

Topic from the field of Leksell Gamma Knife – radiotherapy (example of tasks created by students)

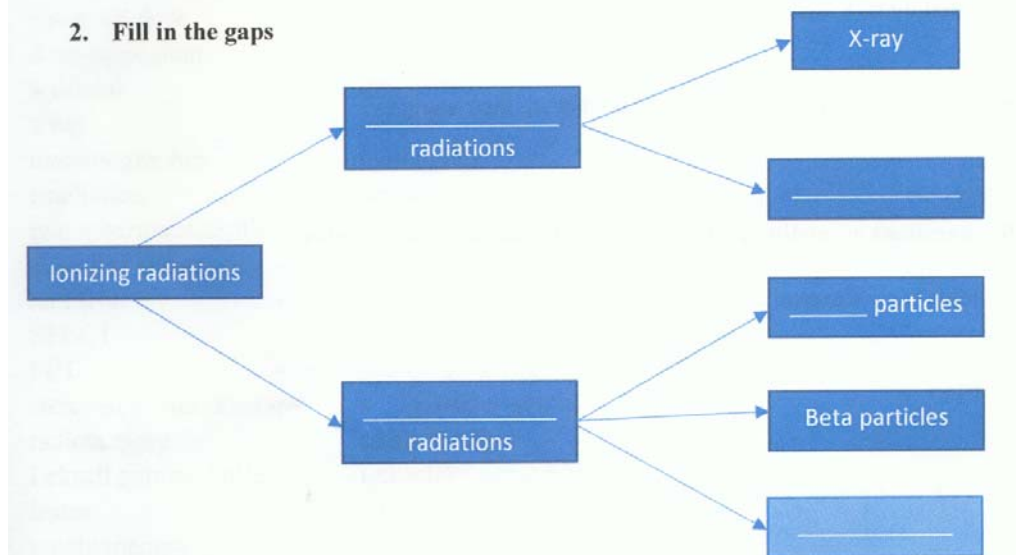
IONIZING RADIATION IN MEDICINE

Worksheet

1. Questions:

- a) What's the difference between ionizing and non-ionizing radiation?
- b) Name at least two of the basic quantities in radiation dosimetry.
- c) What two effects can ionizing radiation cause to living organism?
- d) What dose causes immediate death?

2. Fill in the gaps



3. Connect quantity with its unit

Emission	Gy
Dose equivalent H	Sv
Absorbed dose D	Bq
Activity	s ⁻¹

4. True or False:

- | | |
|---|-------|
| a) The biggest amount of natural irradiation comes from inhaled radionuclides, especially Radon | T / F |
| b) The unit of absorbed dose D is Sievert (Sv) | T / F |
| c) Direct ionization of DNA is more common than ionization through H ₂ O | T / F |
| d) Cell death is associated with deterministic effects. | T / F |
| e) CT is diagnostic method. | T / F |
| f) SPECT and PET are methods used in therapy. | T / F |
| g) One of the most commonly used radionuclides in radiotherapy is Cobalt 60. | T / F |

Topic from the field of DNA (deoxyribonucleic acid) (example of tasks created by students)

What is the alphabet of the DNA code?

What the letters from DNA alphabet means?

How big is the human DNA code?

How many cells makes the different between humans?

With what accuracy can we predict the eye color?

What organism was the first with six-letter DNA?

What letters pair together to form two base pairs?

How many amino acids we know?

Topic from the field of Neural Prosthetics (example of tasks created by students)

Mark the following statements as either true (T) or false (F):

Neural prosthetics could potentially be used to help people suffering from chronic pain.

T / F

The researchers are trying to find new materials to protect devices from the environment inside a human body.

T / F

The new polymer is very hard so that it is resistant against the pressure of surrounding tissue.

T / F

Currently used neural implants are protected by a case made of silicone.

T / F

Topic from the field of 3D Printing related to the Human Tissues (example of tasks created by students)

VOCABULARY

kidneys – ledviny
a tissue – tkáň
to suffer from – trpět
intricate – složitý
crucial – rozhodující, stěžejní
roughly – zhruba
to mature – uzrát
a scaffold – podpůrná konstrukce
stem cells – kmenové buňky
suturing blood vessels – sešívání cév
grafts – transplantáty
to tackle – vypořádat se
to obtain – získat
a heart valve – srdeční chlopeň

TRUE or FALSE?

It is possible to use 3D printed kidney inside the body.
Artificial tissue could be used for testing the toxicity of new drugs.
Half of the world's population suffers from chronic kidney disease.
Dialysis machines are as effective as kidneys.
Engineered tissue has real kidney function.
Proximal tubule is the basic functional unit of the kidney.

EXTRA QUESTIONS

What is dialysis?

What is the function of nephron?

What is “bioprinting”?

Topic from the field of Myoelectric Prosthesis (example of tasks created by students)

1. Complete sentences

I'm an MIT professor, but I do not design buildings or computer systems. Rather, I build body parts, _____ legs that augment human _____ and _____.

In 1982, I was in a _____

accident, and both of my legs had to be amputated due to _____ damage from frostbite.

I'm a bionic man, but I'm not yet a _____. When I think about moving my legs, neural signals from my _____ pass through my _____ nerves and activate muscles within my residual limbs.

That future will provide _____ new bodies. NeuroEmbodied Design will extend our nervous systems into the _____ world, and the _____ world into us, fundamentally changing who we are.

What is _____? When you _____ your ankle, muscles in the front of your leg contract, simultaneously _____ muscles in the back of your leg. The opposite happens when you _____ your ankle. Here, muscles in the back of your leg _____, stretching muscles in the front. When these muscles flex and extend, biological sensors within the _____ tendons send information through nerves to the brain. This is how we're able to feel where our feet are without _____ them with our eyes.

3. True or False.

1. Jim Ewing is first cyborg rugby player.
2. Carbon fiber has allowed artificial limbs to be stronger and lighter.
3. Hugh Herr was a terrible student. He often got D's and F's.
4. Vincent van Gogh said, "When once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been and there you will always long to return."
5. Myoelectric prosthesis uses a special wireless processor to connect artificial limb with body.

2. Vocabulary

Artificial	Končetina
Knee	Zastaralý
Joint	Protáhnout se
Limb	Umělý
Residual	Připojený
Gait	Koleno
Obsolete	Ohnout, ohnutí
Flex	Kloub
Stretch	Napětí
Awareness	Nevýhoda, nedostatek
Suffer	Provedení
Embodiment	Zbytkový, zbylý
Hesitant	Chůze
Tension	Povědomí
Attached	Váhavý, nerozhodný
Drawback	Trpět