Empowering innovation in TE(A)M
through IP awareness
2020-1-UK01-KA201-078934

MODULE 1: COPYRIGHT AND MATHEMATICS.

LESSON PLAN

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Contents

1.   Copyright and Mathematics.

1.1   General Information

Mathematics is a discipline almost as old as mankind itself. However, advances in research, big data and data analysis using algorithms mean that our needs are gradually changing. As a result of this completely natural evolution for society, many changes are proposed, such as, for example, the link between copyright and some methods of this discipline.

1.1.1 Brief description

This Lesson Plan aims to raise awareness of the importance of copyright and to learn about the unusual relationship between mathematics and copyright. By completing this lesson plan, you will be able to understand the links between these two disciplines and learn how to implement this knowledge through the following activities.

1.1.2 Learning objectives and IP topics

The learning objectives of this lesson plan are as follows:
- To understand the basic theory of intellectual property.
- To learn what is the function of copyright.
- How this part of intellectual property can be applied to mathematics, as well as to implement critical thinking about whether such implementation is the most appropriate.

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1.1.3 Links to curriculum

These instructional exercise can motivate youngsters actively investigate and examine current technology breakthroughs and uses, with a focus on Mathematics. It improves cognitive (thinking) and affective (social/emotional) learning and is related to:

- Science
- Technology
- Arts
- Mathematics

1.1.4 Duration

The estimated time to complete this lesson plan will be approximately two hours.

1.1.5 Extra materials required

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

1.2 Step-by-step instructions

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First, in order to have defined activities, the class will be divided into groups of 5 people. The composition of the groups is fundamental for the development of the activities. The teacher must create the groups, which will carry out **three activities** related to critical thinking, the fundamental bases of **intellectual property**, the use of **copyright** in our days and its application, in this case, to **mathematics**.

Once the three activities have been completed, a whole class discussion will take place to engage students in reasoning and most importantly, to enhance their learning about this topic.

1.2.1 Introduction or orientation

In this Lesson Plan, three activities will be carried out on the chosen topic, which aim to:

- To develop critical thinking skills among the students.

- To argue about whether mathematics should or should not be patented.

- To take advice from experts in mathematics.

- To learn about the limits of intellectual property and copyright.

The three questions to be discussed in groups of 5 students will be as follows:

a) Why is intellectual property necessary? Here, the different aspects of intellectual property explained in the module will be explained and students will have to argue in their own reasoning whether mathematics is a tangible or intangible good.

b) Should certain mathematical procedures be protected by copyright in the future? In this question, students will have to argue for or against the latter question, based on the knowledge provided by the experts, as included in the Module.

c) As this is a mathematics class, do students feel that the exercises and knowledge they learn daily are protected by copyright? Doing problems, equations, algorithms, etc. This question would serve to see the real application of copyright in a more familiar environment such as their own classes and provide that point of reality that the copyright-mathematics relationship lacks.

1.2.2 Preparation or conceptualization

To prepare for this activity there will be two main topics related to mathematics. In this phase, students will have to warm up their critical thinking with the two topics presented below.

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Firstly, the use of personal data and big data.

Source: pixabay.com

- Students should reflect on the use of their personal data and, in the groups of 5 people created earlier, come to an agreement on whether their data should be protected by coyright or not. They should discuss among themselves and argue their answers.

Secondly, they should focus on the possible use of copyright in the mathematics exercises they do every day during their lessons.

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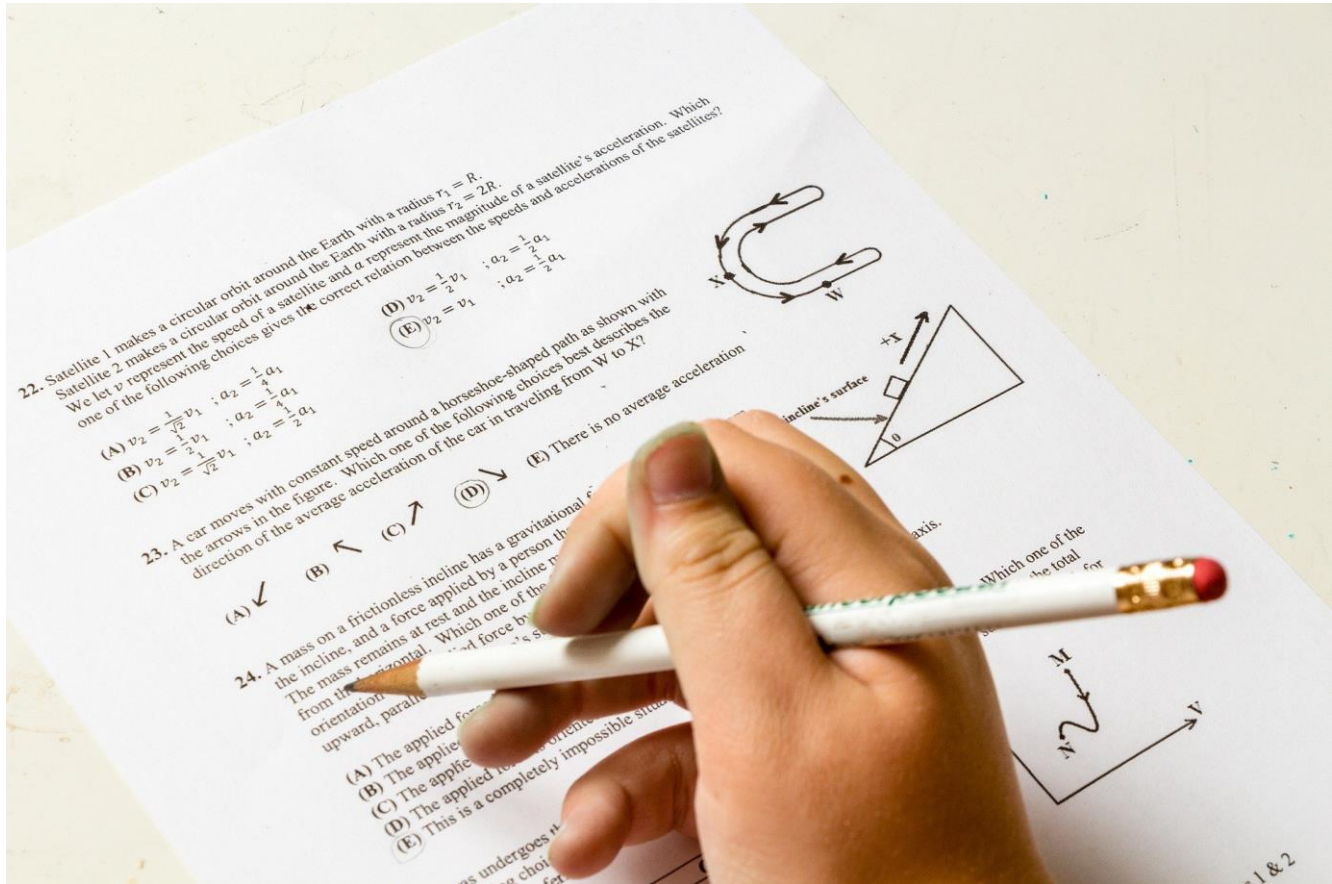
Source: pixabay.com

- Students should reflect on the development and accessibility of the exercises and, in the 5-person groups created earlier, reach agreement on whether these exercises, which involve mathematical procedures, should be subject to copyright legislation. They should discuss among themselves and argue their answers.

1.2.3 Investigation

During this phase:

1. Students should do some individual research on the concepts of copyright, big data and data protection.

2. The teacher will divide the students into groups of 5. It is also possible for the students to agree among themselves to divide themselves into the different groups.

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3. Once you have split up, you will have to focus on the three general questions in section 1.2.1 and come to common conclusions on the two proposed themes. One is the protection of data by algorithms and the other is the use of intellectual property to copyright access to mathematics exercises.

Against this background, we propose the following two scenarios:

 3.1. Someone hacked all the Google account information of one of his classmates and now all his data is online and easily searchable because Google has sold the data. The students must come to an agreement on whether Google's decision is ethical and reflect on whether or not they are giving out too much personal data on the net.

 3.2. For each maths exercise or problem solver they search for and download from the internet, they must pay a total of 5 cents to the person to whom they are entitled. The proceeds will be invested in research into further aspects of mathematics and the development of new theories.

4. After discussing the above scenarios, the students will have to answer the three initial questions and argue their answers in front of their classmates. At this stage, they should prepare a couple of slides to make their presentation more complete.

5. Once all the presentations of the classmates have been completed, a class discussion will be opened in which they will have to put all their ideas on the table. Afterwards, they will have to come up with a common idea or solution for each of the two scenarios proposed.

1.2.4 Conclusion

The aim of this activity is that through copyright and mathematics, students can learn more about the real world, implement creativity, make this subject more enjoyable and above all, use critical thinking and healthy debate to reach conclusions.

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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: Copyright belongs to intellectual property
[True] [False]

Question 2: Search algorithms access a lot of personal data through cookies.
[True] [False]

Question 3: There are two types of copyright
[True] [False]

Question 4: Why can't mathematics be copyrighted?
[Because of the Berne Convention regulation]
[Because our legal system is different]
[Because we have not progressed far enough to consider it.]

Question 5: Tick the two correct copyright types
[Moral rights] [Economic rights] [Legal rights] [European Rights]

1.4   References or additional resources

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

1.5   Appendix

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