

Infection

an outdoor game that represents the danger of a worldwide pandemic of some infectious disease

A new unknown virus has appeared on Earth, which caused a pandemic of a deadly disease. The mankind is endangered. Will the researchers with cooperation with the pharmacists and doctors be able to make an antibody in time, or will the disease be faster?

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Physical stress: 4 - high

Psychological stress: 2 - low

Preparation time: 60 min.

Number of instructors: 1–4¹

Time needed: 90 min.

Number of players: 15–35

Age group: secondary school pupils

Environment: forest, rough and hilly landscape, natural obstacles, the area should be adapted to the physical capability of the players

Daytime: any

Season: any

Material: Flowers made from the paper (hanging on a tree on a rubber band or a string) containing a cipher, glass or plastic marbles, aluminum foil, scarves or colored ribbons, conversion tables of ciphers for the researchers (see Annexe 1), pencils and papers for the researchers.

Subject / Seminar: Biology (the biology of viruses), Physical Education

Theme summary: Education towards Thinking in European and Global Context, Environmental Education

Expected outcome:

- the player understands and learns how to describe the mechanism and the speed of spreading of an infectious disease – a pandemic that hits all continents

¹ The higher number of instructors is needed in the case that shamans use the ropes to get the flowers down from the trees (in the first part of the game). The instructors can belay them.

- the player tries out all of the stages of a process of making an antibody, which would stop the disease – from collecting of a natural basis of the drug, over the research in a laboratory, till the distribution in medical facilities
- the player is able to describe dependency and relations between the participants in a drug production process
- the player develops strategic thinking and tactics
- the player develops team skills (accepting of a role, individual responsibility and willingness to cooperate)
- the player gets better in physical competence (stamina, agility and speed)

Characteristics of the game: The players are split into groups – the ones that are infected and the ones that aren't infected (shamans, researchers, pharmacists, doctors). The goal of the infected is to infect others. The goal of the uninfected is to fulfill all the tasks needed for gaining the drug, with the help of their own strategy, and to heal the planet.

Realization:

The players are separated (for example through a draw) into the following groups (see the Table of the Number of Players):

1. The Infected
 2. The Uninfected
 - ▲ Shamans
 - ▲ Researchers
 - ▲ Pharmacists
 - ▲ Doctors
- a) The infected players move with some defect (they have their hand taped to their thigh by an adhesive tape or a scarf). They infect others by a touch and “inflict the defect on them”. Since that, those who were caught, start to behave same as the infected.

The uninfected have to hide themselves before the infected and they also try to develop and distribute the antibody, which will destroy the infection, as fast as possible.

1. At first, the shamans work– they have to take the flowers down from the trees, which represents a basis of the drug. Each flower contains a cipher. The shamans hand over the flowers to the researchers.
2. The researchers have the task to decipher it – this symbolizes a scientific research of the drug. The deciphered message (about the places, where the players can find the vaccines/marbles scattered on the ground) is taken over

by the pharmacists.

3. The pharmacists have to pick up the marbles and wrap them into an aluminum foil, which they have by themselves. The wrapped vaccines have to stay on a given places until the doctors get them.
4. At last, the doctors come into a game. They have had to hide before the infected people so far. Now they have to search for the pharmacists, who hand them over the wrapped vaccine - and so, the doctors can finally start to vaccinate the mankind. The task of the doctors is to take the wrapped vaccines from the pharmacists and, while only holding one at a time, to gather them in a clearly marked “medical facility” (where nobody else can enter, only the doctors).

The game ends when the doctors gather enough vaccines (for example 20 of them) in “the medical facility”, or when the infected spread the disease on every other player.

Other variants:

- a) the uninfected, even if they got the infection, don't become infected and they still have their original role, but they are be excluded from the game for a few minutes. For example, they have to run five times around a certain object or make 100 sit-ups and then they come back to the game in their original role²;
- b) the doctors have the ability to heal the infected by giving them the wrapped up vaccine in the hand.

Review: The instructor lets the players to sum up and interpret the process and the individual phases of the drug development. The instructor explains the term “bioprospecting” to the players (see the Infobox “What's Bioprospecting alias Biopiracy?”).

Methodical notes:

- The flowers contains a ciphered hint (for the types of ciphers see Annexe 2), where the pharmacists can find the vaccines (marbles), for example “at the

² This variant is recommended, because the newly infected could reveal the strategy of the uninfected. Another reason for the choice of this variant is that the infected usually outnumber the uninfected and the game ends quickly, while you play the first variant of the game.

gate of the camp”, “along the northern wall of the dining room”, “under two tall pine trees”, “near a hide”, “next to the birch at the crossroads” etc. There will be about 10 such places. A possible shape of the flower can be seen in Annexe 3.

- The players are distinguished according to the roles by the colored ribbons, which they have tied up on their arms – e.g. doctors – red ribbon, shamans – green ribbon and so on.
- It is necessary to adjust the area, where the game takes part, to the number of players. Excessively large area can be the reason for a game failure.
- It is possible to make a map of the area and plot only a part of information for each group on it. The groups can share the maps with each other, if they want to.
- The researchers don't have to get the conversion table of the ciphers immediately, but they can go for it to “the research facility” (which is marked on the map) instead.

TABLE WITH THE NUMBER OF PLAYERS

Number of players	Infected	Uninfected			
		Shamans	Researchers	Pharmacists	Doctors
15-20	2-3	3-4	4-5	4-5	2-3
21-25	3	4-5	6-7	5-6	3-4
26-30	4	5-6	7-8	6-7	4-5
31-35	5	6-7	8-9	7-8	5-6

What is a Pandemic?

A pandemic is a **large scaled rate of appearance of an infectious disease without spatial borders**. That's why we talk about a pandemic in the moment, when a disease spreads on the territory of multiple states or even continents and it doesn't have any spatial limits.

For its creation, a pandemic usually needs an entirely new type of pathogen, which our organism hasn't met yet. It doesn't know it and it doesn't have developed any antibodies against it. Only in that way can an illness spread quickly across the continents.

In the 20th century, the world suffered from three pandemics of flu that significantly reduced the world population: “The Spanish Flu” in 1918, “The Asian Flu” in 1957 and “The Hong Kong Flu” in 1968. In the year 1918, the pandemic killed about 40 to 50 millions people around the globe. This extraordinary pandemic belongs to the most deadly medical catastrophes in the human history. The following pandemics were a lot

softer, in the year 1957 an estimated 2 millions people died and in 1968 a million.

At the end of the 20th and in the beginning of the present century, there was no pandemic in the world. Even though, a few diseases (mostly of viral origin) that have an unquestioned ability to set off a pandemic have been discovered in the last 15 years. Besides flu, it's been mainly SARS, AIDS, Ebola, Marburg's hemorrhagic fever and the Lassa fever.

Source: *Pandemie.cz [online]. 2011 [cit. 2011-07-13]. Pandemie, pandemické plány a bdělost, pandemické mapy, šíření ptačí chřipky, prevence nákaz, cestování, antivirotika a vakcíny. Dostupné z WWW: <<http://www.pandemie.cz/home>>.*

What's Bioprospecting alias Biopiracy?

Most countries in Latin America belong to the poor countries with large natural resources. This wealth has become a centre of interest of the pharmaceutical companies in developed countries, which want to use the natural resources of Latin American states to find their hidden effective and usable characteristics.

In the past, there wasn't any law about the natural resources, about the approach to the genetic source and its usage. With development of the biotechnological and pharmaceutical industries, which use the natural resources and the traditional knowledge of the native population, a need to protect those valuable characteristics and resources has raised. Not only a modern medicine, but also a modern society itself places constantly bigger demands on the quality of medicaments it uses. New illnesses that aren't curable are discovered, and old ones on which a cure still hasn't been found remain. The cosmetic industry tries to survive by selling products that attract the customers by exclusiveness. This exclusivity is usually based on using highly effective natural materials, which are found only in the areas with high biodiversity – the rain forests. With only profit on their mind, the pharmaceutical and cosmetic companies started to research the biodiversity.

Bioprospecting is a research of the organisms with the aim to gain commercially valuable biological and genetic resources. It is common that there is the attempt to use the obtained resources for trade and cash in money. Instead of just randomly gathering and sorting out the plants, it is more effective for the pharmaceutical companies to use the traditional knowledge of native population to precisely mark those plants, which are of medical usage.

What some people see as bioprospecting – an important part of progress in the means of searching for organisms that can be used in the process of the drug development – others call a biopiracy, in other words stealing of valuable resources by multinational corporations with the aim to gain a commercial profit. The international

environmental law describes biopiracy as an industrial way of products patenting, which usage is partly based on the traditional knowledge or genetic sources made by the native population, without being fairly rewarded.

An unauthorized access to genetic sources and the use of traditional knowledge without sharing the profits is being labeled as biopiracy. A lot of countries try to fight against the biopiracy, even though there is no official definition of it. The Convention on Biological Diversity from 1993 obtains some recommendations dealing with an access to genetic sources and a way how to share the profits from it. However, the recommendations included in this convention aren't enforceable legally.

“The problem of a vagueness of biopiracy lies in that if you cannot agree on what it is, you cannot measure it. Neither can you agree on what should be done about it.” (Graham Duttfield).

Source: BŘEŇOVÁ, Martina. *Problematika bioprospektingu se zaměřením na region Latinské Ameriky : diplomová práce.* Olomouc : Univerzita Palackého, Fakulta přírodovědecká, 2009.