# MOGOK FEDERAL SCHOOL HIGH SCHOOL PROJECTS

DIY Hydraulic Lift


## ABSTRACT

This collaborative project introduces students' innovative DIY hydraulic lifts, each designed and executed by talented high school students. Utilizing two syringes as cylinders and water as the hydraulic fluid, these projects collectively demonstrate the application of fundamental hydraulic principles in a hands-on and engaging manner.



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# Project Overview

**Objective:** To design and construct functional hydraulic lifts using readily available materials.

**Common Components:**

- Two syringes as hydraulic cylinders
- Water as the hydraulic fluid
- Frame structure

# Individual Project Highlights

## 1. Project Title: "NNF-S-005 Lift"

**Student:** 005

Requirements

- 60ml &25 ml syringes
- Four wooden Sticks & A big one
- Tape/ screw/ Inner tube of tyre
- Medical tube

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|
| Force | 1 N | 3.6N |
| Area | 2.4 cm^2 | 5.2 cm^2 |
| Displacement | 9.6 cm | 4.4 cm |

Ref document:

Ref video:
https://drive.google.com/file/d/1a1MIiWt06v0lfZe8iy8mxj6z53J5vsES/view?usp=drivesdk

## 2. Project Title: " NNF-S-56 Lift "

**Student:** 56

Requirements

Pipe
chair
two syringe s
water
5 small iron blocks
2big iron blocks
two plates
strings
glue

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|
| Force | 130 g | 440g |
| Area | 3.7 cm^2 | 12.56 cm^2 |
| Displacement | | |

Ref document: https://1drv.ms/x/s!AvdSBmDDUzcegVcyJTpCjPUlIPh2?e=cLhRmt

Ref video:

## 3. Project Title: "" NNF-S-08 Lift "

**Student:** 08

Requirements

- Two syringes
- Pipe
- Glue

- Glass
- Two Flip Chart
- Two Poles
- Two small Iron

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|

| | | |
|---|---|---|
| Force | 200g | 300g |
| Area | 1.04 cm^2 | 2 cm^2 |
| Displacement | | |

Ref document:
https://drive.google.com/file/d/1OgMmtYc5cjDfTVIAGdKs1Uc4npDZILqf/view?usp=drivesdk

Ref video:
https://drive.google.com/file/d/1OazgzmKszsk1SuHTMJ1s15lESYM8OepW/view?usp=drivesdk

## 4. Project Title: " NNF-S-14 Lift "

**Student:** 14

Requirements

- Two syringes, small one and big one
- Cardboards or cups for put objects
- A pipe for connect two syringes
- A glue gun

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|
| Force | 2 MG | 2.5 MG |
| Area | 1.2 cm^2 | 2.9 cm^2 |
| Displacement | 2.8 cm | 3 cm |

Ref document: https://drive.google.com/file/d/1dzr2UpUbOXDQJ9XUjepniK3eNHmXLw9p/view?usp=drive_link

Ref video: https://docs.google.com/document/d/1YIZ4aMjFz5CtZmyX20kc-i7J9YgHQEYF/edit?usp=drive_link&ouid=103455366272311694031&rtpof=true&sd=true

# 5. Project Title: " NNF-S-09 Lift "

**Student:** 09

Requirements

- two syringes
- pipe
- cardboard
- wood
- wire
- nail
- candle
- lighter
- water bottle
- can of sardine fish
- jam bottle
- water
- marker

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|

| | | |
|---|---|---|
| Force | 1.4715N | 1.9626N |
| Area | 1.47 x 10^-4 m^2 | 2.2 x 10^-4m^2 |
| Displacement | 2.8 cm | 1.7 cm |

Ref document:

Ref video:

## 6. Project Title: "" NNF-S-55 Lift "

**Student:** 55

Requirements

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|
| Force | 850 g | 1450g |
| Area | 1.8 cm^2 | 2.9 cm^2 |
| Displacement | | |

Ref document: https://sg.docworkspace.com/d/sIPfq8ZXyAe2o060G

Ref video: https://t.me/AliNay006

## 7. Project Title: " NNF-S-71 Lift "

**Student:** 71

Requirements

- Two syringes
- Cardboard
- Glue
- Medical tube

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|
| Force | 2900.8g | 7301 g |
| Area | 1.3 cm^2 | 3.25 cm^2 |
| Displacement | 4.2cm | 2.6cm |

Ref document:

Ref video:

## 8. Project Title: "NNF-S-20 Lift"

**Student:** 20

Requirements

- Two syringes
- Glue

- Three sticks
- Medical tube
- Woodblock
- Rubber band
- Weight
- Water

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|
| Force | 81.5g | 326g |
| Area | 2 cm^2 | 2.2 cm^2 |
| Displacement | 5 cm | 1.7 cm |

Ref document:

Ref video:

## 9. Project Title: "NNF-S-59 Lift"

**Student:** 59

Requirements

Set Up

Result

| | Small Cylinder 1 | Large Cylinder2 |
|---|---|---|
| Force | 65g | 275g |
| Area | 12.56 cm^2 | 52.78 cm^2 |
| Displacement | | |

Ref document: https://d.docs.live.net/bf7508aabf94d77d/Experiment.4.xlsx

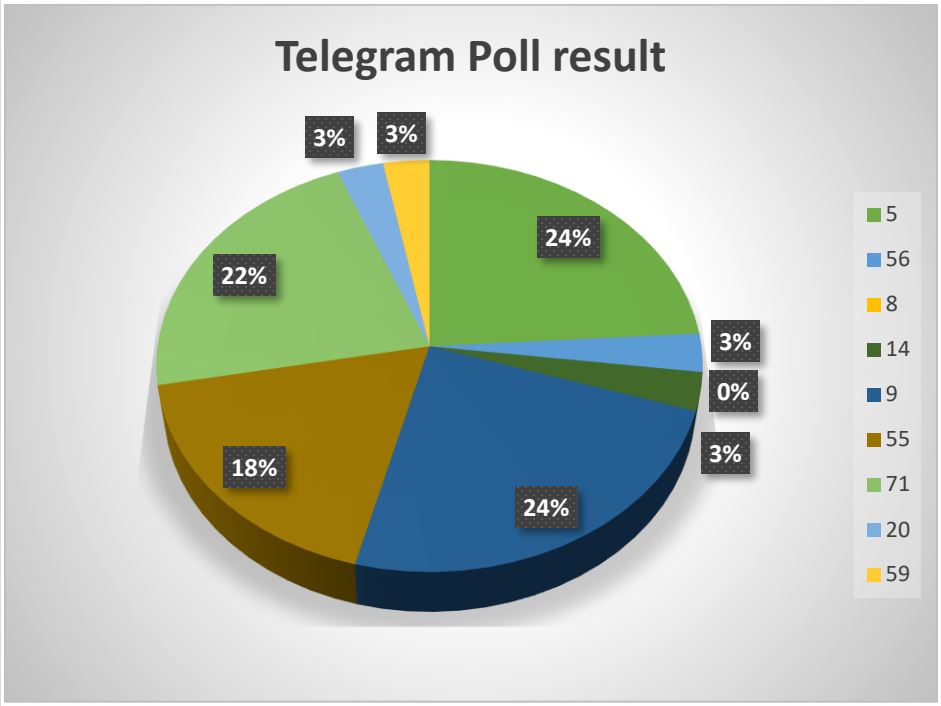
Ref video:

# Results and Achievements

These projects collectively demonstrate the versatility and ingenuity of hydraulic engineering when applied by creative minds. The successful construction and operation of seven unique hydraulic lifts serve as a testament to the students' dedication, innovation, and ability to apply theoretical concepts in a practical setting.

Popular Award

Thirty-three audiences voted results are listed below.




Both NNF-S-05 and NNF-S-09's projects are considered as popular awards. The community recognized the project for its tidy and neat structure. This feature highlights the projects' popularity among peers.

The Best Project Award is presented to the project titled "NNF-S-05 lift " by 05 This project excels in practical structure, popularity, and task achievements. The key factors contributing to its recognition include:

- **Force Ratio:** Michael's project effectively maximizes force output relative to the input force, showcasing an understanding of hydraulic principles.
- **Area Ratio:** The design optimally utilizes the syringe surface area, resulting in an efficient hydraulic lift system.
- **Displacement Ratio:** Michael has demonstrated a keen understanding of displacement ratio, effectively converting fluid displacement into vertical lift.
- **Reason for Task Achievements:** The focus on investigating the impact of syringe size on lifting capacity and speed showcases a meticulous approach to understanding the practical aspects of hydraulic systems.

Best Project Award

# Educational Significance

The DIY hydraulic lift showcase not only imparts knowledge in basic hydraulics but also encourages students to explore their interests, fostering a deeper understanding of fluid power systems. Each project offers a distinct perspective on the practical applications of hydraulic lifts, showcasing the diverse talents of the participating students.

# Future Collaborations

As we celebrate the success of these seven projects, we look forward to future collaborations, improvements, and innovations within the realm of DIY hydraulic systems. This showcase marks the beginning of a journey towards continued exploration and discovery in the field of fluid power.