Principle Models Activities

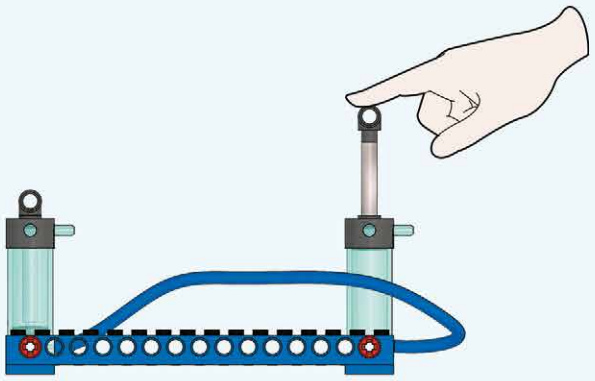
The principle models show you how pneumatics works in a simple and hands-on way. Use the Buddy Building instruction booklets to build each model. Investigate using the models, and then explain your observations. You may use the words presented at the top of each page as you write your findings. (Do you need to repeat the same words at the top of each page or just create a vocabulary page for students to use as a reference?)
Next, make a minor change as shown in the illustration. Continue your investigations. There are 14 steps used to create five principle models. When you have completed these steps, you will be ready to make interesting pneumatic machines.

Air tank
Manometer
Piston rod
Piston
Pump
Tube
Air port
Valve
Cylinder
Force

1A

Build 1A book 5 to step 5.
Press down on the piston rod.
Explain what happened and why.

When I push down on the piston rod...



Hints:

- The easiest way to empty the air tank is to disconnect the tube going from the air tank to the valve.
- It is always a good idea to start with the valve in the off position. This allows you to control the airflow.

Air tank Manometer

Piston rod

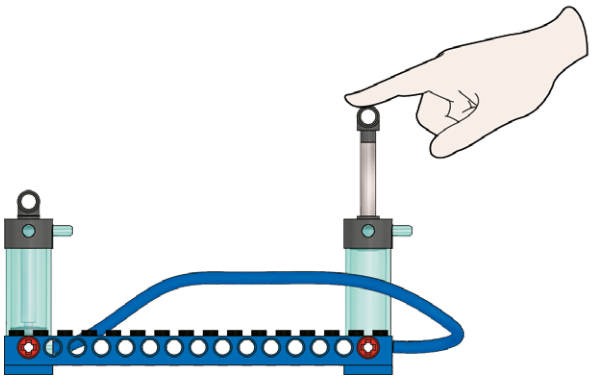
Tube Air port Piston Pump

Valve

Cylinder Force

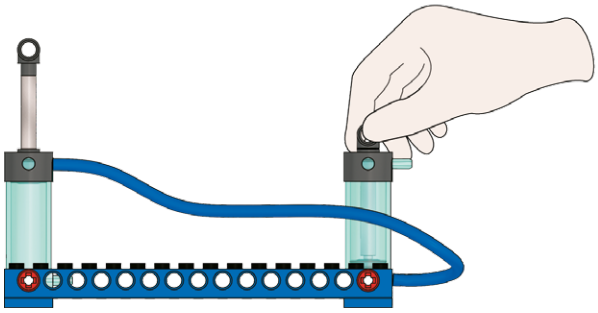
1A

Build 1A book 5 to step 5
Press down on the piston rod.
Explain what happened and why.



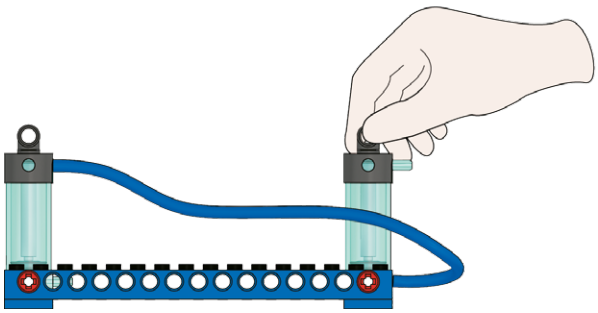
1B

Change the model as shown.
Pull up on the piston rod.
Explain what happened and why.



1C

Change the model as shown.
Pull up on the piston rod.
Explain what happened and why.



Air tank Manometer

Piston rod

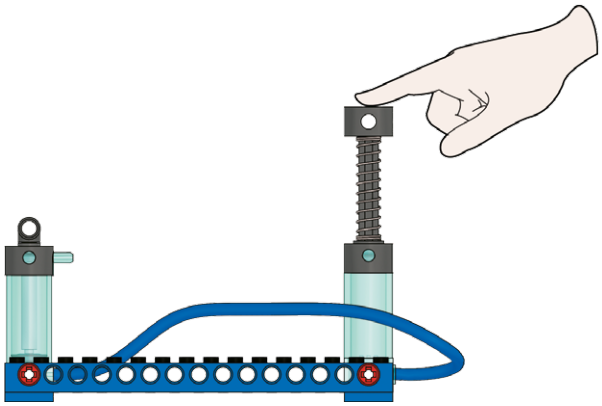
Tube Air port Piston Pump

Valve

Cylinder Force

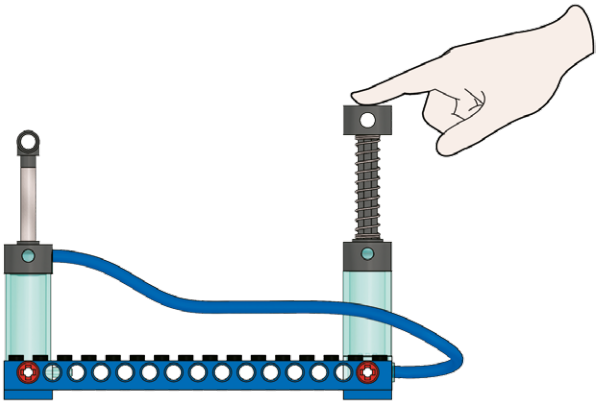
2A

Build 2A book 5 to step 7
Press down on the pump once.
Explain what happened and why.



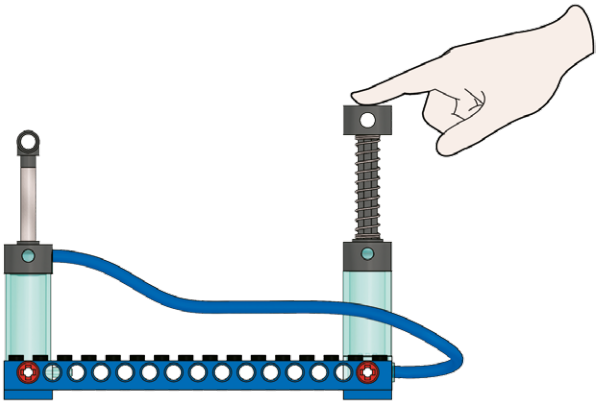
2B

Change the model as shown.
Press down on the pump once.
Explain what happened and why.



2C

Keep pumping and after each pump try pulling the cylinder piston rod up.
Explain what happened and why.



Air tank Manometer

Piston rod

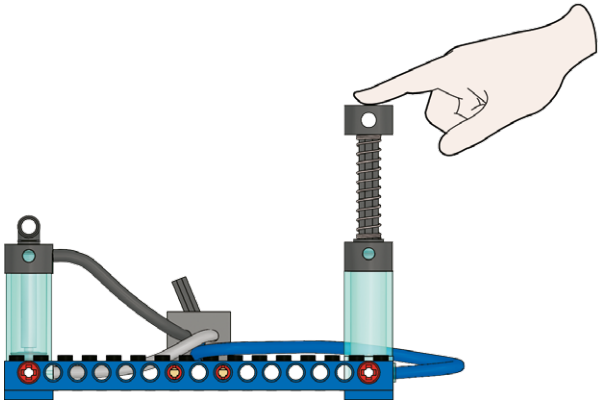
Tube Air port Piston Pump

Valve

Cylinder Force

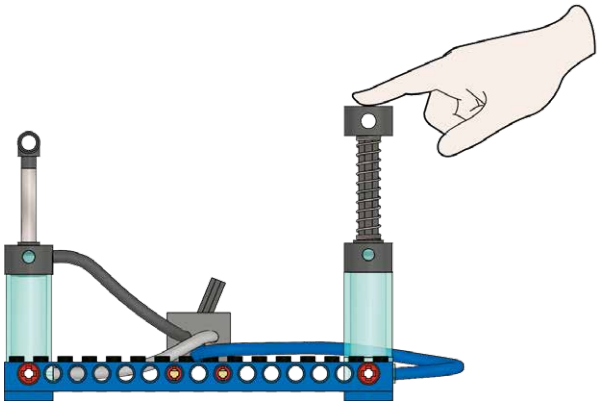
3A

Build 3A book 5 to step 10
Press down on the pump once.
Explain what happened and why.



3B

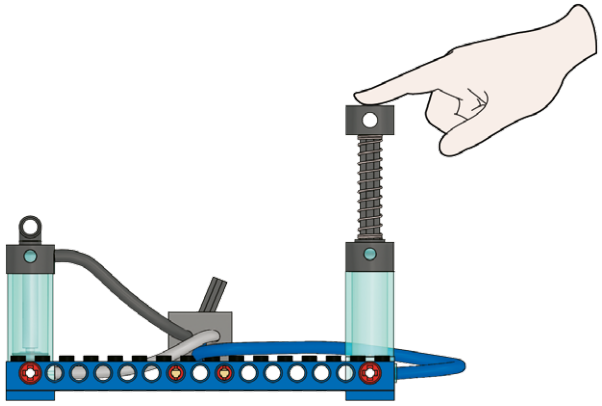
Change the model as shown.
Press down on the pump once.
Explain what happened and why.



Air tank Manometer
Piston rod
Piston
Tube Air port Pump
Valve
Cylinder Force

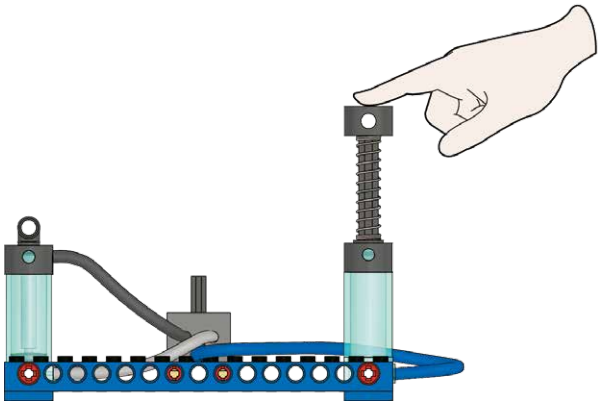
3C

Change the model as shown.
Press down on the pump once.
Explain what happened and why.



3D

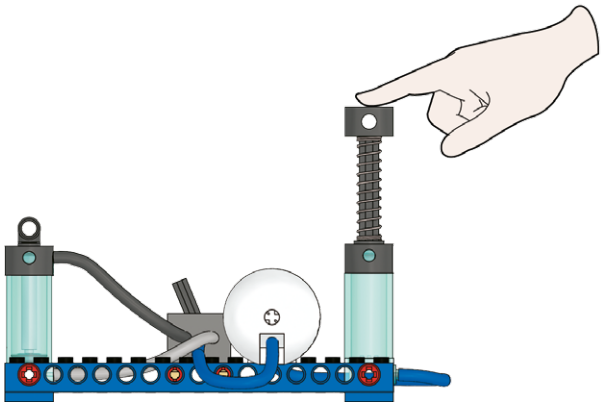
Change the model as shown.
Press down on the pump twice.
Explain what happened and why.



Air tank Manometer
Piston rod
Tube Air port Piston Pump
Valve
Cylinder Force

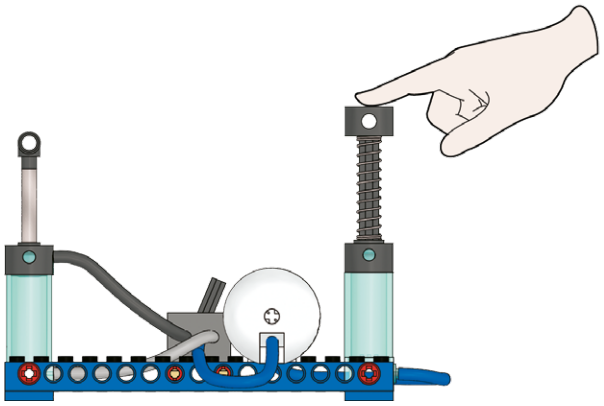
4A

Build 4A book 5 to step 13
Press down on the pump twice.
Explain what happened and why.



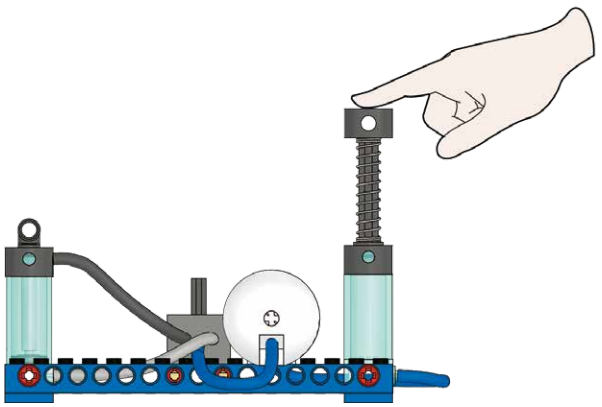
4B

Change the model as shown.
Press down on the pump twice.
Explain what happened and why.



4C

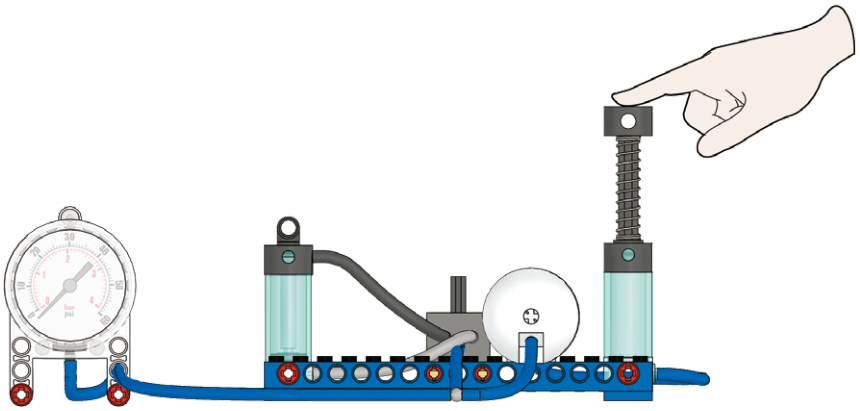
Change the model as shown.
Press down on the pump twice.
Explain what happened and why.
How many pumps are needed to fill the tank completely?



Air tank Manometer Piston rod Piston Pump Tube Air port Valve Cylinder Force

5A

Build 5A book 5 to step 17
Press down on the pump twice.
Explain what happened and why.
Keep pumping.
What's the highest pressure you can obtain?



Test how many times you can extend and retract the piston rod when using about 14 PSI (or 1 bar).
Then, do the same test using about 29 and about 36 PSI (or 2 and 2.5 bars).