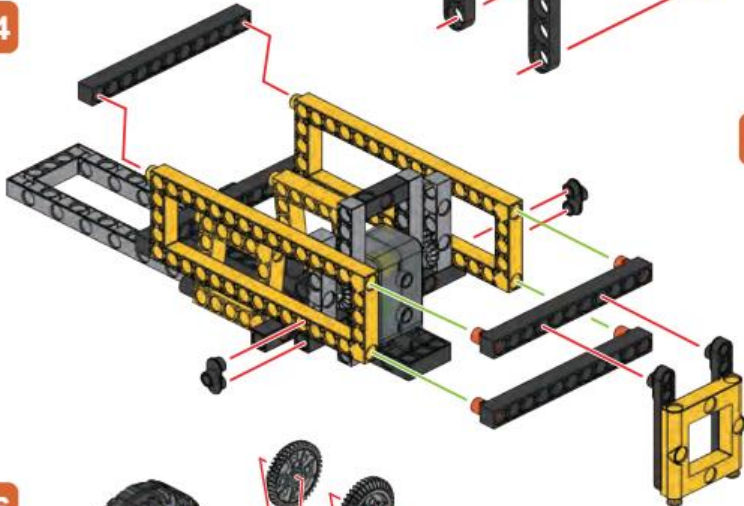
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13



14

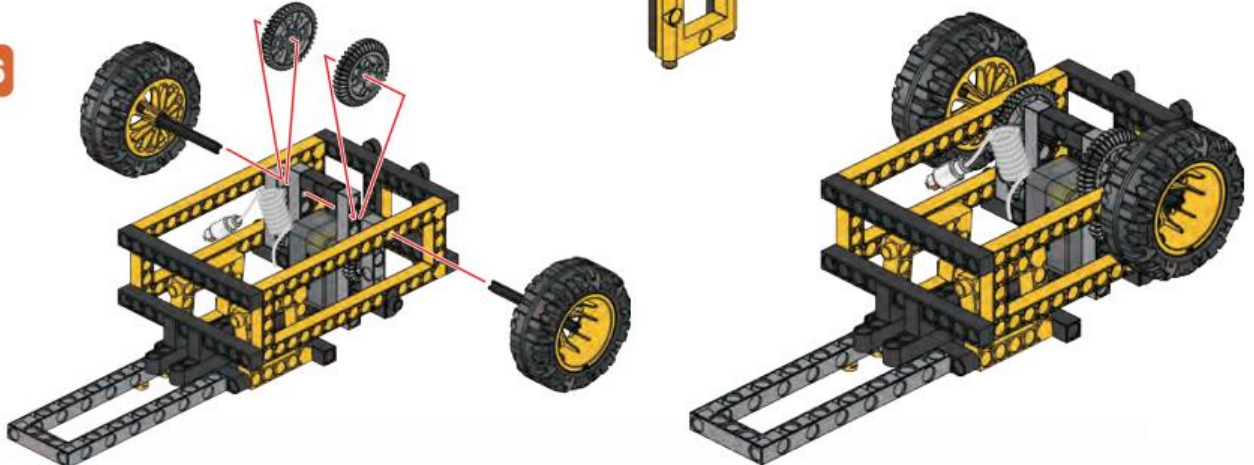


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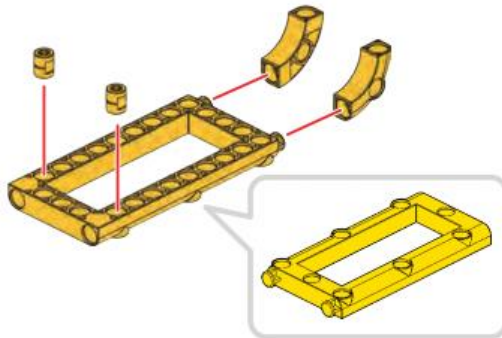
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Grader Model 7

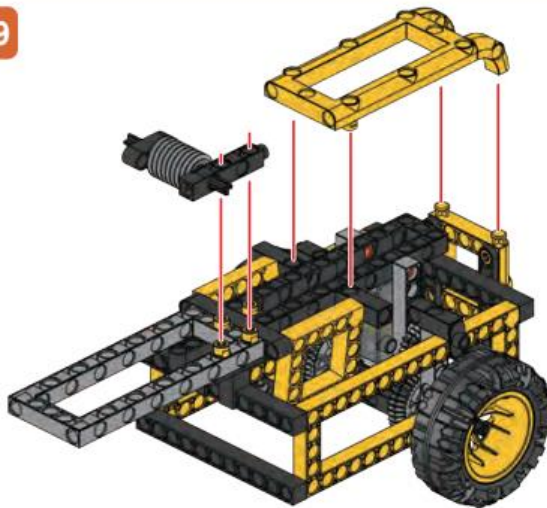
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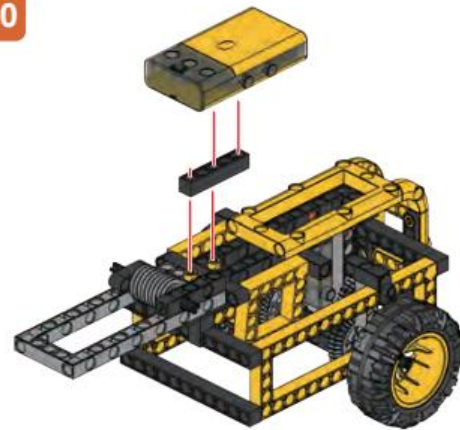
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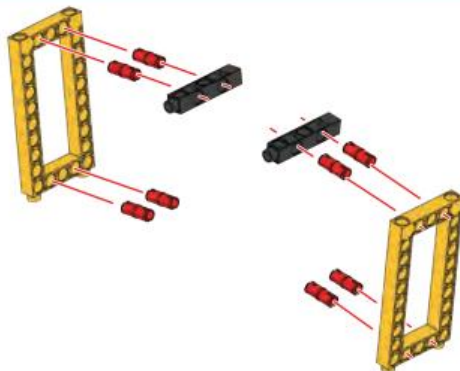
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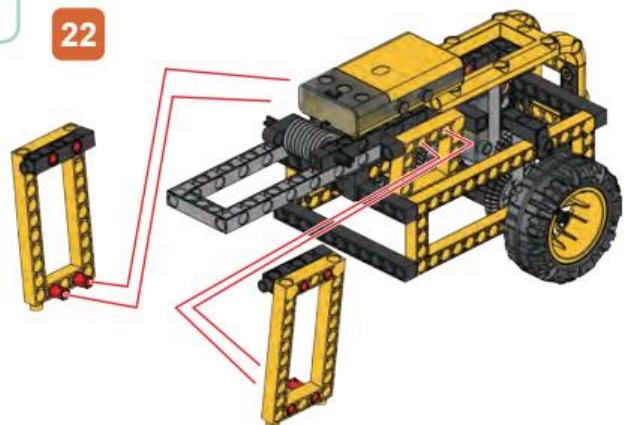
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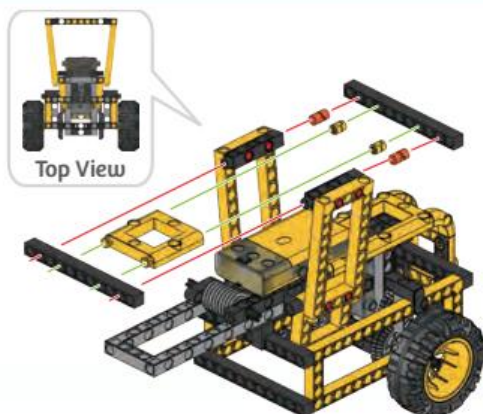
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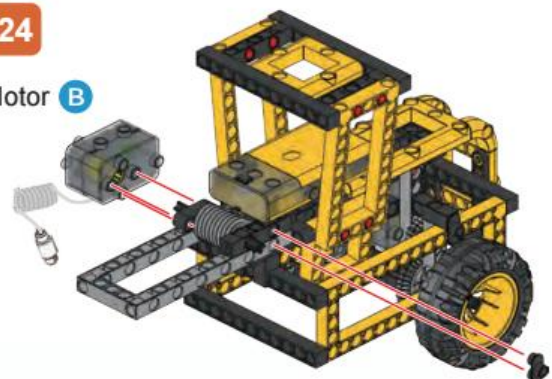


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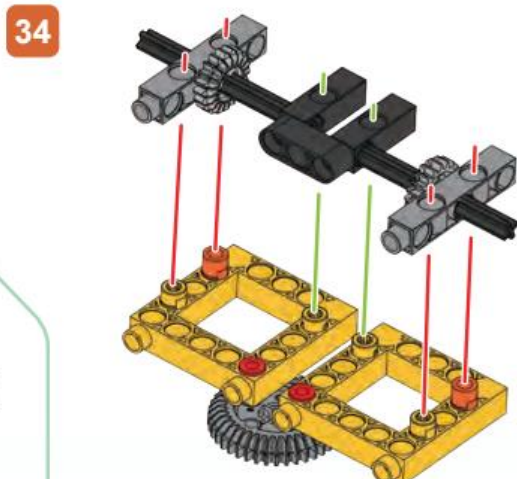
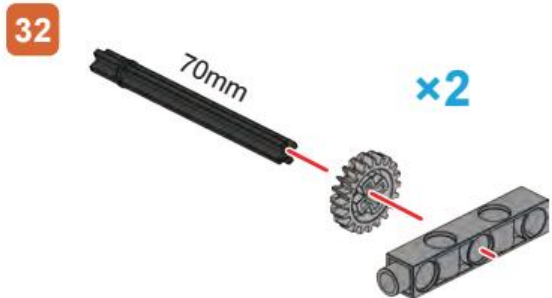
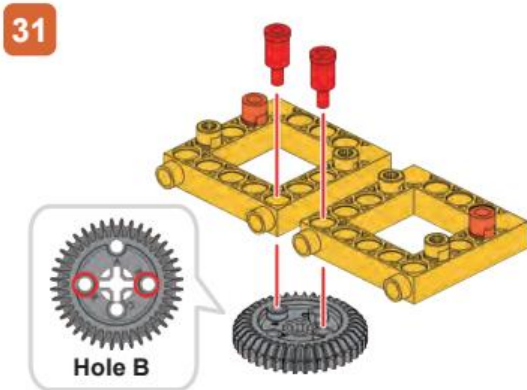
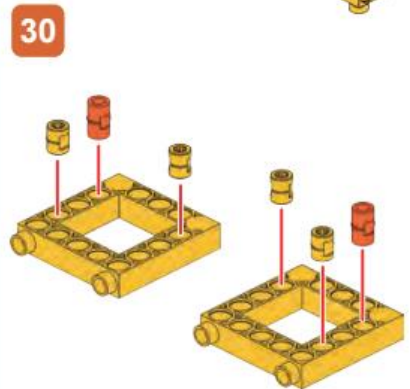
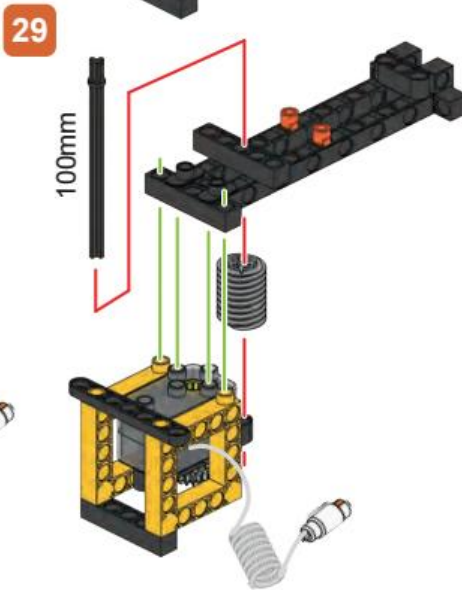
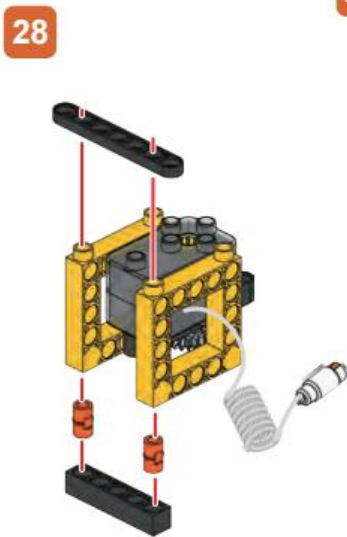
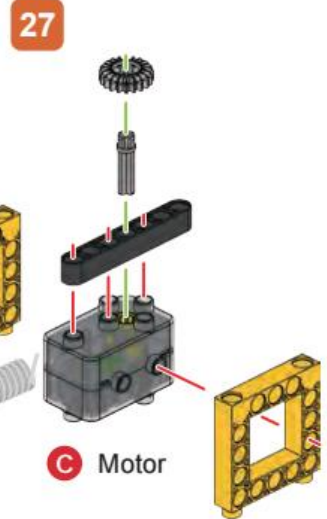
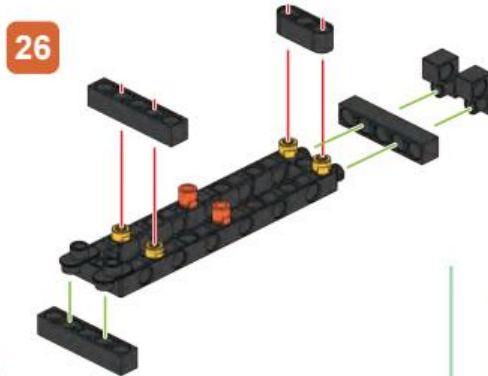
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Motor B



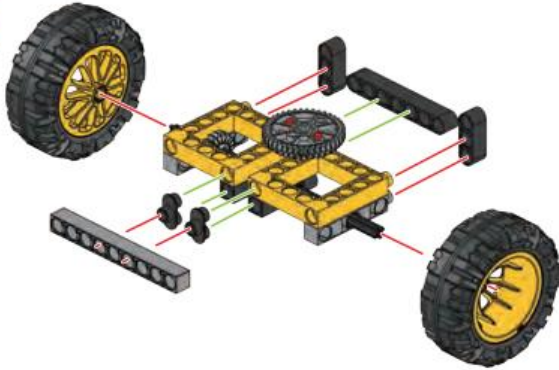
● ● ○ GRADER

Model 7 Grader

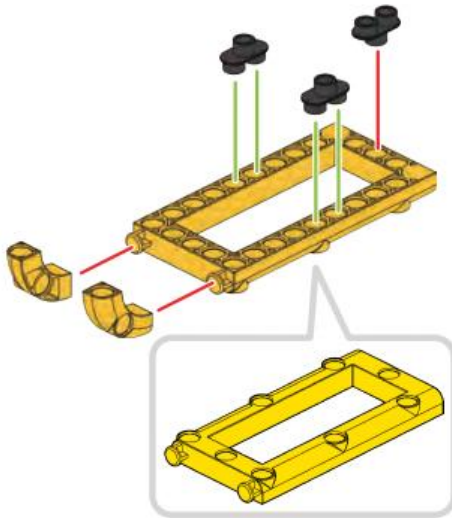


Grader Model 7

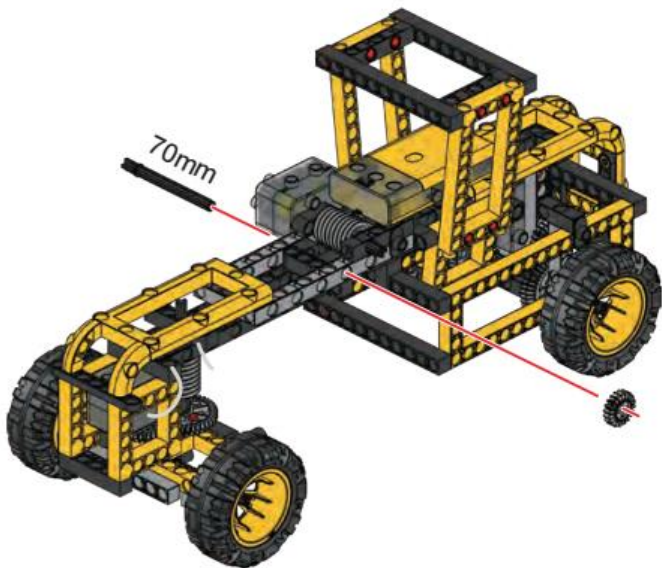
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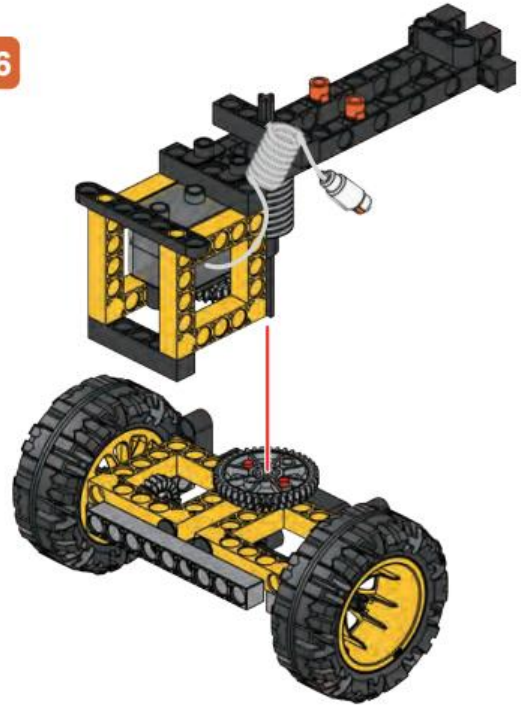
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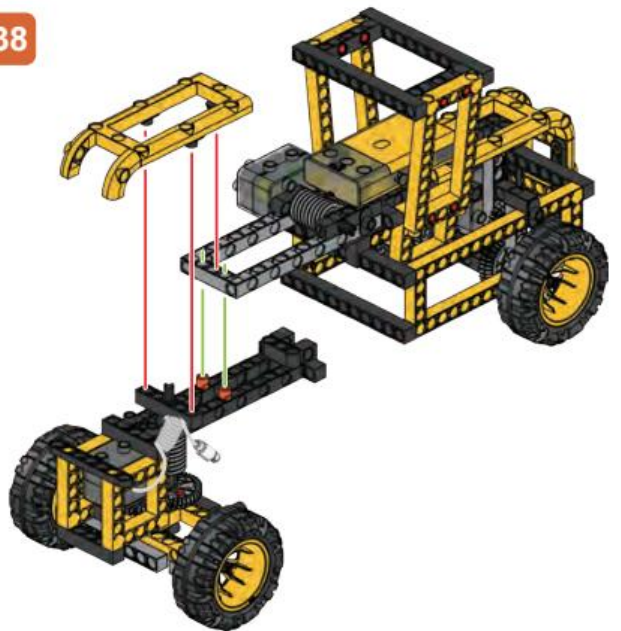
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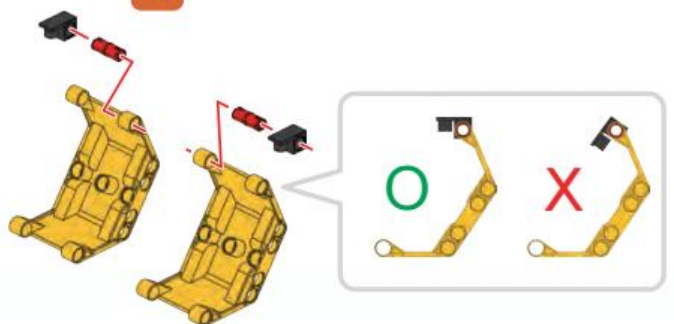
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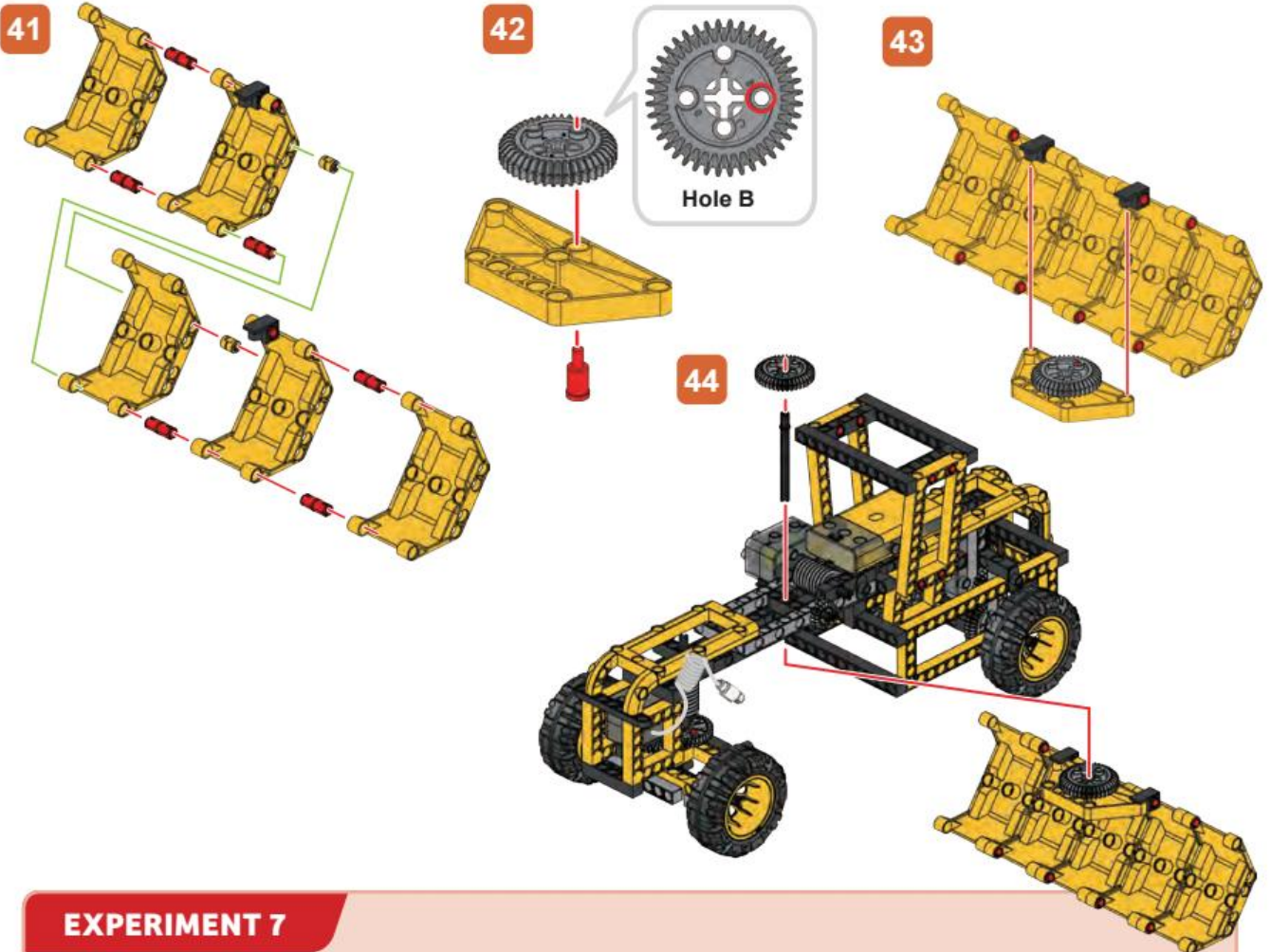


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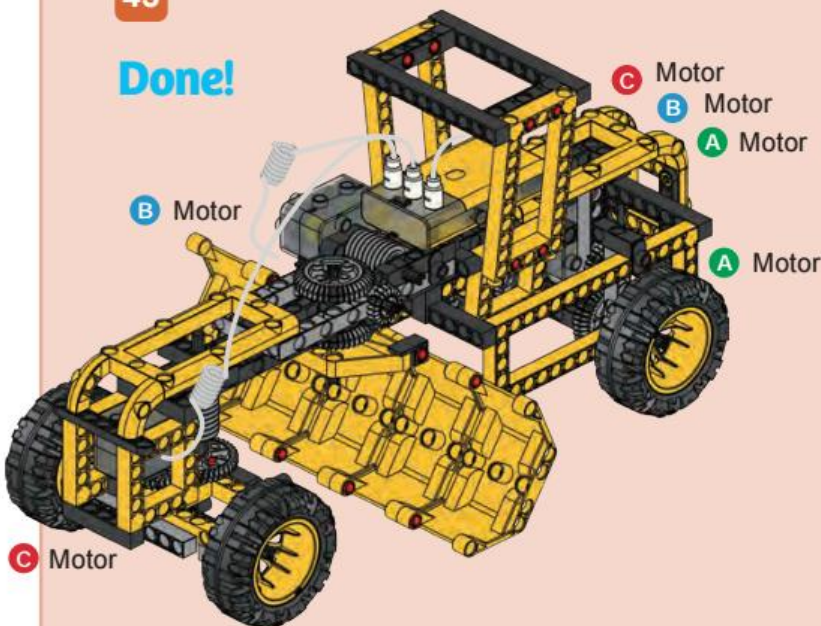




EXPERIMENT 7

45

Done!



What is grading?

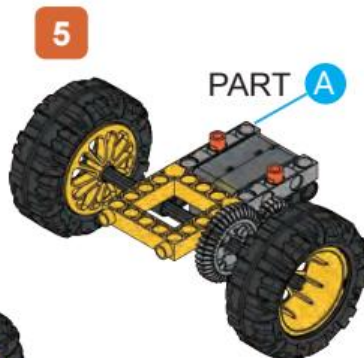
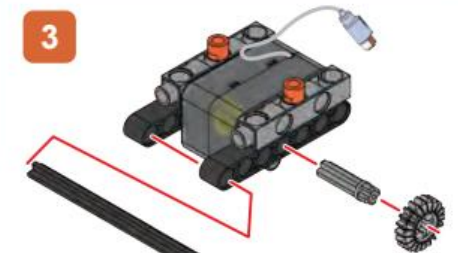
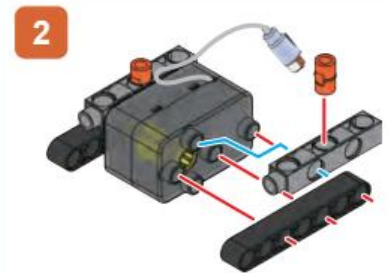
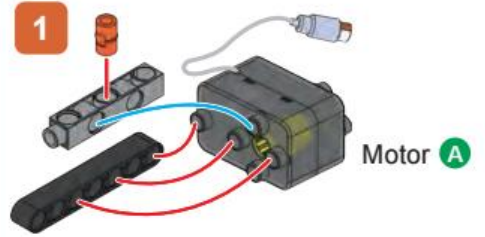
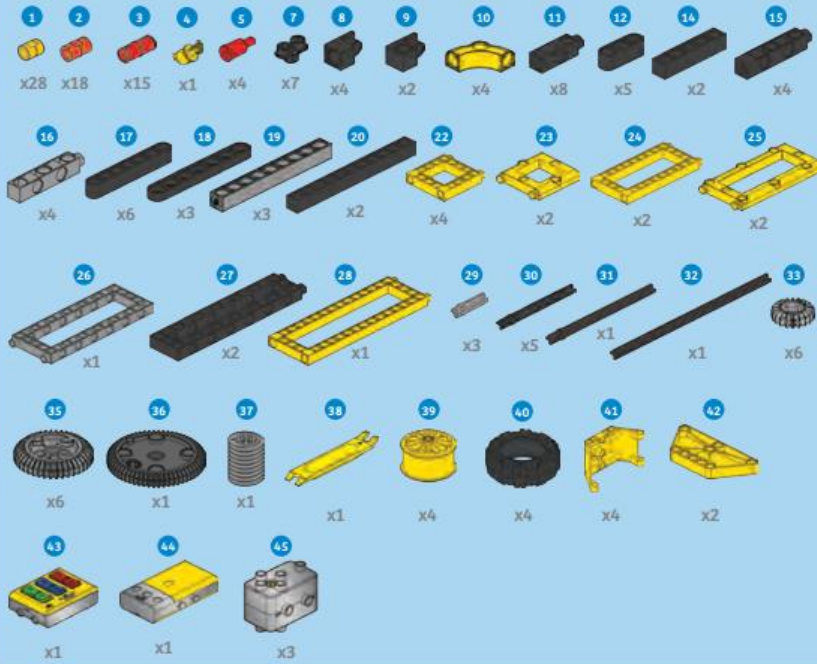
HERE'S HOW

A road grader is a large construction vehicle with a long blade that is used to create surfaces with a specified slope during a process called **grading**. Grading is important for the foundations of buildings, railroads, and landscapes. Grading allows civil engineers to direct the way that water, from rain or irrigation, flows off a piece of land. The grader's purpose is to refine the grading. The rough grading is performed by other construction vehicles such as bulldozers or skid-steer loaders.

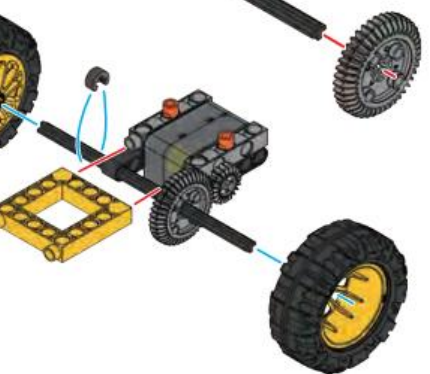
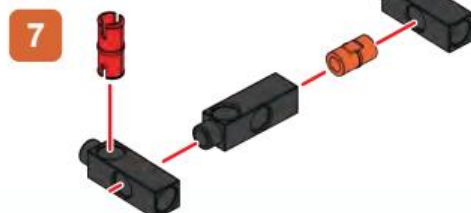


Skid-Steer Loader Model 8

Parts Needed

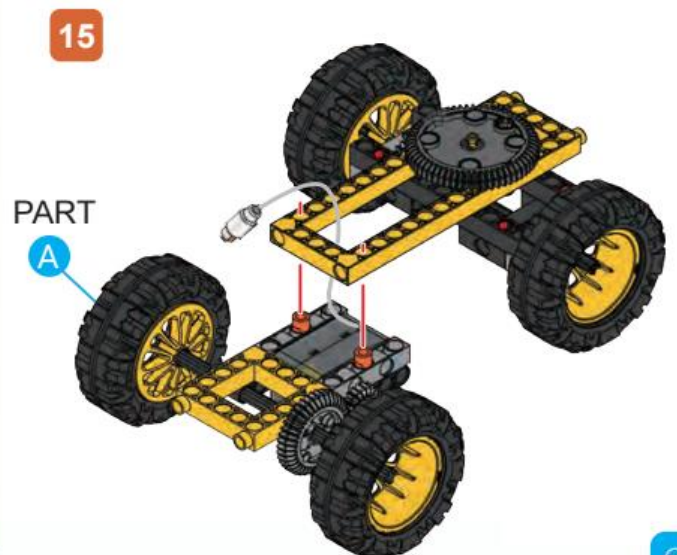
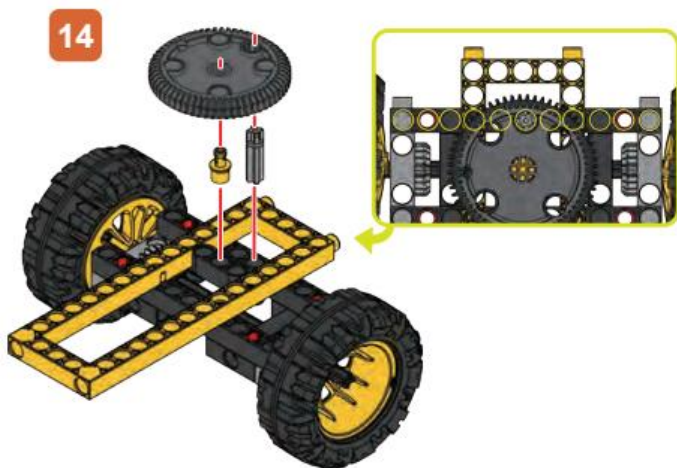
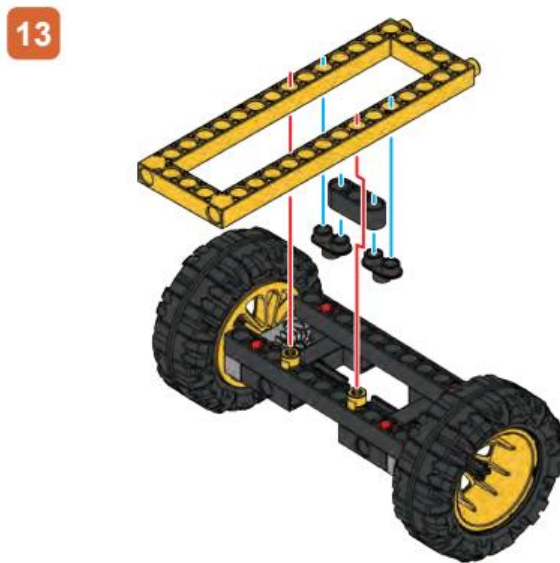
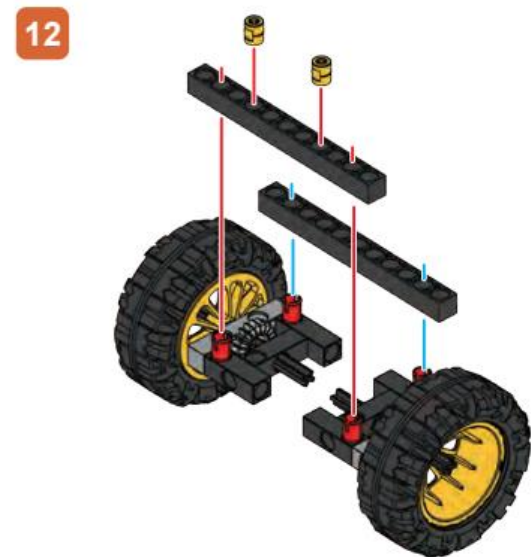
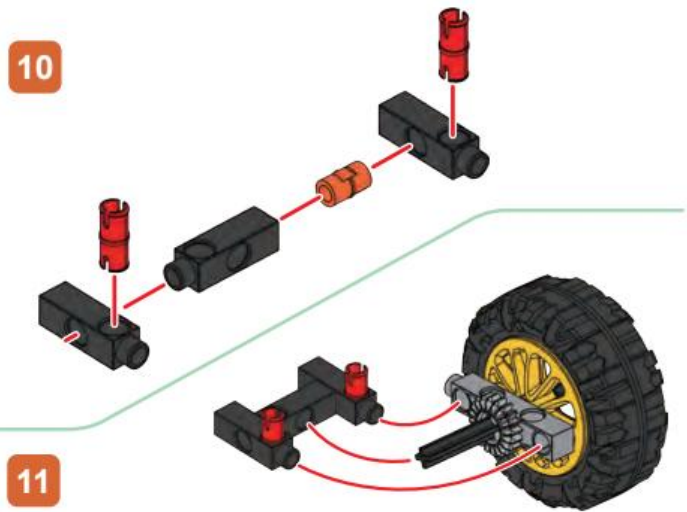
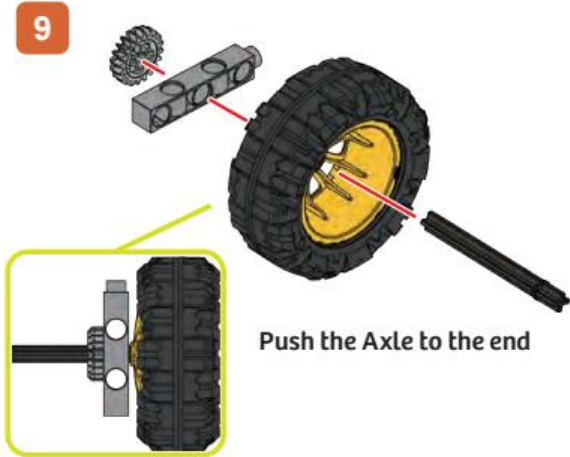


Push the Axle to the end



SKID-STEER LOADER

Model 8 Skid-Steer Loader



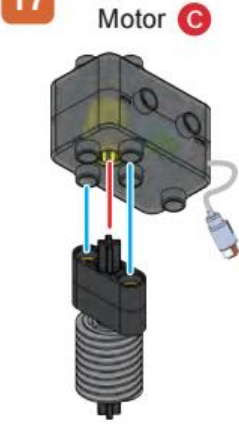


Skid-Steer Loader Model 8

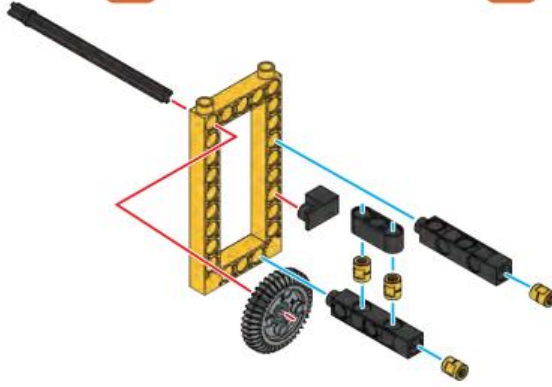
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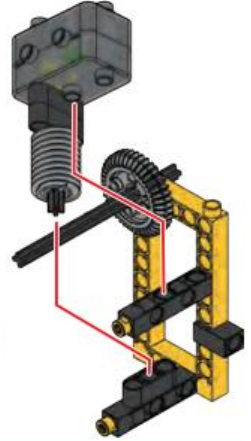
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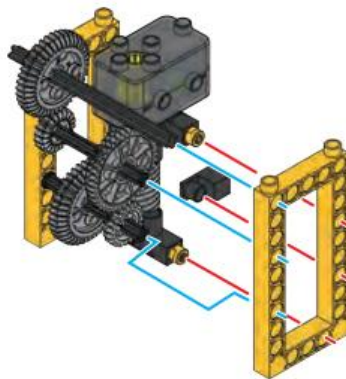
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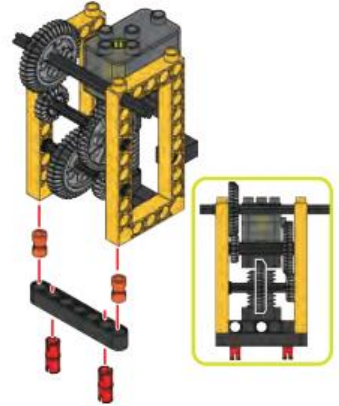
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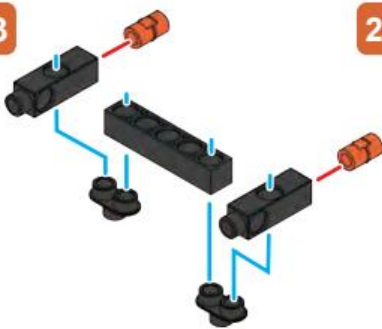
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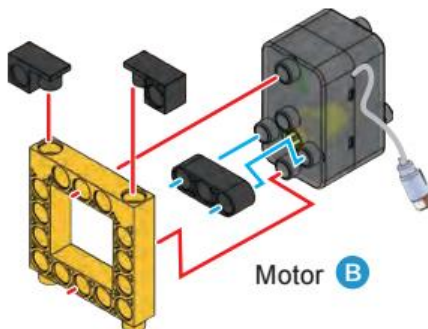
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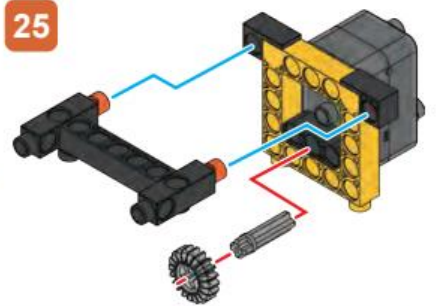
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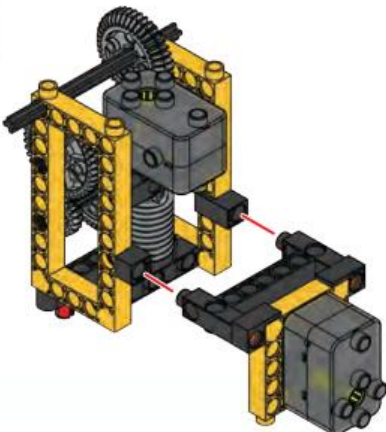
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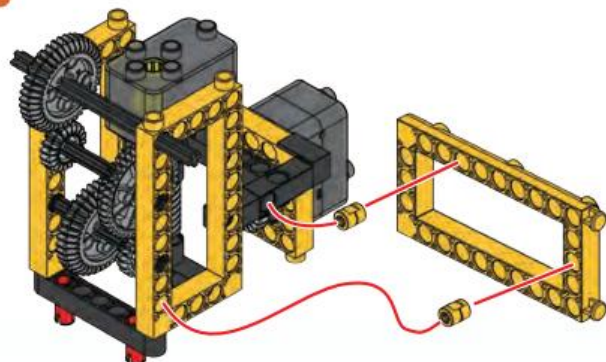
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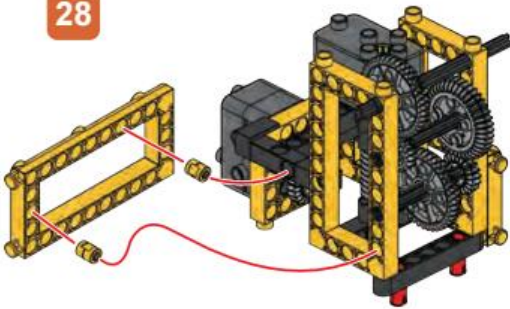
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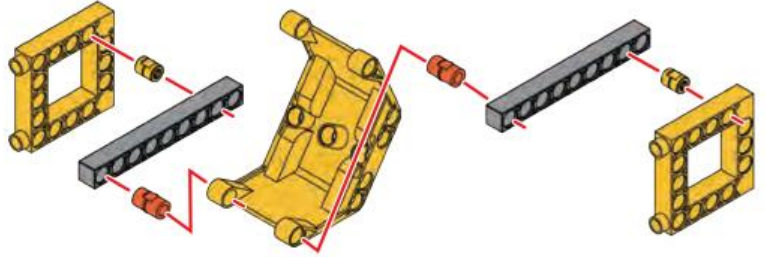
SKID-STEER LOADER

Model 8 Skid-Steer Loader

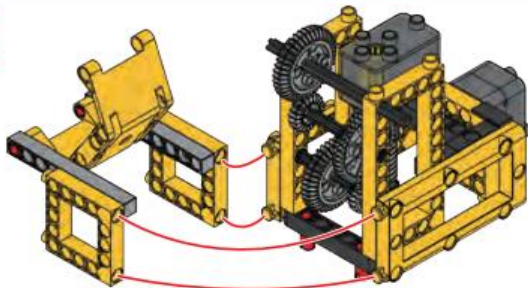
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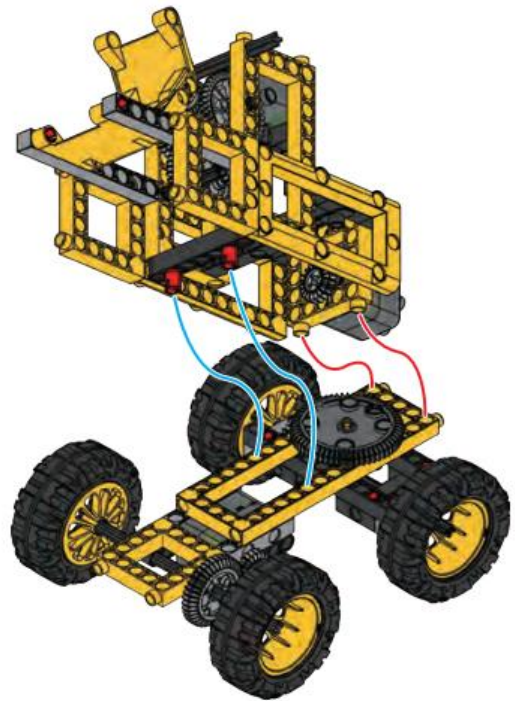
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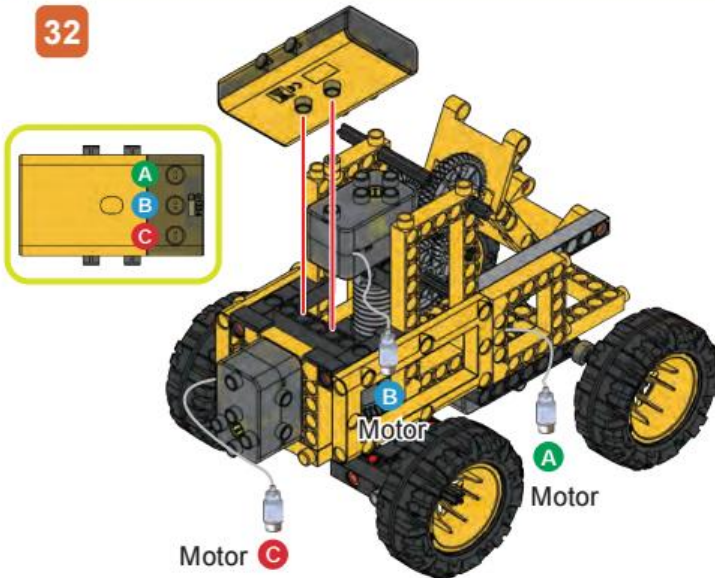
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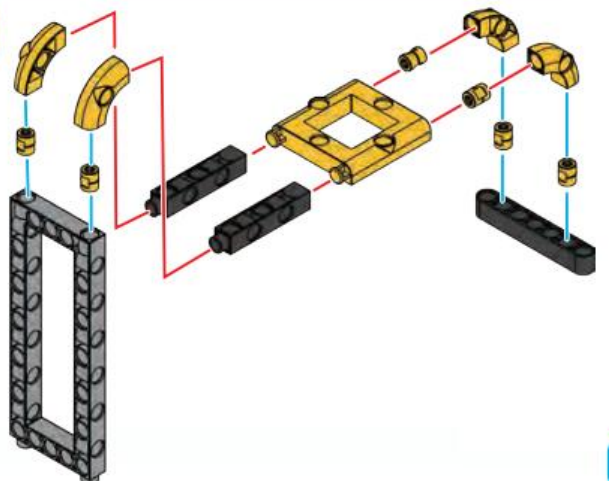
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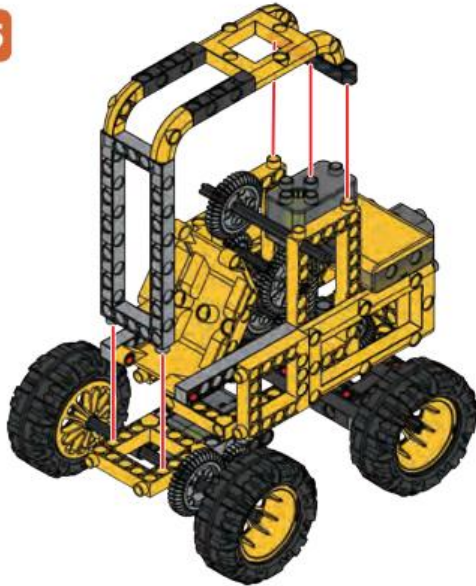
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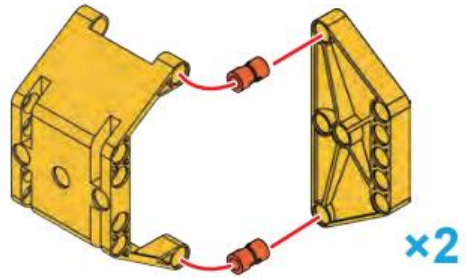


Skid-Steer Loader Model 8

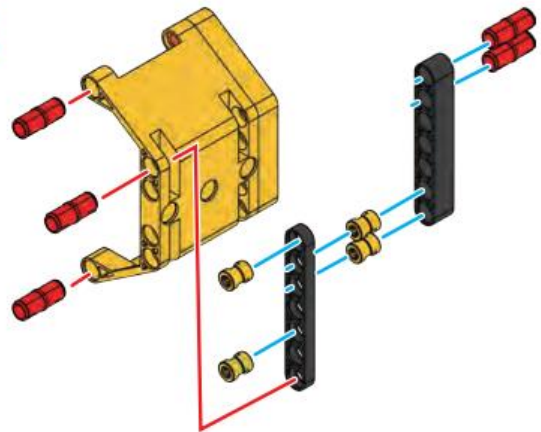
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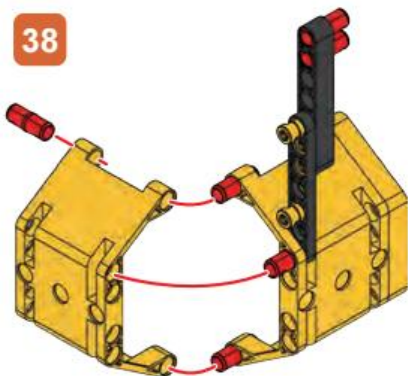
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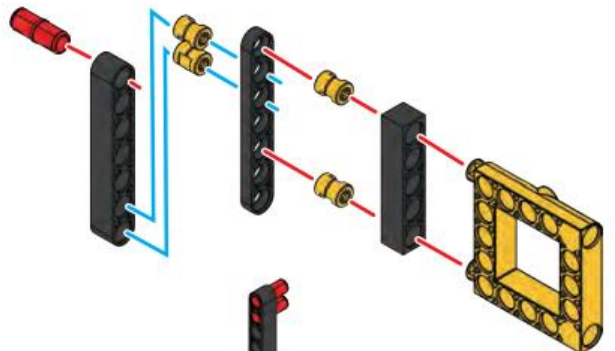
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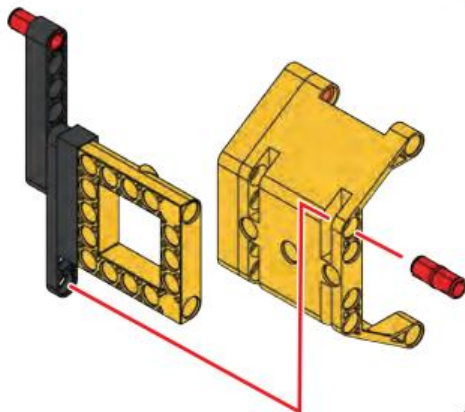
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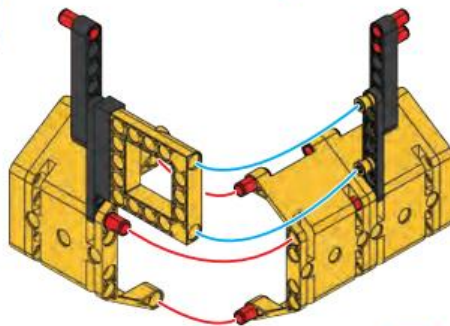
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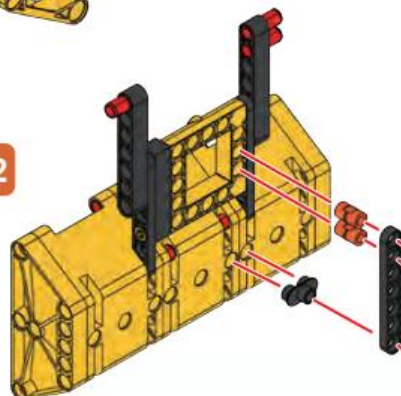
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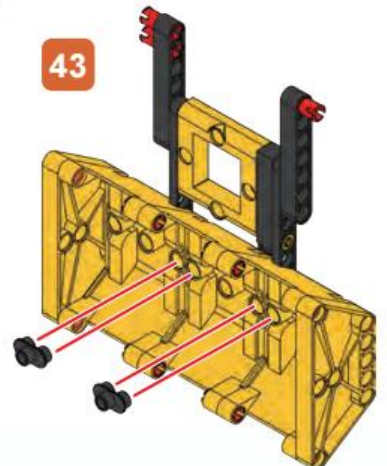
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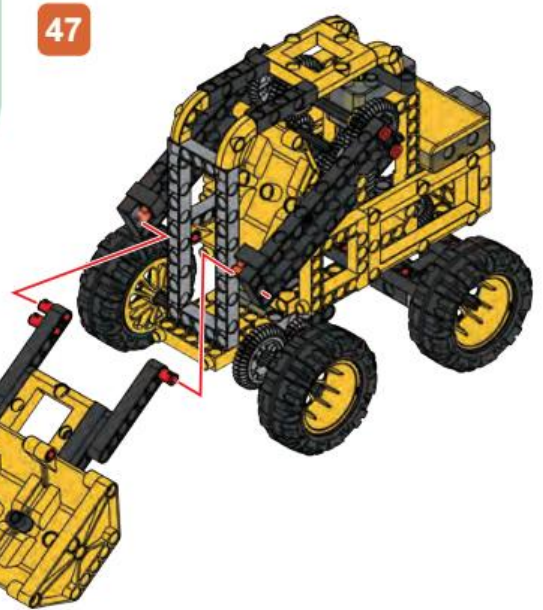
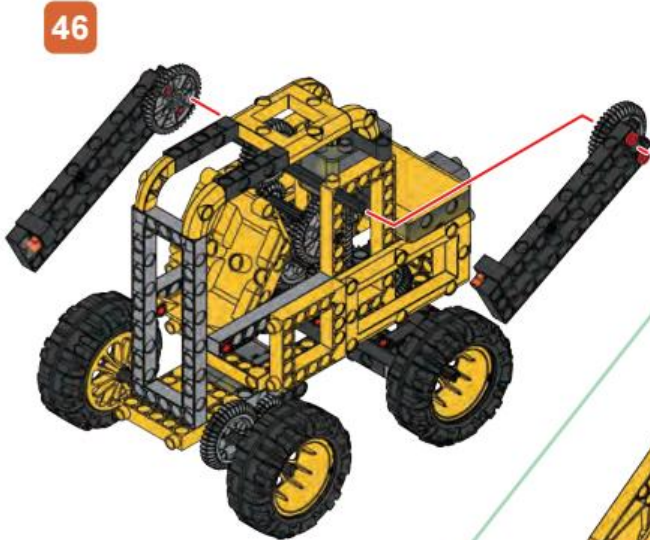
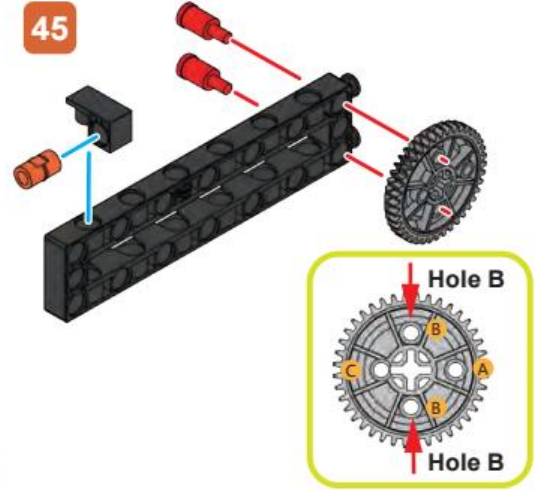
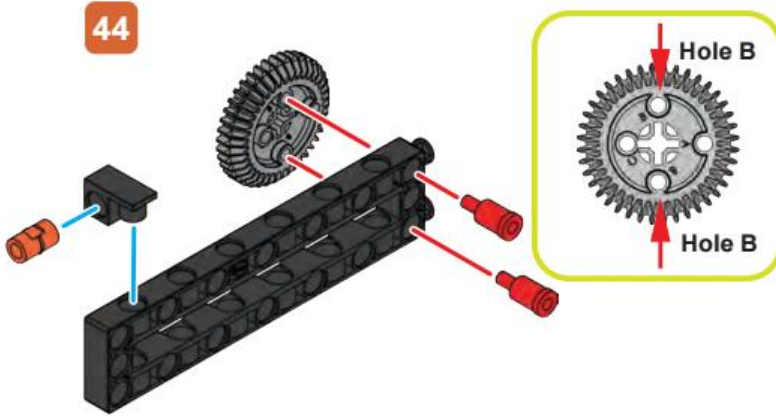


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SKID-STEER LOADER

Model 8 Skid-Steer Loader



Safety Information

Warning! Not suitable for children under 3 years. Choking hazard — small parts may be swallowed or inhaled. Store the experiment material and assembled models out of the reach of small children.

The models are intended for indoor use. Do not use your models in a sandbox.

Keep packaging and instructions as they contain important information.

Safety for Experiments with Batteries

>>> The wires are not to be inserted into socket-outlets. Never perform experiments using household current! The high voltage can be extremely dangerous or fatal!

>>> To operate the models, you will need two AAA batteries (1.5-volt, type AAA/LR03) and three AA batteries (1.5-volt, type AA/LR6), which could not be included in the kit due to their limited shelf life.

>>> The supply terminals are not to be short-circuited. A short circuit can cause the wires to overheat and the batteries to explode.

>>> Different types of batteries or new and used batteries are not to be mixed.

>>> Do not mix old and new batteries.

>>> Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) batteries.

>>> Batteries are to be inserted with the correct polarity. Press them gently into the battery compartment. See page 2.

>>> Always close battery compartments with the lid.

>>> Non-rechargeable batteries are not to be recharged. They could explode!

>>> Rechargeable batteries are only to be charged under adult supervision.

>>> Rechargeable batteries are to be removed from the toy before being charged.

>>> Exhausted batteries are to be removed from the toy.

>>> Dispose of used batteries in accordance with environmental provisions, not in the household trash.

>>> Be sure not to bring batteries into contact with coins, keys, or other metal objects.

>>> Avoid deforming the batteries.

As all of the experiments use batteries, have an adult check the experiments or models before use to make sure they are assembled properly. Always operate the motorized models under adult supervision.

After you are done experimenting, remove the batteries from the battery compartments. Note the safety information accompanying the individual experiments or models!

Notes on Disposal of Electrical and Electronic Components

The electronic components of this product are recyclable. For the sake of the environment, do not throw them into the household trash at the end of their lifespan. They must be delivered to a collection location for electronic waste, as indicated by the following symbol:



Please contact your local authorities for the appropriate disposal location.

Dear Parents and Supervising Adults,

Before starting the experiments, read through the instruction manual together with your child and discuss the safety information. Check to make sure the models have been assembled correctly, and assist your child with the experiments.

We hope you and your child have a lot of fun with the experiments!

FCC Part 15 Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



Please browse website



Gigo website

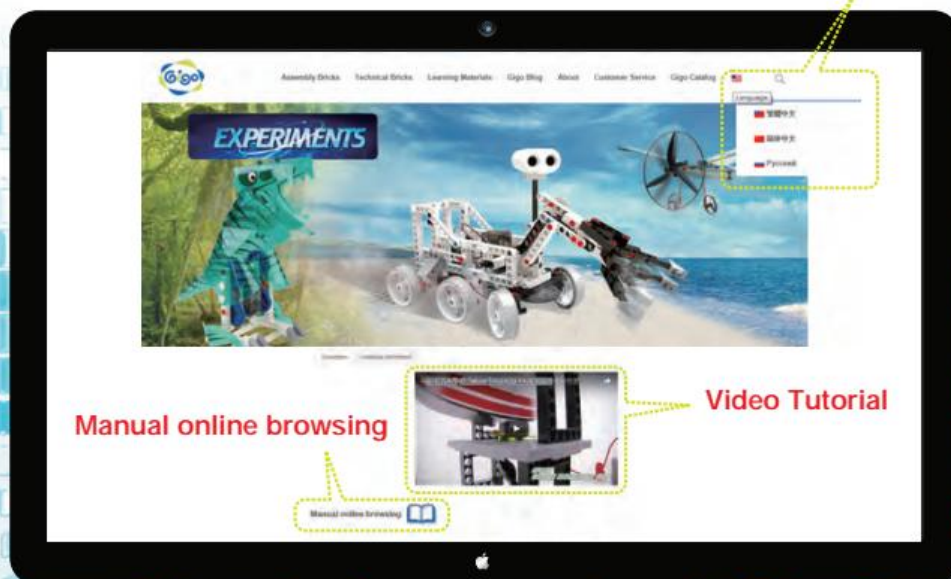


f Gigo FB

Welcome to our newly redesigned Gigo website!

- We now offer four language options (English, Traditional Chinese, Simplified Chinese, Russian).
- Many brilliant videos for product introduction.
- Online product brochures to facilitate timely browse.

Multi-Language



Manual online browsing

Video Tutorial

EXPERIMENTS



RUBBER BAND RACERS
#7403
5 Models to build
71 PCS



SPACE MACHINES
#7337
10 Models to build
255 PCS



WATER POWER MINI
#7389
6 Models to build
60 PCS



CROSSBOWS AND CATAPULTS
#7406
10 Models to build
110 PCS



MINI GYRO
#7395
20 Models to build
88 PCS



SMART MACHINES
#7416
8 Models to build
230 PCS



ORNITHOPTER
#7405
4 Models to build
49 PCS



ELECTRICITY & MAGNETISM
#7065
10 Models to build
137 PCS



GECKOBOT
#7409
7 Models to build
176 PCS



MADE IN TAIWAN

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