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1) Introduction

This is your own personal guide to the world of Kitsat and the course concerning environmental studies.

Start your journey by reading through sections 2 and 3 (the table of contents, topics of this course and the main learning goals of this course). Next make your way to the section number 4, "How to set up and execute the course".

Make sure you have printed out the printables needed during the course. These printables include the information sheets for students and other printable materials that you and the students are going to need during the course. You will find these printables attached to the other course material provided.

If you want the students to go through the course at their own pace print out the printable version of the course and have it ready as you start the course. You will find the printable version of the course attached to the other course materials provided.

Now it is time to start the course. Section 5 is the walkthrough of the game. This section will tell you what to do in different stages of the course and game and what the students will do and how. This section is your guideline on how to implement the course. This section also includes the correct answers to each assignment and task the students will face during the course.

2) The main topics of this course are:

- Technologies of everyday life
- Exploration and examination of persons own neighborhood
- Animate and inanimate nature
- Reading and interpretation of different graphs

3) The main learning goals of this course

- Students gets a basic understanding of the topics listed above
- Student knows how to observe ones own close by neighbourhood
- Students are able to utilize the Kitsat satellite and its features and sensors
- Students practice working as a team

The main 21st century skill goals of this course are:

- Thinking and learning to learn skills
- Participation, involvement and building a sustainable future
- Cultural competence, interaction and expression
- Multiliteracy
- Taking care of oneself and managing daily life
- ICT competence

4) How to set up and execute the course

Topics listed above are divided into lessons. Each lesson's minimum duration is 45 minutes. Duration of the lesson can vary depending on the topic. And also you as a teacher can decide if you want to go deeper into some of the topics listed above.

Course is built on a story which continues towards the end as students solve problems, tasks and assignments. Assignments are done by searching, reading and applying knowledge they have acquired. And also by using the features and sensors of the Kitsat. Information can be found in the information material provided with the course or you can use different kinds of information sources during this course.

The following colours in the course's slideshow indicates when it's time to do an assignment, read information from the students' information material or when to give students a piece of the puzzle from which the aliens ship will later be revealed.. The colours are the following:

Grey colour indicates an assignment. More detailed information is provided about the assignment in the assignment itself and at the section 4 of this material (The walkthrough of this game)
Orange colour indicates the time when students should look for information from the informational material provided. In the game this information material is called the Courier
Blue colour indicates when it's time to give the students a piece of the aliens ship. You can decide which piece you will give to them. At the end of the game the students have a complete picture of the aliens ship. You will find the pieces and the complete image of the ship from the printables section.

The course can be teached by the lead of the teacher or the teacher can share the course with students so that they can progress at their own pace. You are free to choose how you will approach the course.

5) Assessment of the course

The course assessment is done by giving the students different kinds of badges as they complete an assignment. There are three levels of badges: Gold, silver and bronze. Each badge represents a certain range of grades.
Gold: Grades 10-9
Silver: Grades 8-7
Bronze: Grades 6-5

Grade ranges include the plusses, minuses and halves of each grade. Students goal is to gather eight badges. And each badge represents a certain grade that is decided by the teacher based on how well and thorough the student has completed a certain assignment. The final grade of this course is determined by the arithmetic mean of each grade.

For example a student has 5 golden badges and 3 silver badges. This particular student's grades are the following:

5 x 9+ (The golden badges)
3 x 8+ (The silver badges)

5 x 9,25 + 3 x 8,25
=46,25 + 24,75 = 71,00

71,0 : 8 = 8,875 ← This is the final grade of the course. Which would mean 8,9 so 9- as the final grade of the course.

The badges can be printed out and handed to students after each assignment. You can choose how your class will present the finalized assignments. Will they be presented and shared orally, handed to the teacher or gathered to some digital platform. Also the way the students answer the assignments is up to you to decide. You can use paper and pen, computers, laptops, mobile phones or any other way you feel comfortable with.

6) Implementation of the course

Present the students with the course's main topics and main learning goals. Have the students discuss the learning goals. You can help them out with the following question to guide their discussion.

- What do you think is the most important topic of this course?
- What do you think is the most important learning goal of this course?
- What topics are you most interested in?
- What topics of this course do you already know something about?
- What topics are completely new to you?

Have a discussion about what the students think about the topics and learning goals of this course.

After the discussions you can divide the students into groups. Divide the groups so that each group gets a satellite. How you divide the groups is up to you to decide. So the number of groups is the same as the number of satellites you have.

Open the Kitsat environmental studies student version on your computer and project it on a screen. You can also print out the student version of the course and hand it out to the students.

Start by reading the story at the beginning of the student version. You can read the story yourself or let the students read it by themselves. If you read the story yourself it is good to read it enthusiastically.

Continue with the story until you reach slide number 23. This is the first assignment. In this assignment the students will have to get the Kitsat satellite high above the school´s yard. You can provide them with different building materials if necessary. The main goal would be that the whole yard could be seen from a bird's eye view through the satellite's camera.

Now it's time to give students badges. In this assignment it's good to focus on completion of the main goal. It's also important to take into account how the students worked as a team and how well their solution worked.

Continue the story until you reach slide number 25. It's time for another assignment. In this assignment the students will use the Kitsat satellite´s camera to take a photo of your own school yard. After this they need to analyze the photo and come up with a plan on how they would change the yard and develop it to be even more cosy and nice. The students can draw or write their answers.

After the assignment is completed it's time to give students badges. It's good to take into account the following. How creative was the group's plan? Could the plan be executed in real life? Does the plan take into account every student of the school? Is the new yard equally fun, cosy and nice for all?

Continue the story until you reach slide number 27.

In the third assignment the students have to come up with an information bulletin about the Kitsat satellite. They have to answer at least to the questions in the task.

Example of a correct answer to ASSIGNMENT 3 is:
- The Kitsat satellite is a cube satellite. The satellite is a cube because the cubical structure is strong and it's easy to attach solar panels to each side of the cube thus the satellite is always facing sunlight no matter what position it is.

- The Kitsat satellite consists of at least the following materials: Plastic, metal, silicon, copper, tin, glass, nickel, cobalt, lithium and carbon fibre. These materials have been chosen because of their durability and weight. It's expensive to launch a satellite to space. So the less the satellite weight the less are the costs of a launch.

In the assessment part of this assignment, when giving the badges, how the students explored the satellite and what kinds of different materials and structures they found out. It's also important to assess how well the students explained their answers.

Now continue the story onwards until you reach slide number 29.

In this assignment the students need to study and explain the basic operational principles of the Kitsat satellite.

EXAMPLE OF A CORRECT ANSWER IN ASSIGNMENT 4:
Kitsat satellite is powered by EPS, Electrical Power System. It gets its power from the sun and uses solar panels to generate electricity. The power is stored in the EPS's battery. It has all the parts that a satellite needs for functioning: solar panels for generating electricity, battery for storing the power,

radios and antennae for communication, computer for controlling all the functions, camera for taking photos and multiple sensors for measurements and determining the attitude and position.

When assessing and giving badges for the assignment number 4 take into account how broadly the students answered the question. It's also important that the students explain the basic operational principles with their own words and understandably.

Continue the story until you reach slide number 31.

In the fifth assignment the students need to think about the ways that satellites are being used on Earth. They also need to decide that if one of these ways to use satellites would be removed then what would this way of use be and why.

EXAMPLES OF CORRECT ANSWERS IN ASSIGNMENT 5:
Satellites are being used on Earth to the following: Telecommunications (TV, internet, telephone and messages), navigation (GPS), earth observation (climate and weather), research (studying seas and glaciers, atmosphere, astronomy), technology demonstrators, military purposes and as planetary probes.

When giving the students badges from this assignment take account of how well they managed to come up with the numerous ways satellites are being used on Earth. Take also into consideration how well the students explained their answer on what way of satellite use would they be willing to give up.

Now continue the story until you reach slide number 33.

In the assignment number 6 the students need to come up with an example on how the Kitsat satellites and its features could be utilized in a real life situation. In the presentation there are three examples. The students can use one of these examples but they can also come up with a situation of their own where the Kitsat satellite could be used.

EXAMPLES OF ANSWERS IN ASSIGNMENT 6:

In a farm the Kitsat satellite could be used to monitor the animals at the farm. It could also be used to monitor temperatures in different areas and places of a farm. The satellite could also be helpful when determining the best location to plant crops.

In a zoo the satellite could also be used to monitor the animals at the zoo. It could also be used to determine the best location for each animal at a zoo. The satellite could also monitor

and observe the visitors at the zoo or it can be used to determine the most visited places or places where the visitors don't often go.

In a football match the satellite could be used to create different kinds of statistics from the game. In a smaller scale the satellite could be used to produce different kinds of stats from a certain player. For example, the distance covered during the game. Number of jumps and sprints could also be monitored through the satellite.

In the assessment part of this assignment it is important to notice how well the students have explained their answers and what kind of creative solutions they have come up with. And of course it's good to observe how well and equally the group of students are working together.

It's time to move on. Continue the story to slide number 35.

In the 7th assignment the students need to use the satellite's camera with the infrared filter on. Then they will go and explore the school yard and try to find animate and inanimate objects from the yard using the satellite's camera. The students will also have to think about the differences that animate and inanimate objects have and how they differ from one another when looking through the satellite's camera.

When assessing the assignment it's important to take into account how well the students explained the difference between inanimate and animate objects. It is also important to take into account how they managed with the finding of animate and inanimate objects outside.

In this slide you'll find an extra assignment that has no right or wrong answers. You can decide if you want your students to do the extra assignment or not.

Next continue the story until you reach slide number 39.

This is the final assignment of this course. In the last assignment the students need to do different kinds of exercises with the satellite. They will measure their heart rate after each exercise and they will also see a graph that the satellite has drawn to them during the exercise. After the completion of all four exercises it's time to compare the different graphs and heart rates and to think about the reasons why the heart rates and graphs differ from each other.

10)Printables for the course