

# 24.1 Work and Energy (Part I)

Physical  
Science

Summarize main points from each video.

Video Title / topic \_\_\_\_\_

Video Title / topic \_\_\_\_\_

Video Title / topic \_\_\_\_\_

# Topic Introduction



**Summarize your understanding of each paragraph.**

The expression “work” is used in every-day language to convey several meanings. The expression “work” when used in science (physics, in particular) has a specific meaning. When this topic refers to *work*, the science definition is intended (work=force \* distance).

Work is done only when force is applied to an object and the object moves in the same direction as the applied force. Work is calculated by multiplying the force by the distance over which the force is applied.

Take a look at the math formula of  $W=fd$  which translates to work equals force multiplied by distance. Notice that if the force is zero, or if the distance is zero, then the work would also be zero.

As an example, if you try to move a very heavy stone and apply a lot of force toward the effort, but the stone never moves – then according to physics, no work is done. This would be  $W = (\text{big force}) \times (\text{zero distance})$ . Anything multiplied by zero is zero ... so ... zero.

# Read/Summarize Text



1. Read the passage.
2. Underline key expressions in each sentence.
3. Re-write each word (or expression) you underlined.
4. Summarize the passage.

*What is Power? .... Or, as a science pun: Watt is Power?*

Power is another interesting word in physics. Power has a very specific meaning.

**Power is calculated by dividing work by time.**

$$\text{Power} = \frac{\text{work}}{\text{time}}$$

$$P = \frac{W}{t}$$

Whereas work is measured in joules (J), power is measured in watts. The amount of power needed to do one joule of work in one second is called a watt (W).

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*Re-write words you underlined*

\_\_\_\_\_

\_\_\_\_\_

*Using a complete sentence, summarize or rephrase the passage*

\_\_\_\_\_

# Read Text for Comprehension

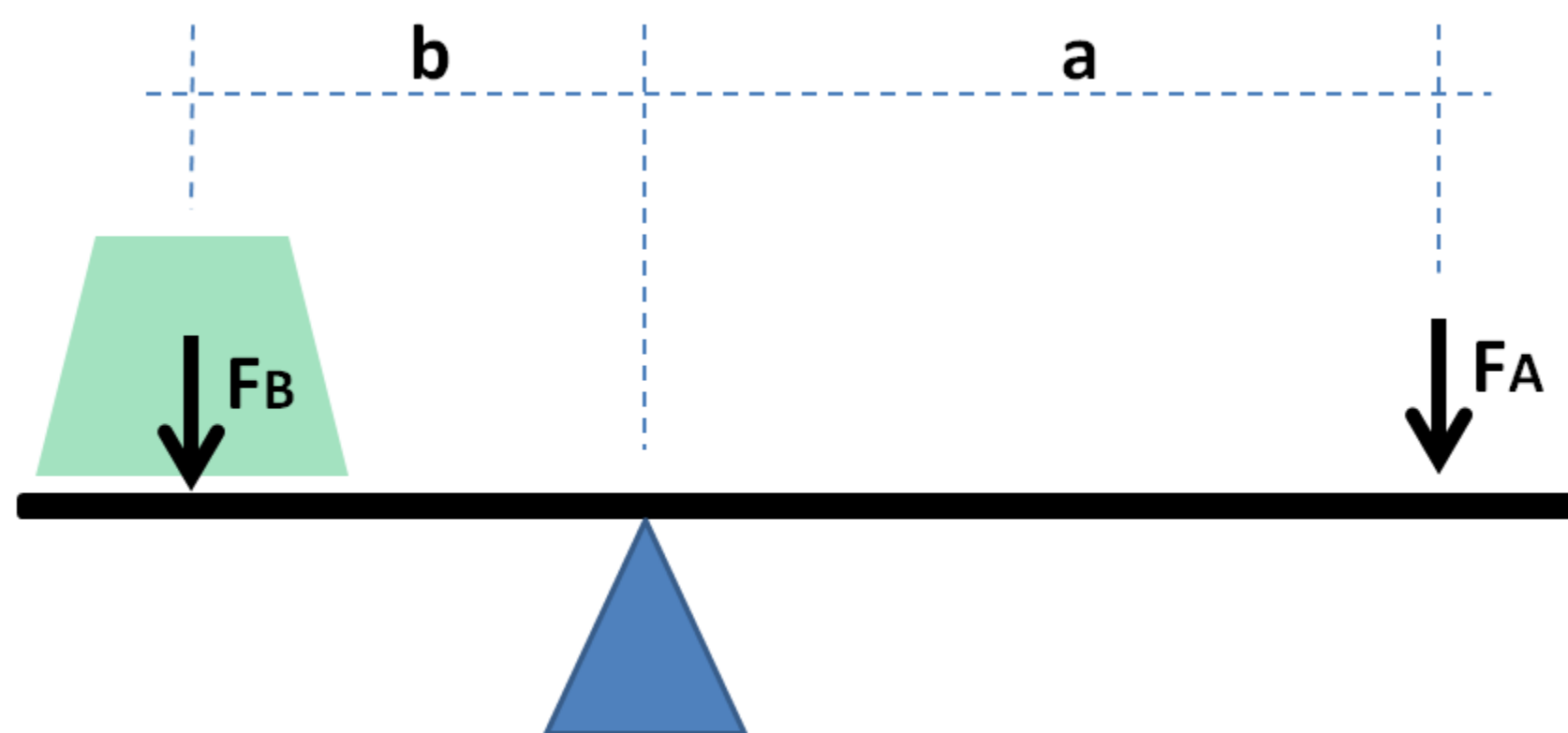
Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

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Mechanical advantage is a measure of the force amplification achieved by using a tool, mechanical device or machine system. The device preserves the input power and simply trades off forces against movement to obtain a desired amplification in the output force.

The lever is a movable bar that pivots on a fulcrum attached to or positioned on or across a fixed point. The lever operates by applying forces at different distances from the fulcrum, or pivot.

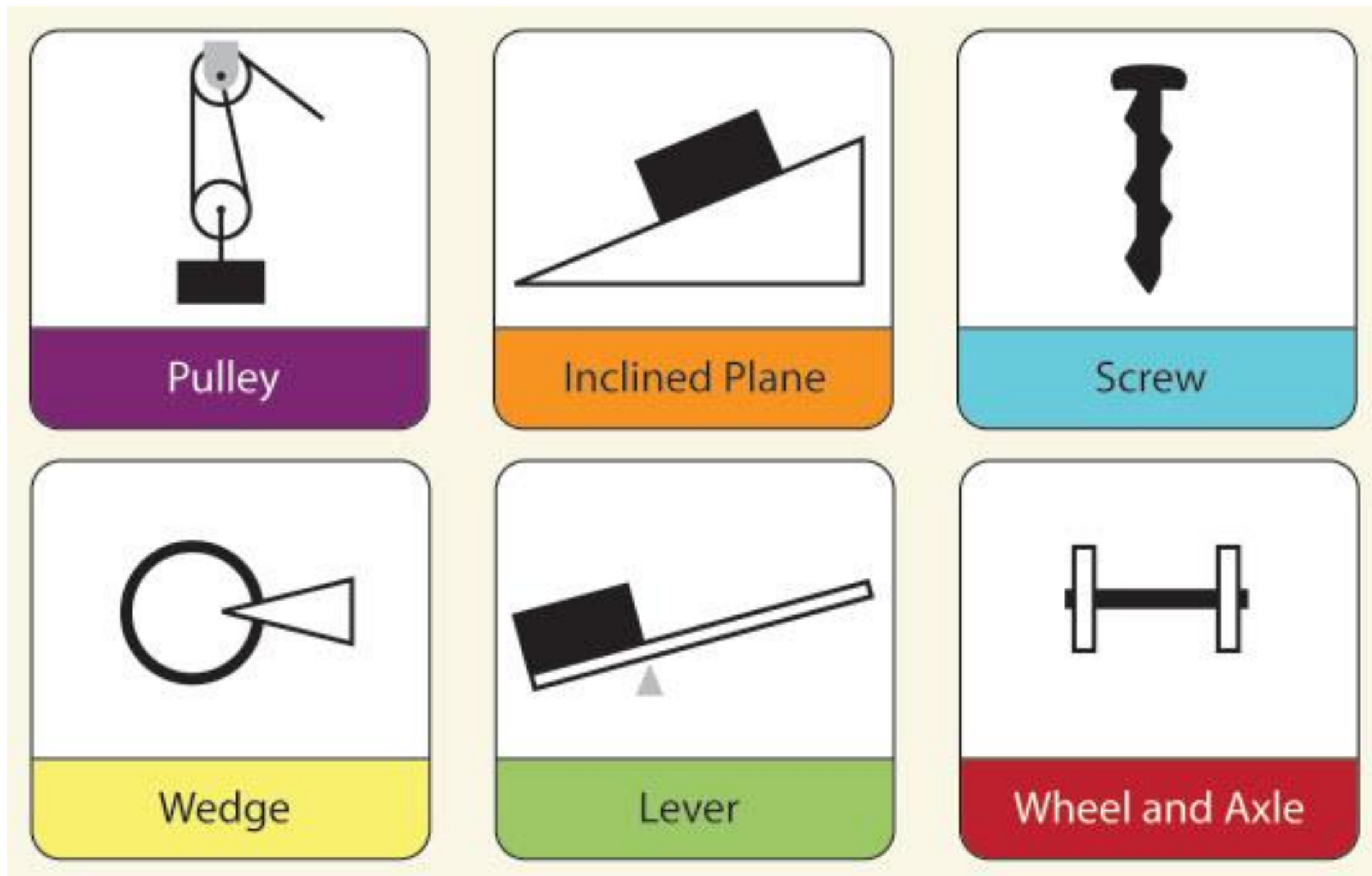
As the lever pivots on the fulcrum, points farther from this pivot move faster than points closer to the pivot. The power into and out of the lever is the same, so must come out the same when calculations are being done. Power is the product of force and velocity, so forces applied to points farther from the pivot must be less than when applied to points closer in.



# Draw Illustration



Copy and Label the Illustration in the Space Provided



<https://www.omegadesign.com>

Draw (Copy) the Illustration Here

Blank space for drawing and labeling the simple machines.

# Interpret a Graph



Write the title of the graph \_\_\_\_\_

Circle the type of chart this represents

*Bar Chart   Line Chart   Pie Chart   Other*

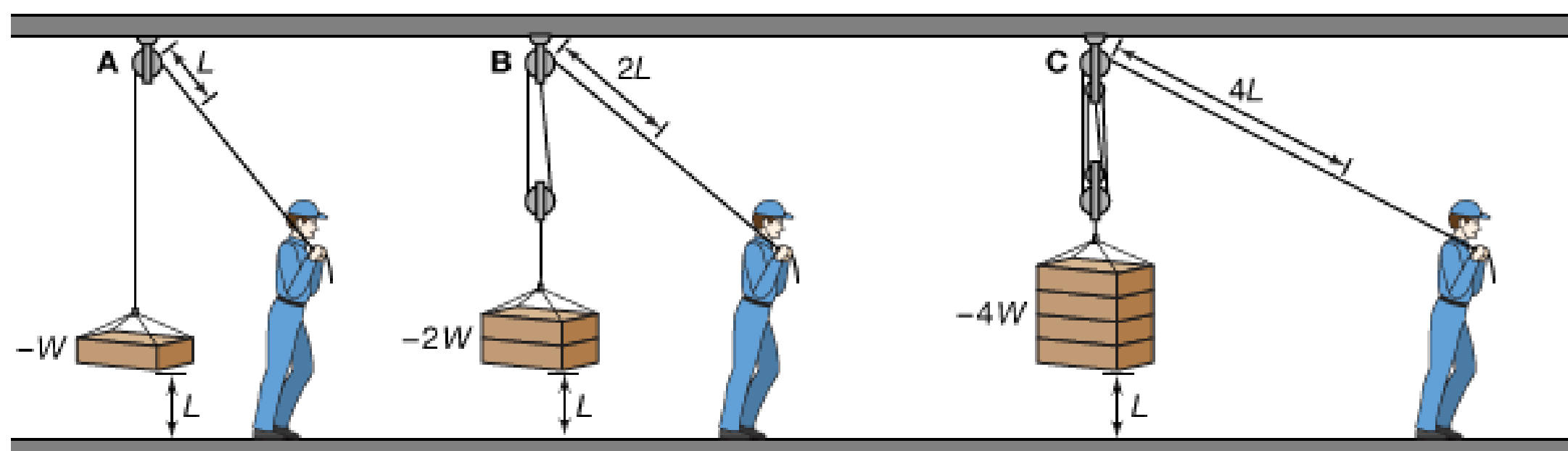
If applicable,

What does the X-axis represent \_\_\_\_\_

What does the Y-axis imply \_\_\_\_\_

Summarize what this graph represents or conveys

<https://kids.britannica.com/students/assembly/view/53665>



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Two

Four

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# Show-Off Your Smarts!



## Instructions

- Complete as an individual or small group.
- Discuss your ideas/answers/responses in a small group.
- Select one person to present your responses to the class.

**Q1. How can this information be applied to a young-person's life?**

**Q2. How does this information apply to (or impact) communities?**

**Q3. When do scientists need to apply this information? How?**

**Q4. How would a person from 100 years ago view this information?**

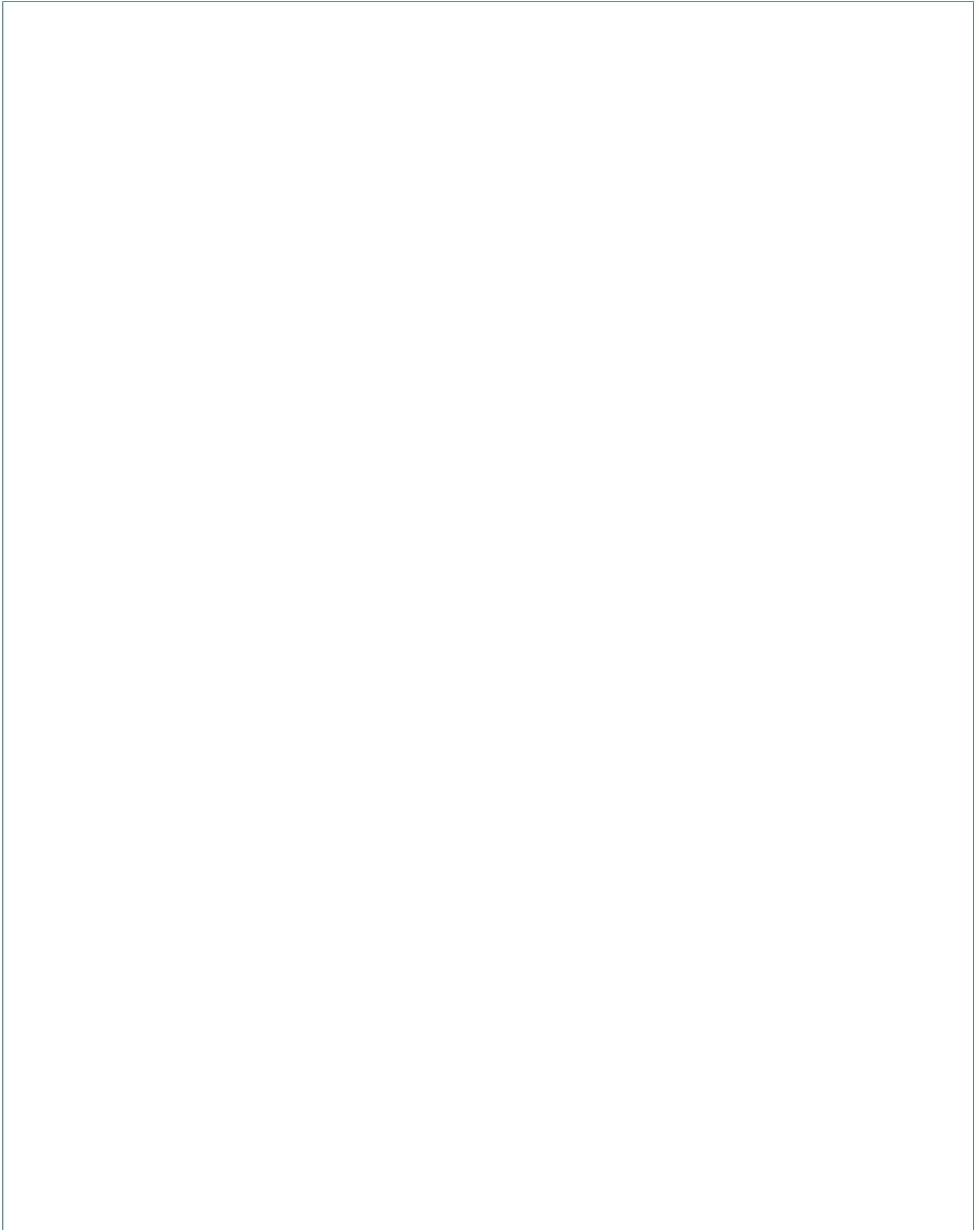
**Q5. How does this topic connect to other science topics or math?**

*Write down at least three words introduced or covered by this topic.*

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

# Make a Poster

In the space provided here, create/draw a poster which conveys the concepts you have learned on this topic.

A large, empty rectangular box with a thin blue border, intended for the student to create a poster. The box occupies most of the page below the instructions.