Module 3 - Patent

Lesson Plan in 3D printing

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IPin STEAM

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HEARTHANDS SOLUTIONS
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(*) Action: C = Creation, I = Insert, U = Update, R = Replace, D = Delete

REFERENCED DOCUMENTS

ID	Reference		Title
1	2020-1-UK01-KA201-078934		IPinSTEAM Proposal
2			

APPLICABLE DOCUMENTS

ID	Reference		Title
1			
2			

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1. Patent

1.1 General Information

Background, needs analysis, etc.

Patents protect original and useful works from counterfeits and other unauthorised uses. This can be especially damaging in the field of 3D printing, where several properties of an invention are blended: digital files, the methods used for 3D printing, the printed object with its appearance and its function, and so on. As a result, IP awareness is necessary for students to understand how they can create and protect their work or legally use the work of others.

1.1.1 Brief Description

Give a short description of the lesson plan or educational activity

During this activity, students will learn about basic terms and definitions regarding IP and patents in particular. They will be introduced to the theoretical framework concerning inventions and patent protection. Next, they will study practical examples to understand the importance of patents. Finally, students will visualise the consequences of unprotected patents through comics and fun art.

1.1.2 Learning Objectives – Intellectual Property in STEAM topics

Write here the learning objectives of this lesson plan or educational activity. Do not forget to mention the main IP topics it is related to.

This educational activity is about patents and inventions, patent laws, patentability and patent registration, as well as patent infringement.

1.1.3 Links to curriculum

List here the curriculum domains, subdomains, STEAM subjects or topics that this lesson plan or educational activity can be linked to.

This educational activity will encourage children to explore and question contemporary technological advancements and applications of the concept of a patent in 3D printing. Through basic theoretical analysis and practical examples, this activity promotes **cognitive** learning (thinking) and **affective** learning (social/emotional) and is linked to:

- Science
- Technology
- Engineering
- Arts
- Mathematics

1.1.4 Duration

Give an estimate of how much time (in hours) is needed to complete this lesson plan e.g. in classroom of 20-25 students

2 hours

1.1.5 Extra materials required

List here all materials required (per student or per classroom) for the lesson plan or educational activity.

- Beamer or digiboard to project materials.
- Internet-connected computers (preferably: 1 computer per 5 students)
- Productivity and presentation tools like Microsoft Office and Google G Suite for Education.
- Digital creation tools

1.2 Step-by-step instructions

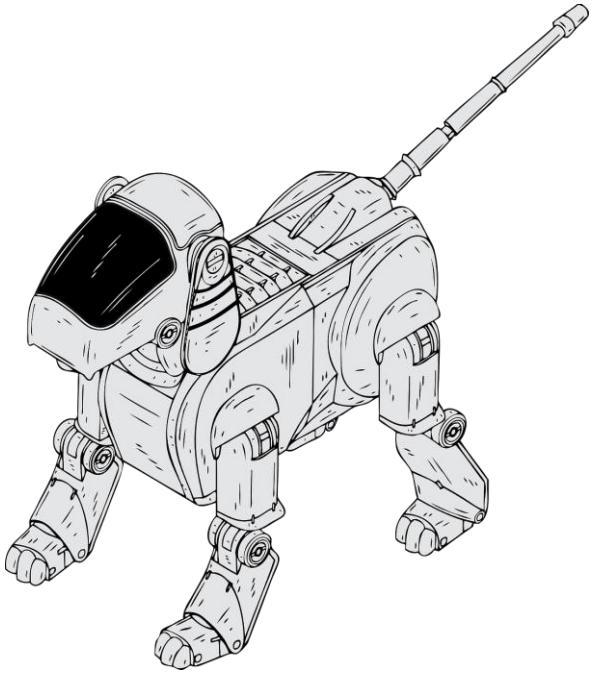

Image Title: Robotic Dog

Source: pixabay.com

This lesson is about **patents** and their implementation in **3D printing**. The first phase consists of the **theoretical framework** regarding **Intellectual Property** notions and rights, with a focus on new and useful creations that qualify as **inventions**. Through practical examples and comics, students will be able to visualise patented objects and think of the advantages of legal protection and the consequences for unprotected materials. Finally, they will explore their creativity by thinking of objects/products that could be patented.

1.2.1 Introduction or orientation

1. Through projected materials, students will be encouraged to:
   - express their proper ideas and/or prior knowledge regarding intellectual property

- discuss the concept of novelty/originality

2. Then, they will be encouraged to
   - distinguish the appearance from the function of an object
   - navigate limitations and requirements for IP protection

The following pictures can be used to initiate relative conversation:

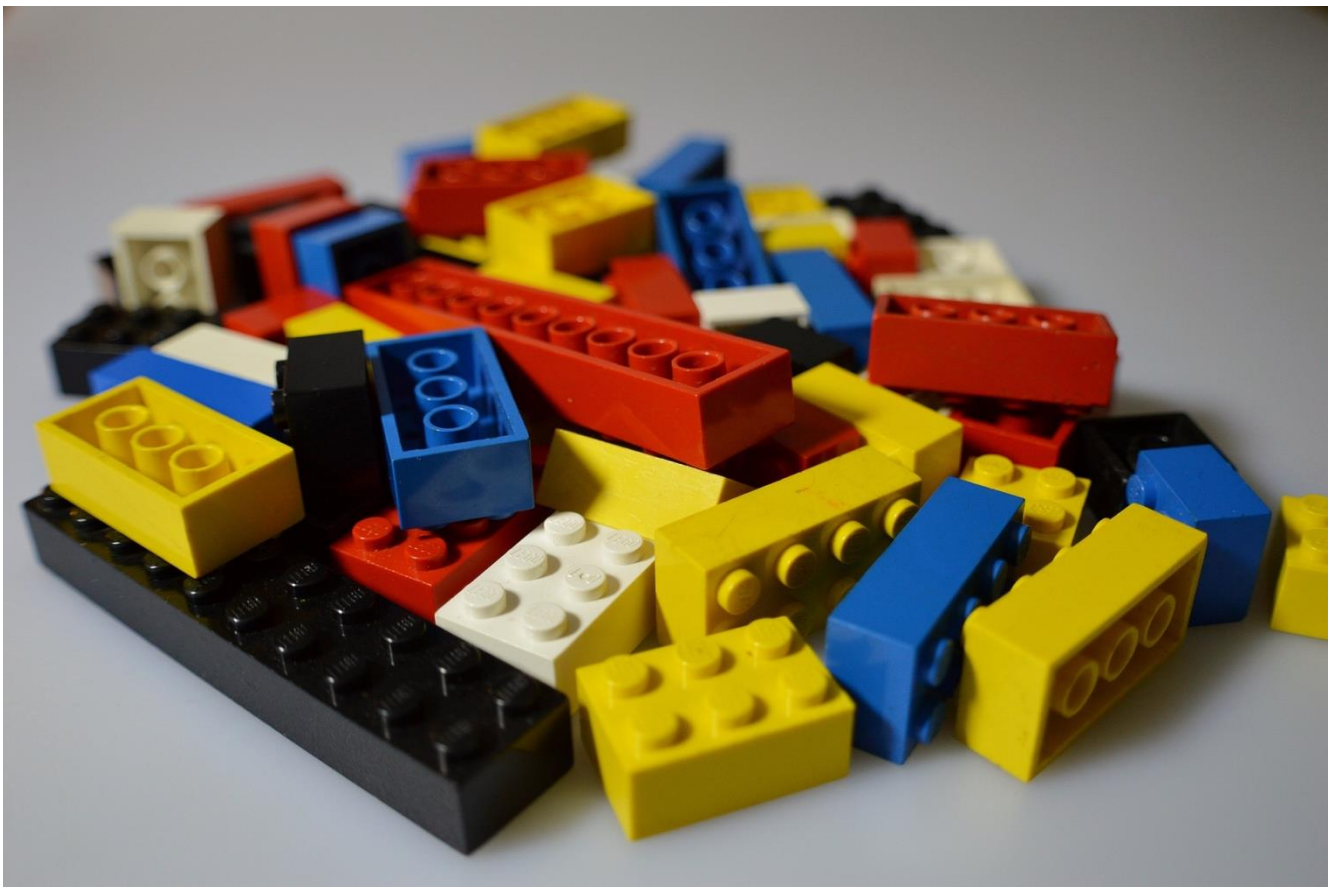

Image Title: Lego bricks
Source: pixabay.com

Image Title: iPhone
Source: pixabay.com

3. Next, students will study the concept of **patent** and its applications in **3D printing**:

a) When given the following comic strip, students will be asked to express their comments and think of examples of designs: https://www.ipd.gov.hk/eng/promotion_edu/educational_corner/comics/image/22.htm
b) When given the following comic strip, students will be asked to discuss ownership: https://www.ipd.gov.hk/eng/promotion_edu/educational_corner/comics/image/21.htm
c) When given the following comic strip, students will be asked to discuss patent registration: https://www.ipd.gov.hk/eng/promotion_edu/educational_corner/comics/image/23.htm

1.2.2 Preparation or conceptualization

1. During this phase, students will learn about **inventions** and the **patentability conditions**:
   - What constitutes a **novelty**?
   - What is an **inventive step**?
   - What does it mean for an invention to have a possible **industrial application**?

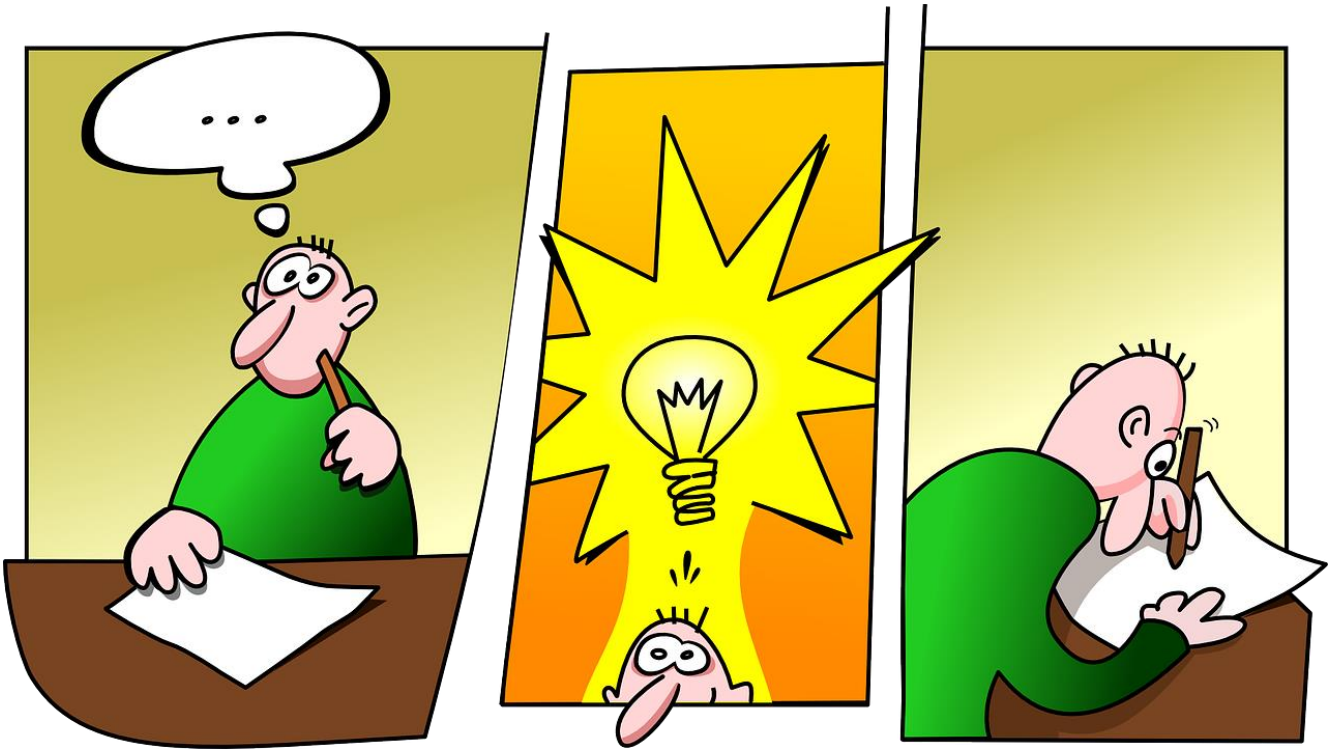

Image Title: Idea
Source: pixabay.com

2. With pictures like the following, students will be asked to ponder the idea of **old vs. new**:

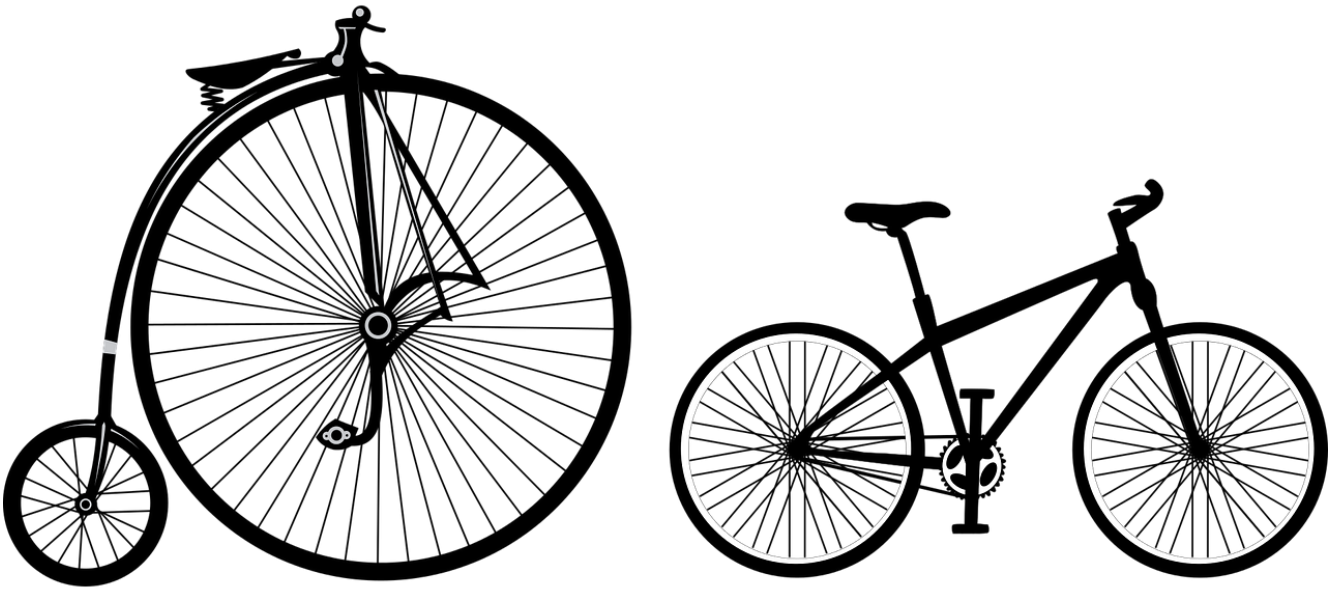

Image Title: Penny Farthing
Source: pixabay.com

3. Next, students will have fun by discovering out-of-the-ordinary patents, with the help of the World Intellectual Property Organization (WIPO):
https://www.wipo.int/patents/en/2020_patent_picks.html "Weird and wonderful"
In groups of five, students will be asked to discuss the purposes behind the pictured patents.

1.2.3 Investigation

During this phase:
1. Students will be encouraged to express their creativity and come up with inventions of their own. This activity will enhance the students' understanding of **patentability** conditions:

- Ask students to draw their inventions on a piece of paper (or digitally create them, if possible)
- Advise students to meet the three **patentability** conditions: **novelty**, **inventive step**, **industrial application**

2. Next, ask the following questions:

- What are the functions of your invention?

- How does your invention meet the patentability conditions?
- Do you think your invention has any commercial value? Why?

3. Discuss all the **misconceptions** that may have been revealed during the previous steps
4. Discuss **Patent Registration Process**
5. Ask students what they think the consequences of **patent infringement** are.
6. Discuss the importance of **protective laws**, with a special focus on the endless possibilities of 3D printing technology.

1.2.4 Conclusion

The teacher will revisit the key topics addressed in this lesson plan: patents, inventions, patent law, patentability conditions, novelty, inventive step, industrial application, patent infringement. Then, the students will be asked to summarise the basics of IP with a particular focus on the concept of **patent** and its implementation in **3D printing**.

1.3 Key questions for knowledge testing

The lesson plan can be accompanied by a short quiz of about five key questions that can be used to check the learners' knowledge acquisition. Correct answers in multiple choice questions can be marked in bold.

Question 1: What is a patent?

[an invention's design 1] [a process granting you unique rights 2] **[an exclusive right granted for an invention 3]**

Question 2: Who is an inventor?

[a person who sells someone else's invention 1] **[a person who creates/discovers an invention 2]** [a person who manufactures someone else's invention 3]

Question 3: What is 'patent registration'?

[the process to follow when disclosing an invention 1] [an inventor's legal rights 2] [a complaint made for counterfeited products]

Question 4: What is 'patent infringement'?

[a creation that does not fit the patentability requirements 1] [un undisclosed invention 2] **[the unauthorised use/reproduction/distribution of an invention 3]**

Question 5: Who owns the rights for the exploitation of a patent?

[the country where the inventor was born 1] **[the inventor 2]** [the patent lawyer 3]

2. Additional resources

2.1 Further reading

Mention here any references or additional resources related to this lesson plan or activity

https://www.ipd.gov.hk/eng/pub_press/publications/learning_guidebook_en.pdf Learning Guidebook

https://www.youtube.com/watch?v=dH1EW_Qem9s Intellectual Property

2.2 Appendix

Attach or include here any additional items such as student worksheets, hand-outs that accompany this lesson plan

"Comics on Intellectual Property"
https://www.ipd.gov.hk/eng/promotion_edu/educational_corner/comics/index.htm
Cute and funny scripts to help students learn about IP rights, understand their importance in everyday life and build up awareness per IP protection.

WIPO. (2021). *Patent picks – weird and wonderful*. WIPO. Retrieved October 12, 2021, from https://www.wipo.int/patents/en/2020_patent_picks.html

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Please remember to use APA style for your references. You can add references by clicking on the relevant tab (references) in the tool bar and insert citation.

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