

## 3rd IYNT 2015

### *Invent Yourself* problem statements for the Science Fight 3

#### **Belarus-Spectrum**

##### **1. Invent yourself: Physics**

Investigate the parameters affecting the precise weighting of solid objects with the mass of 10-100 g, and find what maximal gain can be attained by unfair jeweler who sells gold or diamonds. It is assumed that the jeweler makes weighting with certified electronic scales and cannot make any changes in the mechanism of the scale itself and add extra weight.

##### **2. Invent yourself: Biology**

Invent an express method that allows quantitative study of the dynamics of bacterium concentration in liquids. Choose one bacterial type and explain the necessity for providing such study.

##### **3. Invent yourself: Chemistry**

Describe important requirements for potatoes storage and make a design of the most advantageous storehouse.

#### **Bulgaria**

##### **1. Invent yourself: Physics**

Weigh precisely large number of solid objects, which are supposed to have equal masses in the range of 10 to 100 grams. Represent the results of your measurements in appropriate way and interpret them.

##### **2. Invent yourself: Biology**

Describe the general characteristics of a species of anfilamentous fungi. Study the development of fungi in time. Measure the relevant parameters, describing the culture's growth.

##### **3. Invent yourself: Chemistry**

What happens to a potato tuber, from a chemical point of view, during its lifetime - from the moment of its planting till the moment it becomes chips? Investigate in details the final stages of its life, before and shortly after the packing process.

#### **China**

##### **1. Invent yourself: Physics**

How does temperature influence the result of weighting an object with an electronic balance?

##### **2. Invent yourself: Biology**

In what practical ways can we measure the speed of bacteria's reproduction?

##### **3. Invent yourself: Chemistry**

Investigate the chemical reactions in the process of frying potato.

## **Croatia**

### **1. Invent yourself: Physics**

Investigate influence of buoyancy on weighting objects in air. Is weight of 1 kg of lead bigger than 1 kg of feather in atmosphere?

### **2. Invent yourself: Biology**

Using yeast propose methods for determining quantity of yeast in constrained space.

### **3. Invent yourself: Chemistry**

Using chemistry properties of grown potatoes before and after boiling propose a method of time measuring.

## **Georgia-Georgians**

### **1. Invent yourself: Physics**

When buying jewelry sometimes it is very important to measure weight precisely. Study how do modern electronic balances work and reveal their possible flaws.

### **2. Invent yourself: Biology**

All children enjoy playing in the sand. There are special places for it, but are they safe or not? Can we prevent the danger? Investigate how effective different kinds of soaps are against the microbes in the sand and how relevant is the information given in the advertisement?

### **3. Invent yourself: Chemistry**

Different people have different tastes. Some of them like fried potato others boiled potato. We have to investigate which way of cooking is more healthy?

## **Russia-MG 12**

### **1. Invent yourself: Physics**

Calculate the error in the measurement of mass of object by balance, taking into account external factors.

### **2. Invent yourself: Biology**

Confirm the efficiency of using herbal decoctions to fight the microorganisms that cause inflammations in human mouth.

### **3. Invent yourself: Chemistry**

Potato sometimes gets dark when it is boiled. Explain the reason of this phenomenon. Suggest some ways of boiling potatoes without getting dark.

## **Russia-Voronezh-1**

### **1. Invent yourself: Physics**

Measure the object mass in the interval from 10 to 100 g, determine the precision of measurement and interval factors influence on results of experiment.

### **2. Invent yourself: Biology**

A good housewife always knows how to cook delicious pies. Yeast is her main helpers. What novice baker need to know about these microorganisms?

### **3. Invent yourself: Chemistry**

The study of the processes of taking place in the potatoes during the growing and as a result of cooking and frying potatoes. How starch affects these processes?

## **Russia-Voronezh-2**

### **1. Invent yourself: Physics**

Everyone knows that the scales have limits on the allowable weight. What happens if we weighed outside the boundaries of limits?

### **2. Invent yourself: Biology**

As we known, the amount of proteins in animal and plant cells is significantly different: in the former there is much more of it. Define the content of proteins in the yeast cells.

### **3. Invent yourself: Chemistry**

Everyone noticed that after cleaning the potato the vegetable getting darker. Explain it. How fast the vegetable became darker? What does it depend?

## **Serbia-1**

### **1. Invent yourself: Physics**

We parameterized all of the effects on changes in measurement of objects weighing 10-100g and investigated how changes of these parameters affect the precise weighing of these objects.

### **2. Invent yourself: Biology**

We investigated how does the change of the concentration of sugar affect the reproduction rate of yeasts.

### **3. Invent yourself: Chemistry**

We investigated the chemical processes that take place when we fry the potatoes.

## **Serbia-2**

### **1. Invent yourself: Physics**

We have parameterized all of the effects on changes in measurement of object weighting 10g-100g. After that, we have investigated how changes of these parameters effect the precise weighting of these objects.

### **2. Invent yourself: Biology**

We have investigated the influence of different quantities of lead on the residency of bacteria in the soil of the Belgrade.

### **3. Invent yourself: Chemistry**

We have investigated the process of decomposition of starch to amylose and amylopectin during cooking potato. To prove this process we have done two experiments-first with potatoes and iodine tincture and other starch and iodine tincture.

Collected from the teams and released on June 17, 2015.