

14. "The Moon". Determine experimentally the ratio of brightnesses (luminescences) of sunlit and nonsunlit parts of the Moon for different phases. Compare your results with theoretical estimates.

15. "Hydroplane". Produce, please, a hydroplane with engine made from the piece of soap. Your hydroplane has to win in two competitions: on the distance of 50 cm it must show the shortest time and it must be able to cover maximal distance (for every competition you may produce it's own hydroplane). Linear sizes of hydroplane can't be more than 6.28 cm. For the second competition hydroplane can't have more than 0.5 gram of a soap.

16. "Sunset". During sunset the Sun becomes red. What color may have the Moon, Venus or bright star just above the horizon?

17. "Epigraph". What epigraph for the tournament problems can be used as a foundation for serious scientific investigation and just for jokes. Suggest, please, epigraphs of both kinds.

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- Is it a black berry?
- No, it's red!
- Why is it white?
- Because it is green!

1. "Invent yourself". Suggest, please, several demonstrations and experiments, which give possibility to show and explain physical nature of sound and it's properties.

2. "Fortune-teller". If one drops by melted paraffin into a saucer with water, he obtains various shapes of solid pieces: "lens", "boat", "spot". Investigate, please, dependance of shape of these pieces from the height of dropping.

3. "Geizer". Powerful ceramic resistor, having cylindrical form, is plunged into the water so, that it's axis is vertical, the upper edge of the cylinder is slightly over or below the level of water surface. If now one lets the current pass through this device the resistor begins periodically to make fountains of hot water like a geizer. Calculate and investigate experimentally, please, how period of pulsation depends on power of current flowing through the resistor.

4. "Selfexcitation". Sometimes there happens strong buzzing at the concerts of inexperienced rock-groups. It happens when mic is placed near the dynamic, reproducing amplified signals of the same mic. How the frequency and amplitude of these sound vibrations depend on the distance between mic and dynamic and on their mutual orientation?

5. "Cosmic monument". Some supercivilization intends to create a cosmic monument: an isolated planet system consisted of 3 planets, where one of them ought to move along almost triangle trajectory. What ratios of masses and velocities of the planets can you recommend for this supercivilization. Prepare also the project for almost square trajectory.

6. "Radiation measurement". Produce a device, measuring level of radioactivity and investigate by this device the main sources of radiation in common life.

7. "Runner". Estimate, please, the maximal velocity of running for the human being. What will be world record for 100 m running in the year 2000?

8. "TV-screen photo". It is possible to investigate the motion of blinds of your photo camera and determine the velocity of their motion. In this way measure, please, exact values of exposures for your photo camera and its blind velocity.

9. "Passive propeller". Apple, falling from the upper store of multistored building, will come down to the hands of your friend standing downstairs absolutely quiet if it will have passive propeller, cut from the dense paper on the axis rest behind the apple. Explain, please, the principle of action of this kind of parachute and investigate how force of resistance depends on the velocity of falling and on the size of the propeller.

10. "Hunter's gun". It is possible to shoot from a hunter's gun by small knitting needle with two pieces of paralon on it. Find, please, optimal sizes of tube for shooting by the projectile. What maximal velocity could you achieve?

11. "Golden cube". Cubic planet made from the pure gold is rotating around the sun, always facing the sun by the same side. Estimate, please, temperature difference between various sides of the cube.

12. "Small ship". Light ship is swimming on the surface of electrolytic liquid. If one switches on the electric current through this liquid, the ship begins to move. Estimate, please, the velocity of such ship.

13. "Wooden cube". A small cube is cut from some tree. The size of this cube is much smaller than the diameter of the tree. Suggest the way for determination of wood fibre direction in this cube, if one considers as a positive direction the one from the roots to the top of this tree.