Name: _____   Klasse: _____

Applications of the Evolutionary Strategy

1. The scientist Professor Tinkerer has the task of developing a submarine that is as light as possible. It should also move through water with the lowest flow resistance possible. He has following materials to carry out the experiment to find the perfect shape for the submarine:

1 chunk modelling clay – 1 high, narrow glass cylinder – stop watch – scale – water

While Professor Tinkerer is in the middle of his research, he describes the steps he has taken so far:

"First I divided the modelling clay roughly into two equal parts. One part I formed into a cube, the other one I shaped into a cube with slightly rounded edges. Then I compared how both move in water. Afterwards I copied the shape of the superior cube with the other one, but changed its shape slightly. Then I compared their movement in water again. The superior one I again recreated with the one of lesser success and again slightly altered it – I rounded the edges even more, because I thought this could improve the movement in water…"

Picture credits: © Tigatelu / Thinkstock

a) Describe briefly the arrangement Professor Tinkerer could have used with the given materials to compare the flow resistance of the two modelling clay pieces in his experiment.

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b) One part of Professor Tinkerer's experiment should be more precise in order to achieve good data. Point his mistake out to him and briefly explain it.

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Name:

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c) Professor Tinkerer is convinced that he is using evolutionary theory to solve his problem. Critically argue if the Professor is really using an evolutionary theory method!

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2. Contrast the biological evolution of living creatures and the evolutionary strategy as it is used in science in the table below. Fill in the gaps! *Hint:* Use the given example as a guide for filling out the table!

	Biological Evolution	**Evolutionary Strategy**
(changing) Object	living organism	e.g.
Creation of Variation	through arbitrary mutation or mixture of genotype	
Selection		developer selects the object best fulfilling the optimization goal

3. The evolutionary strategy has many uses. Give as many examples of developments in different fields of application that can be optimized by using evolutionary strategy.

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