**Work and Power**

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|  | Work: **W = Fd** |
| 144 J | 1. How much work does Fred do exerting 45 N to lift a box 3.2 m? |
| 7.5 m | 2. What distance will 90 J of energy slide a box against 12 N of frictional force? |
| 1.25 N | 3. Katherine moves a box 7.2 m doing 9 J of work. What is the frictional force? |
|  | Work and weight and friction: **W = Fd, F = mg or F = μmg** |
| 4060 J | 4. How much work is needed to lift a 45 Kg box 9.2 m? |
| 102 Kg | 5. A pump does 4500 J of work in a minute. What mass of water can it pump to a height of 4.5 m in one minute? |
| 425 m | 6. A rifle cartridge contains 250 J of energy. How far can it launch its 60 gram slug into the air if it is shot straight up? |
| 27,900 J | 6.1 What work do sled dogs do dragging a 134 kg sled 170. m across a lake where the coefficient of friction is 0.125? |
| 0.765 | 6.2 If it takes 1640 J of work to slide a 16.2 kg box 13.5 m across a floor, what is the coefficient of friction between the box and the floor? |
| 18.9 kg | 6.3 If it takes 1350 J of work to drag a sled 56.0 m across a frozen lake where the coefficient of friction is 0.130, what is the mass of the sled? |
|  | Power: |
| 60 W | 7. A motor can do 540 J of work in 9.0 seconds. What's its power output? |
| 18 s | 8. In what time can a 250 W motor do 4500 J of work? |
| 7500 J | 9. How much work does a 25 W motor do in 5 minutes? |
|  | **Jambalaya !!!!!!!** |
| 35280 W | 10. What must be the power rating of a motor that can lift a 600 Kg load 30 meters in 5 seconds? |
| 188 W | 11. A sled dog drags a 240 Kg sled 50 m in 35 seconds when the coefficient of friction between the snow and the runners is .056. What is the power output of the dog? |
| 2870 s | 12. Greg LeMond can put out 3/4 of a horsepower. (1 HP = 745.7 W). In what time can he climb a 2000 m mountain if he and his bike have a mass of 82 Kg? (Ignore Friction) |
| 895 N | 13. My van can only go about 25 m in one second on a level road at full power. (30 HP,1 HP = 745.7 W) What must be the force of friction opposing my van? (most of this is air friction and drag) |
| 163 Kg | 14. A steam engine must drag logs across 45 m of level rock. if the coefficient of friction between the logs and the ground is .78, and the engine can put out 5 Horse power (1 HP = 745.7 W), what is the maximum mass of logs it can drag in 15 seconds? |
| 4790 m | 15. A hiker can put out 250 W of power. If they have a mass of 72 Kg and are carrying a 43 Kg pack, what elevation gain can they expect to achieve in 6 hours of hiking? |