Wacano Challenges

1. Load, Effort and Fulcrum
    a. Using Diagrams and in your own words explain what you have learnt about in the context of a lever.
        i. Load
        ii. Effort
        iii. Fulcrum

2. First class lever – *Scissors, see saw, crow bar, pliers, tongs, can opener*
    a. Research and find three 1st class levers
        i. Label the pictures with Load, Effort and Fulcrum
        ii. Explain what you know about a 1st class lever
    b. Using Wacano build yourself a 1st class lever

3. Second Class lever – *Wheel barrow, Nutcrackers, hole punch, Wheel barrow, stapler, bottle opener, nail clipper, pliers, can opener, paper cutter(guillotine)*
    a. Research and find three 2nd class levers
        i. Label the pictures with Load, Effort and Fulcrum
        ii. Explain what you know about a 1st class lever
    b. Using Wacano build yourself a 2nd class lever

4. Third class lever – *tweezers, tongs, fishing rod*, *Arm, Baseball bat, Broom, Doors, Mouse Trap, Diving board, Fork, Knife*
    a. Research and find three 2nd class levers
        i. Label the pictures with Load, Effort and Fulcrum
        ii. Explain what you know about a 1st class lever
    b. Using Wacano build yourself a 2nd class lever

5. Simple lever
    a. Explain in your own words what you understand a simple Lever to be
6. Simple linkage
    a. Explain in your own words what makes a simple linkage
7. Levers and Linkages
    a. Using Wacano build yourself a simple linkage, different from the ones above
    b. Take a photo and explain the motions you see
8. Mechanical advantage (MA= load ÷ effort) for example (500N load ÷ 100N effort = 5 MA)
    a. Using what you have learnt above work out the MA below
        i.
        ii.
        iii.

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9. Using your Wacano build yourself a 1st class lever and show the Force as 500N then explain showing all workings out what the effort would be.
    i. Fulcrum is on the SECOND notch of the 5 pin con rod
    ii. Fulcrum is on the THIRD notch
    iii. Fulcrum is on the FORTH notch

10. Using Mechanical advantage can help you work out how to manoeuvre something heavy with very little effort, explain in your own words
    i. Why
    ii. What is the pay-off for this ***(clue: read about Velocity ratio)***

11. Reverse motion
    a. Research a reverse motion linkage and explain using words and pictures what you have found
    b. Using Wacano build yourself a reverse linkage, take a picture and label
        i. The fixed pivot point
        ii. Any other pivot points
        iii. Explain with arrows the input and output directions

12. Parallel motion
    a. Research a Parallel motion linkage and explain using words and pictures what you have found
    b. Using Wacano build yourself a Parallel motion linkage, take a picture and label
        i. The different pivot points
        ii. Explain with arrows the input and output directions

13. Bell crank
    a. Research a Bell crank linkage and explain using words and pictures what you have found
    b. Using Wacano build yourself a Bell crank linkage, take a picture and label
        i. The fixed pivot point
        ii. Any other pivot points
        iii. Explain with arrows the input and output directions

14. Motions, there are four different types of Motion, with words and pictures rotary
    a. Rotary
    b. Reciprocating
    c. Linear
    d. Oscillating

15. We can join different levers together to change direction of motion, you have written about changing direction on a linear path. Now research and show in words and pictures how we can change rotary into;
    a. Linear
    b. Reciprocating
    c. Oscillating

16. Crank, link and slider
    a. Research a Crank link and slider then explain using words and pictures what you have found
    b. Using Wacano build yourself a Crank link and slider, take a picture and label
        i. All pivot points
        ii. Show all motions
        iii. Explain with arrows the input and output directions

17. Peg and pivot
    a. Research a Peg and Pivot (otherwise known as a peg and slot) then explain using words and pictures what you have found.
    b. Using Wacano build yourself a peg and pivot, take a picture and label
        i. All pivot points
        ii. Show all motions
        iii. Explain with arrows the input and output directions

18. Treadle link
    a. Research a Treadle link then explain using words and pictures what you have found.
    b. Using Wacano build yourself a peg and pivot, take a picture and label
        i. All pivot points
        ii. Show all motions
        iii. Explain with arrows the input and output directions

19. Spur Gears
    a. Research Spur Gears and in your own words with diagrams explain what a gear is.

20. Gear train,
    When you put 2 or more spur gears together you form a gear train. Research gear trains then
    a. Using Wacano build yourself a gear train, take a picture and label
        i. Direction of the gears
        ii. Driven and driver gears
        iii. Speed of the different gears *(faster, slower or the same speed as the driven)*
    b. Explain what you mean by driver and driven

21. Gear ratio's
    a. The different speeds of the gears we call Gear ratio
        i. What is another name for gear ratio?
        ii. Show the formula we use to work out a gear ratio
    b. In the Wacano set look at the four different size spur gears
        i. Choose two work out the gear ratios
        ii. Choose another two and show the gear ratio
        iii. Now put three or four together and show the gear ratio

22. Idle gear

    Research idle gears and explain using words and pictures
        i. What they are
        ii. What they do
        iii. Where you will find them

23. Compound gear train
    a. Research compound gear trains and in your own words explain the
        i. Difference between a compound gear train and a normal gear train
        ii. Advantages and disadvantages if any between the two
    b. Using Wacano build yourself a compound gear train and show the pictures with labels

24. Rack and pinion
    a. Research and explain using words and pictures
        i. Rack
        ii. Pinion
        iii. How they work together
        iv. Where you would find one in the real world
    b. Using Wacano build a rack and pinion, take a picture and label it. *(clue: you will need to use sliders guides)*

25. Pulleys
    a. Research pulley systems and explain using words and pictures
        i. Pulley wheel
        ii. Pulley system
        iii. Torque
    b. Show using the Wacano a simple pulley system
    c. Show reverse motion on the same pulley system