

# 1 Simple machine



活動 1 認識槓桿 **Lever**

活動 2 滑輪與輪軸

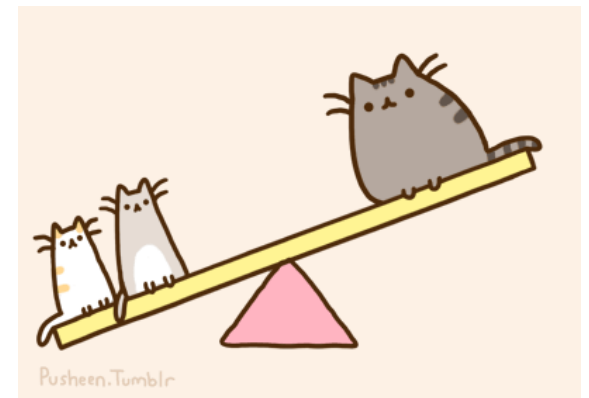
活動 3 動力的傳送



習作指導與說明

- When we talk about simple machines ,

What will you think about ?



Archimedes said, “Give me a place (fulcrum) to stand on, and I will move the earth.”

Why?



- <https://www.youtube.com/watch?v=YIYEi0PgG1g>

- What do you see in this video?

# 活動 1

# 認識槓桿 **Lever**

## 1-1 槓桿原理

Have you ever played seesaw before?

How to reach  
the balance?





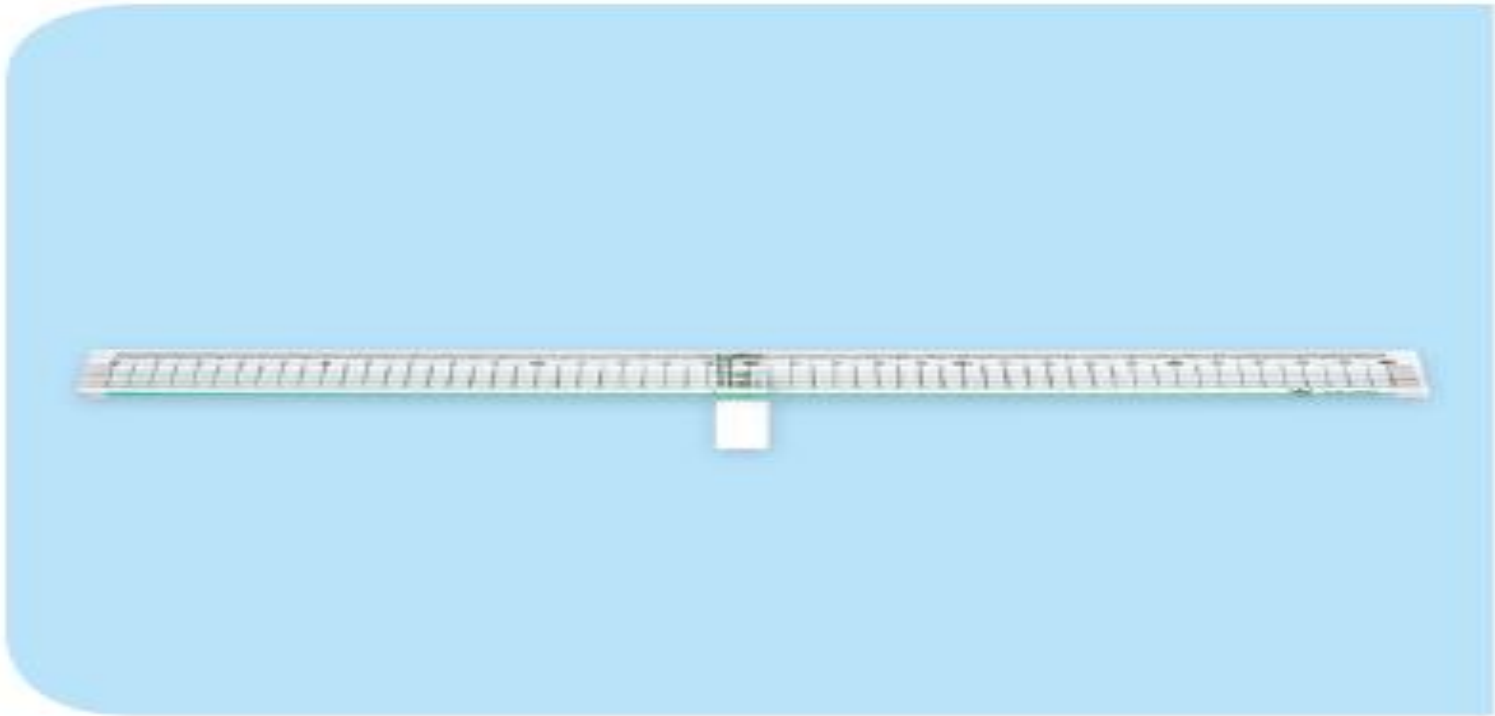
- Discuss in groups.
  - How does the boy lift the girl?
  - Does she move **backward** or **forward**?



# Operate

## 簡易翹翹板

Let's use **eraser** and **ruler** to make a simple seesaw. Try it!



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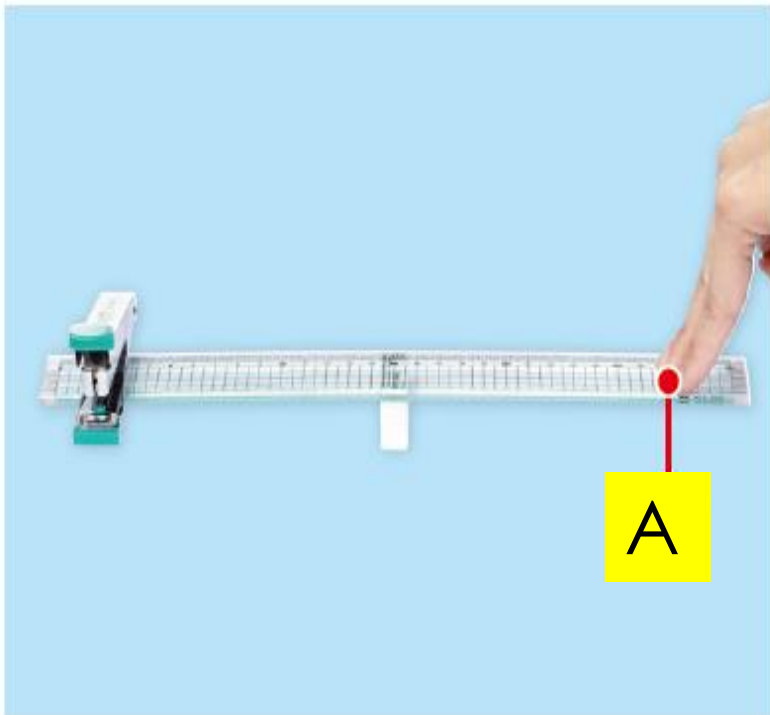


# Operate

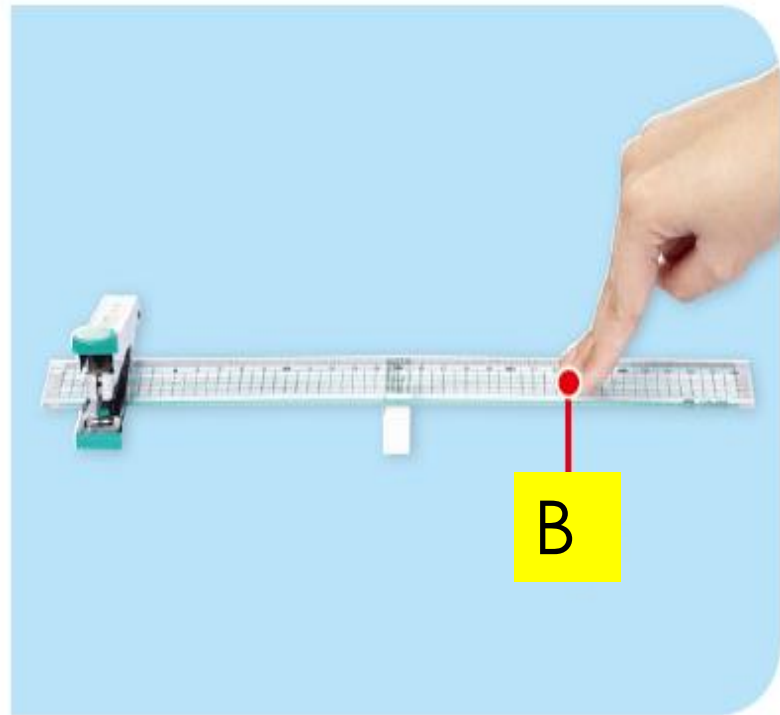
## 簡易翹翹板

### Put a stapler in one side

press the place A



press the place B



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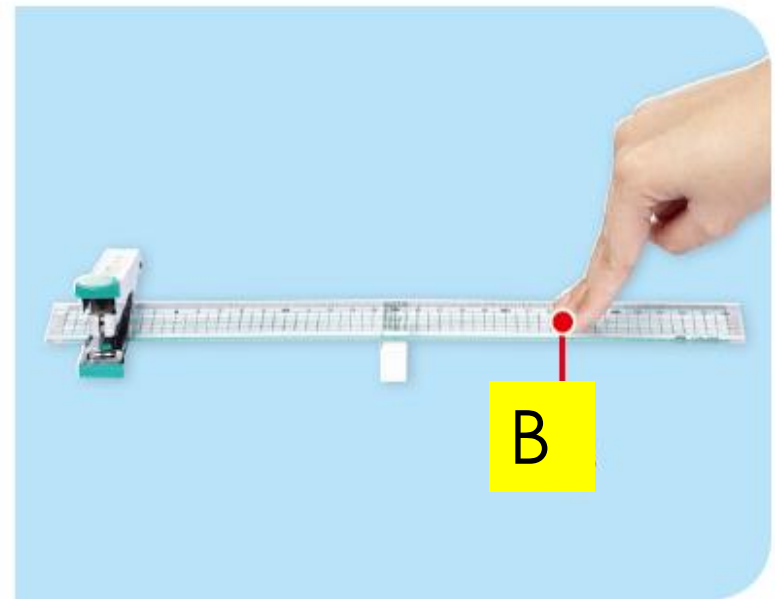
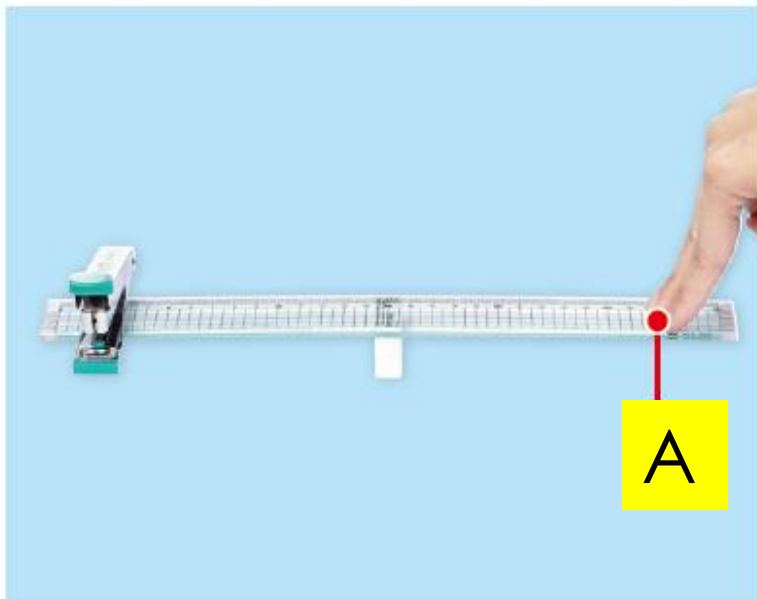
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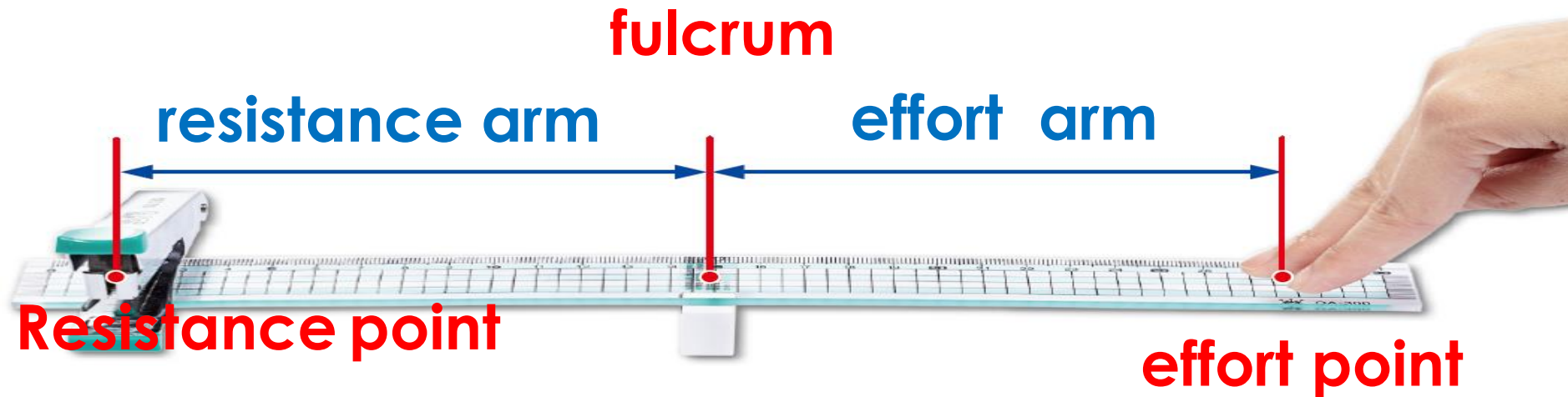


# Discuss

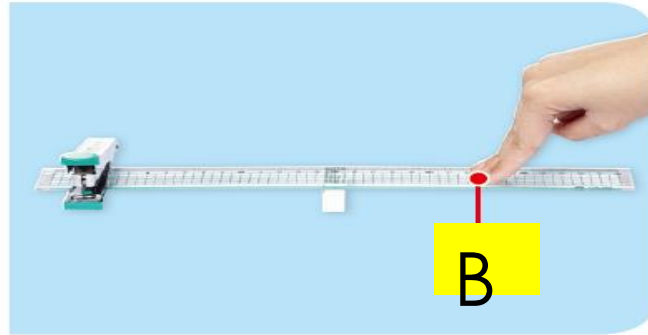
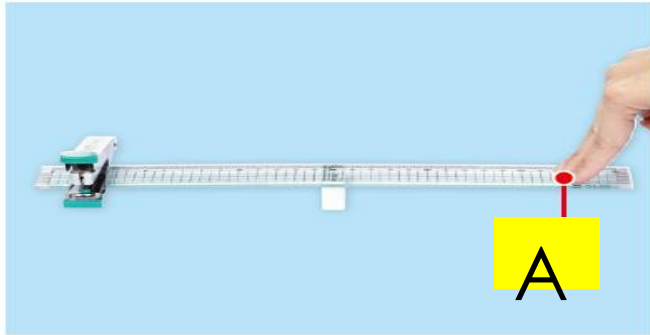
When the stapler is on the same place, where should you press to make the ruler reach the balance with the smaller force? **A**



以簡易翹翹板為例，尺接觸橡皮擦的位置是**支點**；手指用力的位置，稱為**施力點**；放置釘書機的位置，稱為**抗力點**。施力點到支點的距離，稱為**施力臂**；抗力點到支點的距離，稱為**抗力臂**。

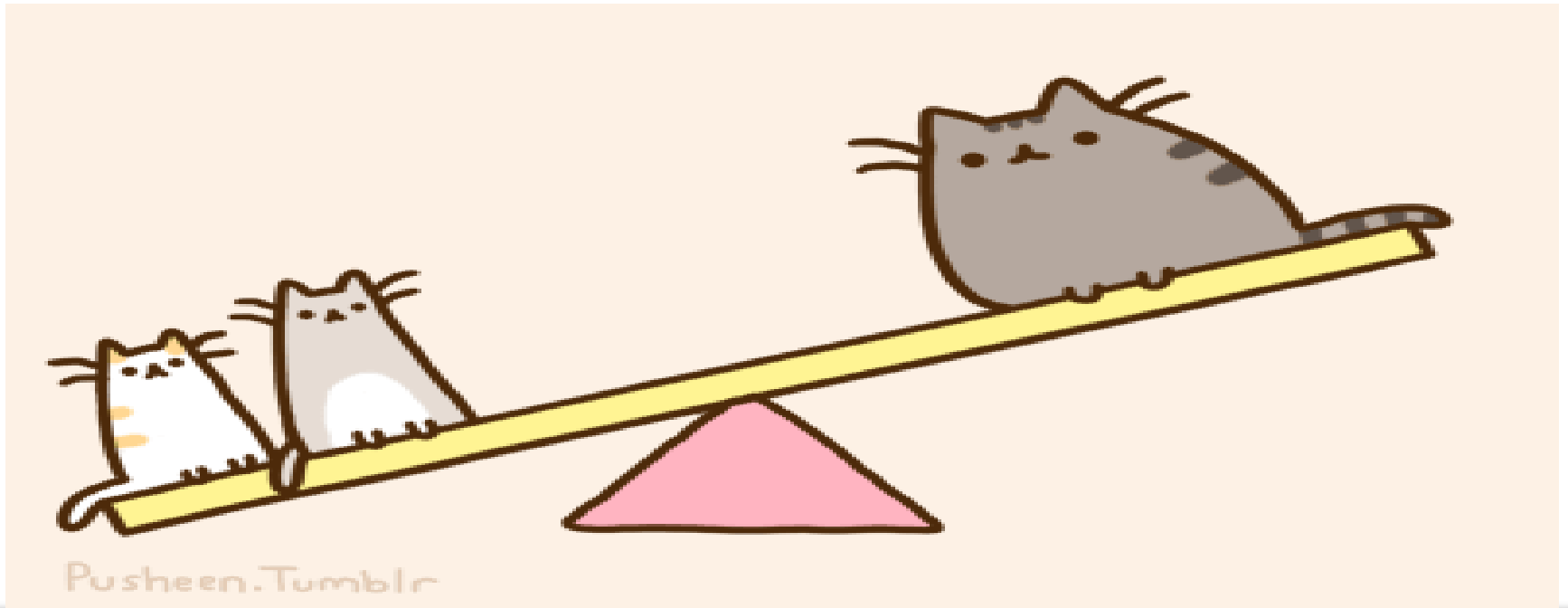


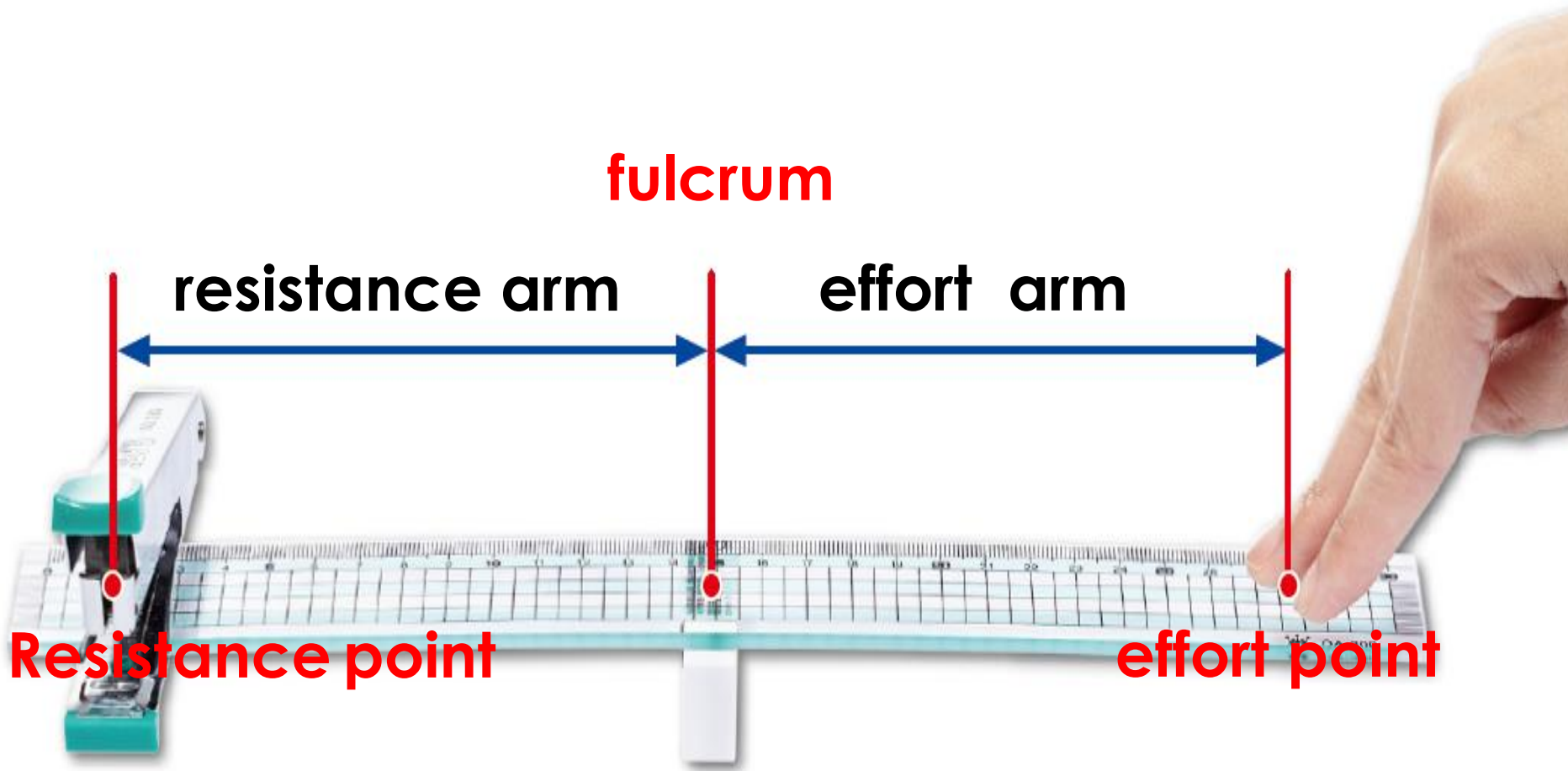
# Explain



- ◆ When **the longer effort arm is**, the force to make the ruler balanced will be **smaller**.
- ◆ When **the shorter effort arm is**, the force to make the ruler balanced will be **bigger**.

When the tool has **fulcrum**, **effort point** and **resistance point**, it uses the **principle of lever**. Seesaw is a kind of application of principle of lever.(槓桿原理)





**fulcrum**

**resistance arm**

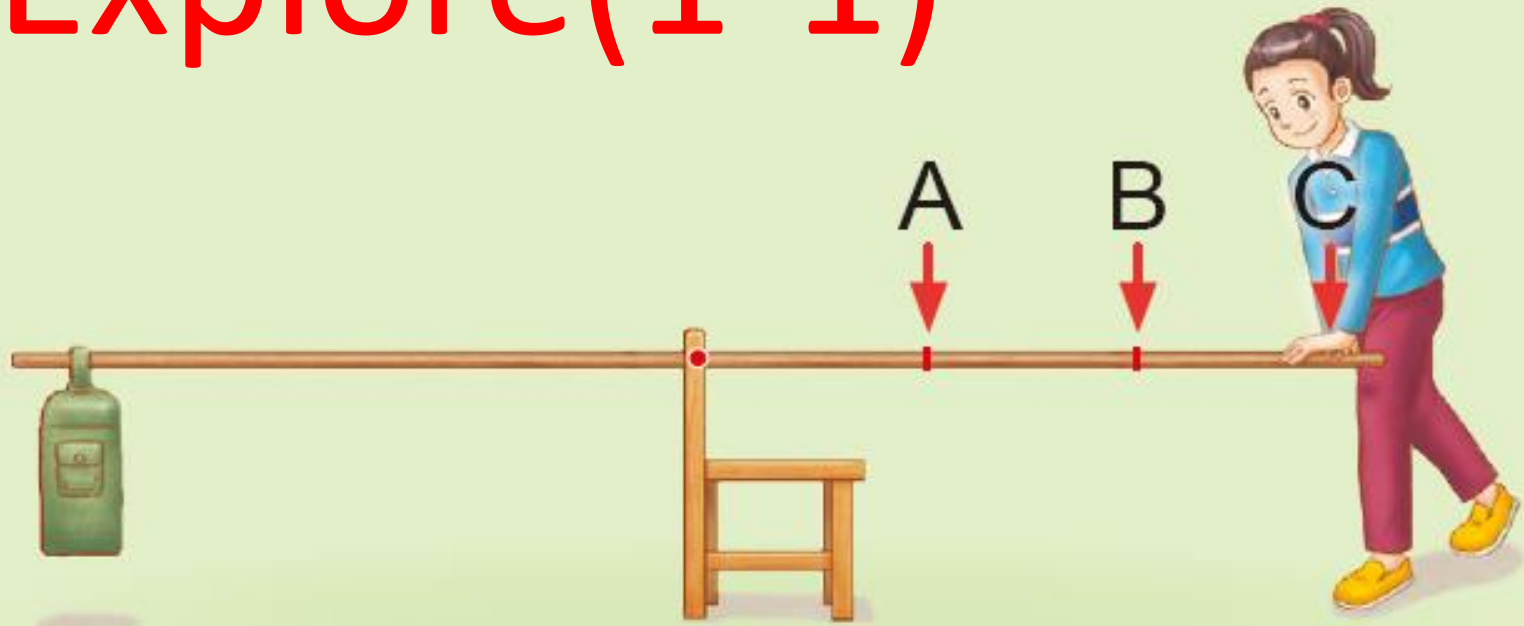
**effort arm**

**Resistance point**

**effort point**

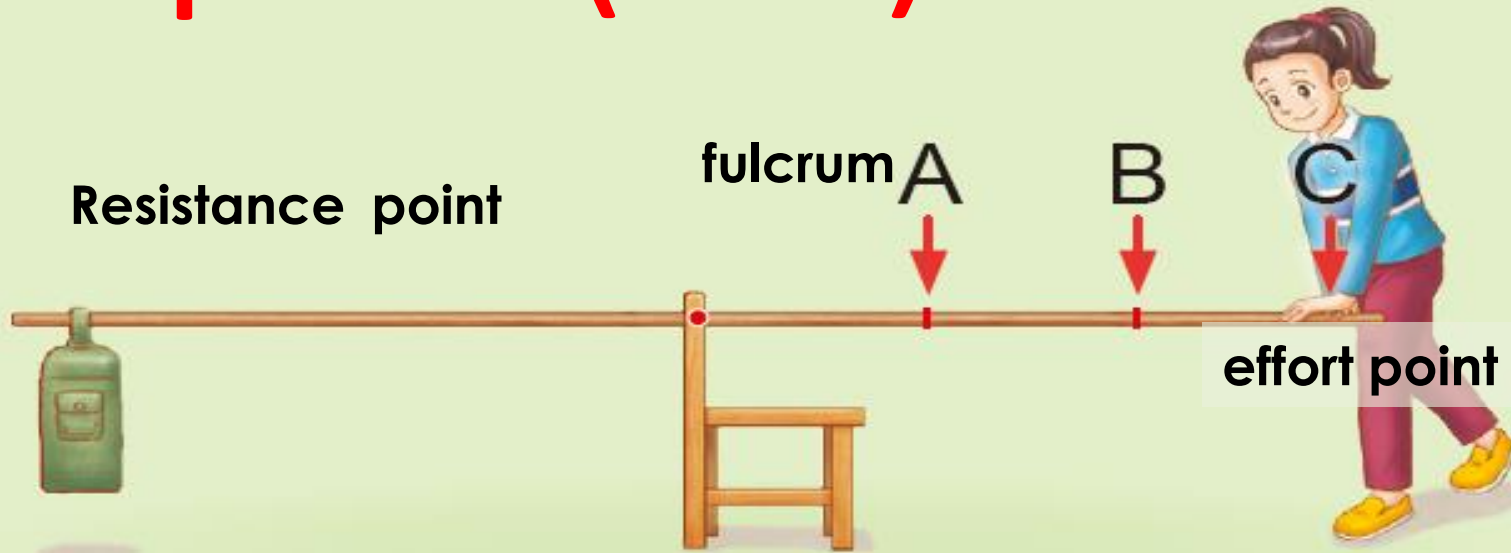


# Explore(1-1)



▲書包位置不變，改變手壓棍子的位置。

# Explore(1-2)



- What is the place of fulcrum, effort point and resistance point?



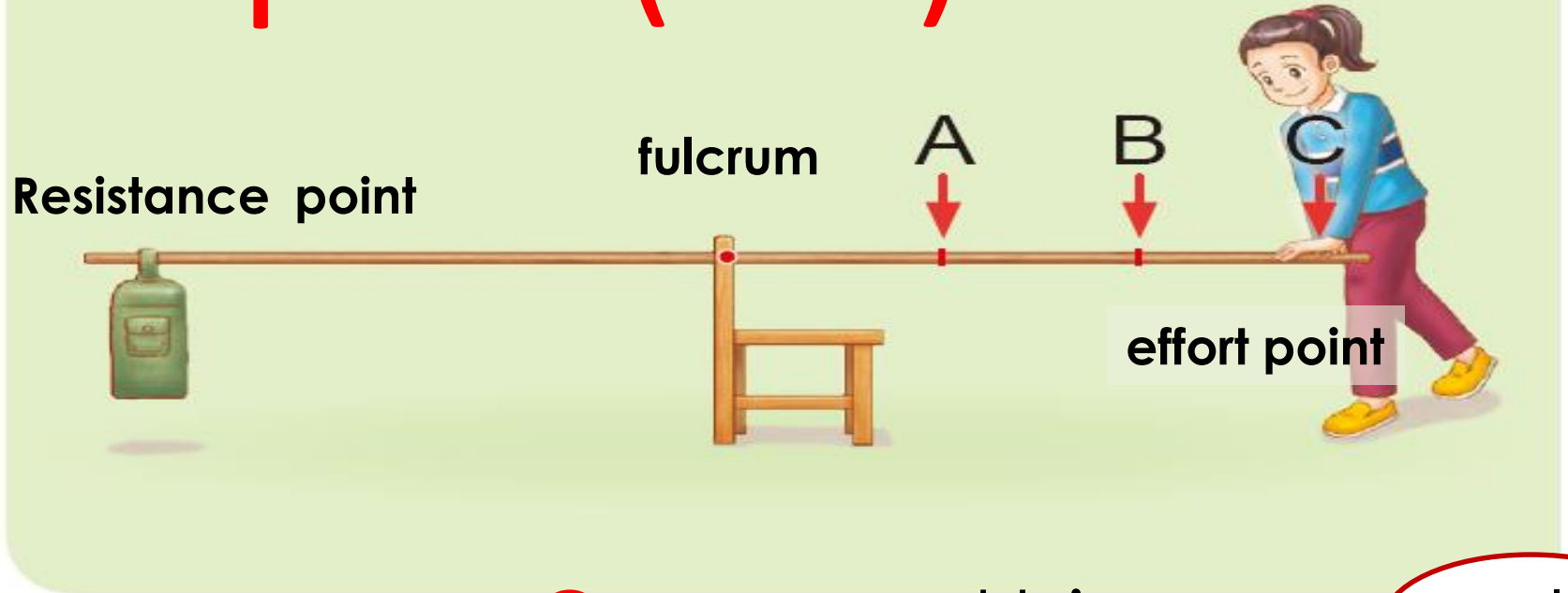
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# Explore(1-3)

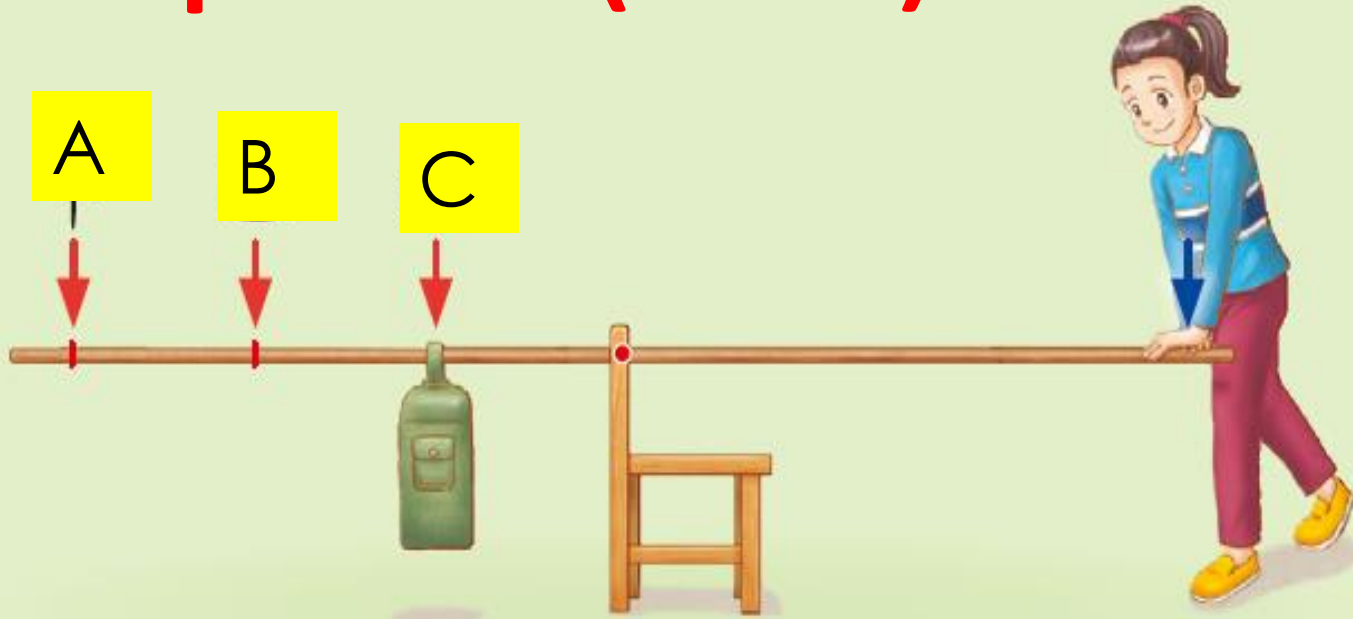


When we press **C**, we need bigger or **smaller** effort.

When we press **A**, we need **bigger** or smaller effort.



# Explore(2-1)



手壓棍子的位置不變，改變書包的位置。



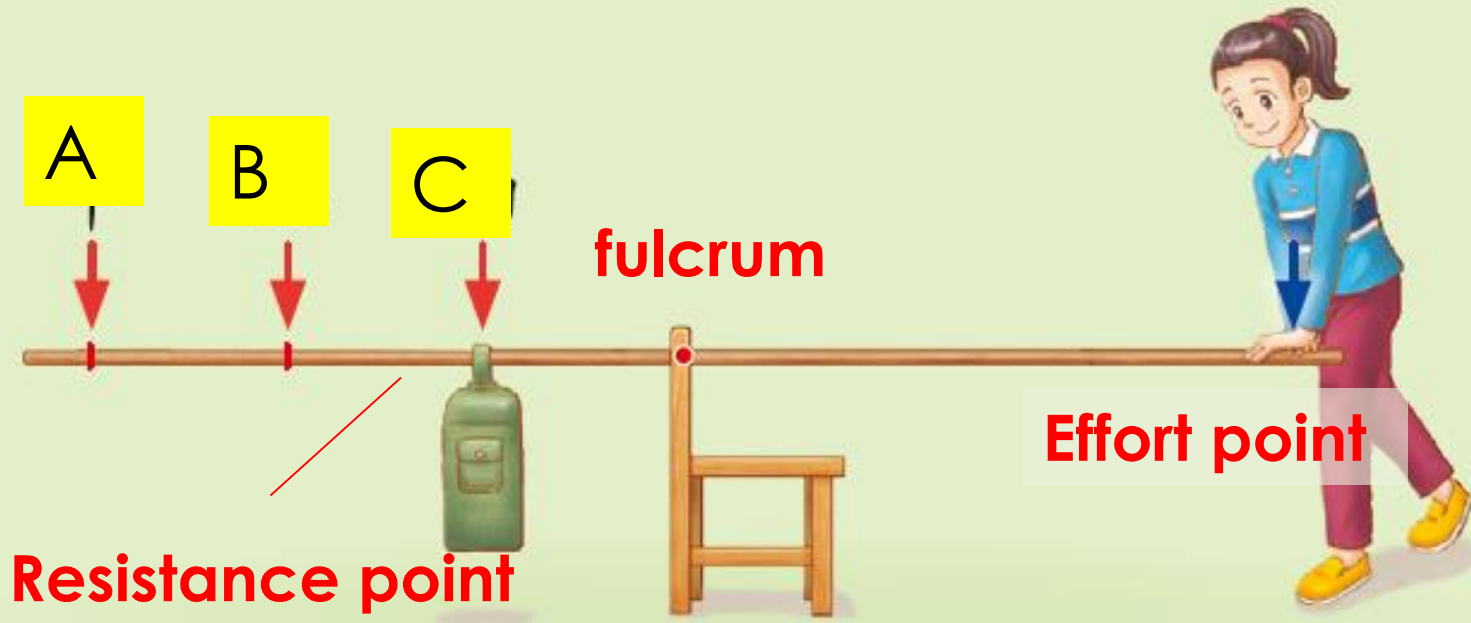
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# Explore(2-2)

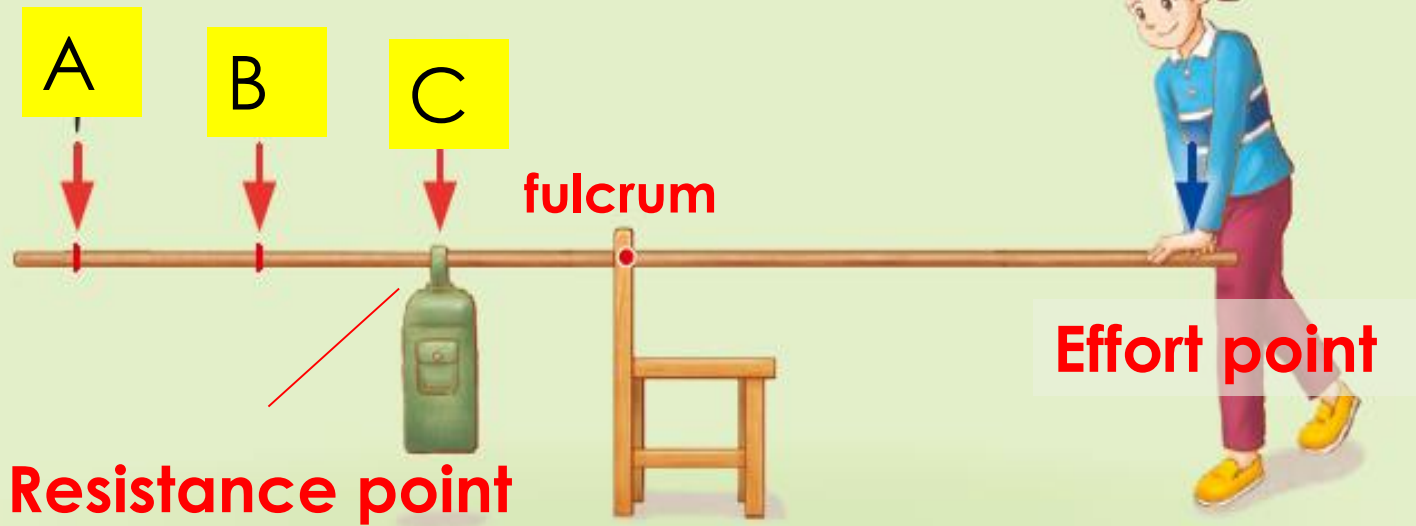


- What is the place of fulcrum, effort point and resistance point?





# Explore(2-3)



改變書包的位置，用力的大小會改變嗎？



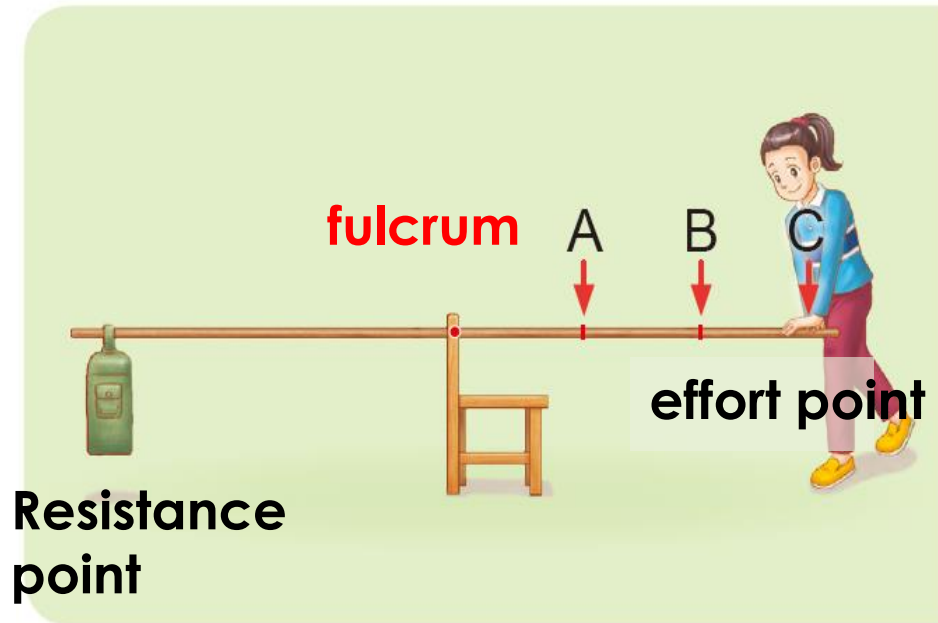
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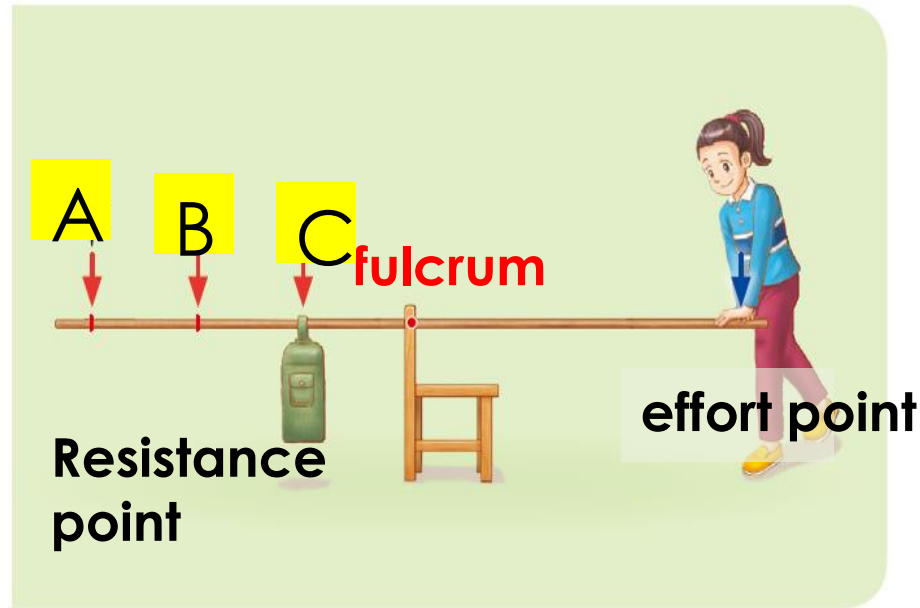
# Explain1



- ◆ When **the longer effort arm (c)**, the force to make the ruler balanced will be **smaller**.

When **the shorter effort arm (A)**, the force to make the ruler balanced will be **bigger**.

# Explain2

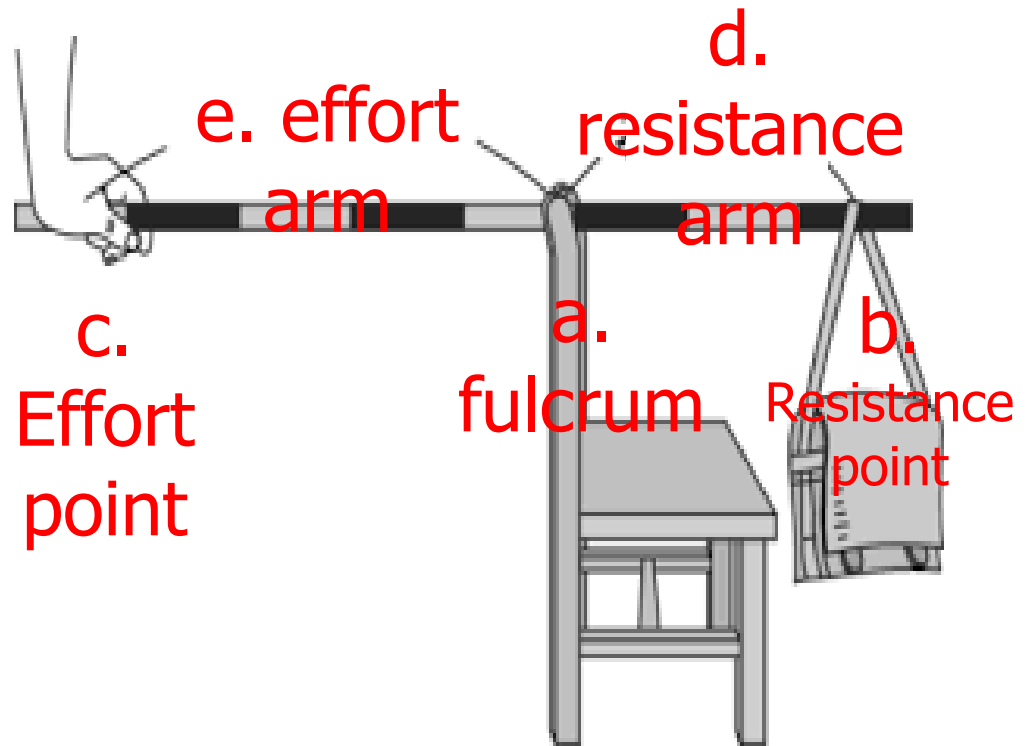


- ◆ When **the longer resistance arm (A)**, the force to make the ruler balanced will be **bigger**.
- ◆ When **the shorter resistance arm (C)**, the force to make the ruler balanced will be **smaller**.

# Test

Where is  
the...?

- a. fulcrum
- b. resistance point
- c. effort point
- d. resistance arm
- e. effort arm



Repeat the terms again 😊

- What have you learned in this class?





# Next time

## A Catapult

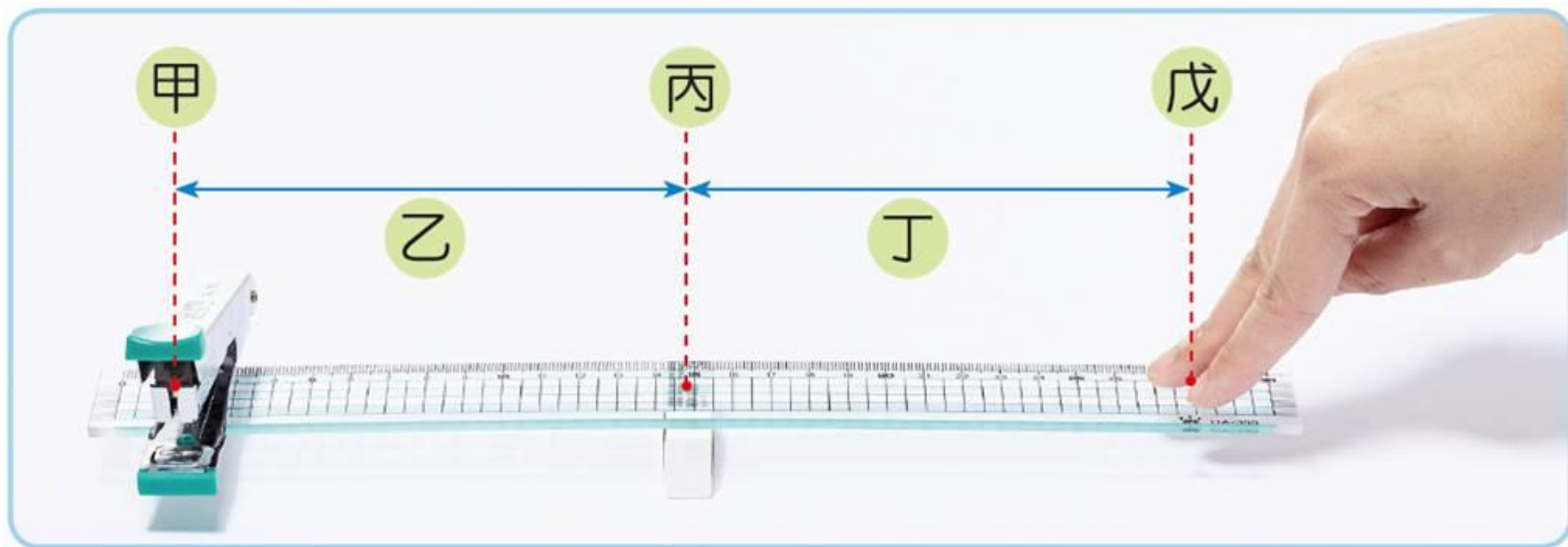
<https://www.youtube.com/watch?v=ky6APmIZRmA>



- Work book

p.3

一、簡易翹翹板是槓桿原理的應用，它的支點、施力點和抗力點分別位於哪裡？施力臂、抗力臂又在哪裡？請在空格中填入代號並回答問題。



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1. 丙 是支點，甲 是抗力點，  
戊 是施力點。

2. 乙 是抗力臂，丁 是施力臂。

3. 當抗力點的位置不變，施力臂越長，使尺達到平衡的施力大小有什麼變化？

施力越小

4. 當抗力點的位置不變，施力臂越短，使尺達到平衡的施力大小有什麼變化？

施力越大

