Lesson plan example
using the «ANGLE MAKERS» application

Lesson: Mathematics
Link to the curriculum: Geometry
Duration: 2 lessons x 80'
Grade: 3rd grade primary students
Learning context: General education (Mainstream classroom)

The lesson plan has been developed by:

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The sequence of learning activities

The following tables present the sequence of the learning activities for the learning unit, in relation to the learning goals and the attainment/adequacy targets.

Lesson 1: Introduction to the concept and the construction of an angle

At the first lesson the students are introduced to the concept of the angle and through a sequence of learning activities, different representations and learning tools (with or without the use of technology) they have the opportunity to understand what an angle is and how it is constructed.

Learning activity	Learning goals	Attainment targets/ Adequacy targets
Activity 1 Students are introduced to the Kinect technology and to the first level of the "Angle makers" app. During this activity, students are asked to create angles (different sizes and positions), individually and then in pairs. The rest of the students pay attention and give feedback to their classmates while waiting for their turn to come. **Duration** 30 minutes **Classroom organization** Individually / Pairs **Materials** • Projector & Computer • Kinect camera • "Angle makers" embodied learning application [Level 1].	The aim of the introductory activity is to prompt students to make different angles, in order to understand what an angle is and how it is constructed.	**Attainment targets** G2.1 Students name and construct parts, straight lines, half-lines and different kind of lines (curve, straight, polygonal chain) using various learning tools and software. **Adequacy targets** In 3rd grade, students are introduce to the G2.1 indicator. Teaching this indicator is necessary for achieving it during the next school years.
Activity 2 During this activity, students lay down on the floor with	This activity gets more in depth, so students can better understand what an	**Attainment targets** G2.1 Students name and construct parts, straight lines,

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Learning activity	Learning goals	Attainment targets/ Adequacy targets
their partner (on a mattress if it's possible) and create angles using their bodies, hands or legs (one pair at a time). The rest of the students are trying to identify the angles and discuss about them. The teacher decides if there is a need to place a ball at the corner of the angles (vertex- meeting point of the two straight lines). **Duration** 15 minutes **Classroom organization** Pairs **Materials** • Mattresses • Balls	angle is and how it is constructed, using their body.	half- lines and different kind of lines (curve, straight, polygonal chain) using various learning tools and software. **Adequacy targets** In 3rd grade, students are introduce to the G2.1 indicator. Teaching this indicator is necessary for achieving it during the next school years.
Activity 3 During this activity students are working in pairs. They walk in the class, trying to find and report different angles (on a worksheet), which might be on objects or in different spots. A whole class discussion is followed where students present the angles they have found. **Duration** 20 minutes **Classroom organization** Pairs / Whole class discussion **Materials** • Worksheet to write down the angles	The activity aims to support students understand that angles are part of our daily life and are applied in different objects and constructions that surround us.	**Attainment targets** G2.1 Students name and construct parts, straight lines, half lines and different kind of lines (curve, straight, polygonal chain) using various learning tools and software. **Adequacy targets** In 3rd grade, students are introduce to the G2.1 indicator. Teaching this indicator is necessary for achieving it during the next school years.

Learning activity	Learning goals	Attainment targets/ Adequacy targets
Activity 4 During this activity, each student is called to stick two straws on a white cardboard to create an angle. **Duration** 15 minutes **Classroom organization** Individually **Materials (for each student)** • White cardboard • Glue • Two straws	This hands-on activity aims to support students connect and understand all the new concepts better. Also, the teacher is able to use this activity to evaluate students' misconceptions and learning gains.	**Attainment targets** G2.1 Students name and construct parts, straight lines, half-lines and different kind of lines (curve, straight, polygonal chain) using various learning tools and software. **Adequacy targets** In 3rd grade, students are introduce to the G2.1 indicator. Teaching this indicator is necessary for achieving it during the next school years.

Tips for a successful lesson implementation

General information: To keep your activities running smoothly, within the established time frames, it is important for the teacher to:

- Be familiar with the "Angle Makers" embodied learning app (It is clarified that students will be able to use the app individually or in their pairs-The rest of the students need to be away from KINECT's field of view).
- Set up the equipment (kinect camera, computer, projector) and prepare the digital application before the lesson.
- Classify all the materials needed for the activities (ahead of time) and especially to keep the learning stations running smoothly.
- Divide students in groups before the lesson. Here, it would be useful to include a student coming from special education in each group. In this way, the student will take part in a supportive system during the activities and the teacher creates opportunities both for his/her inclusion and acceptance.
- Study the lesson plan carefully in collaboration with the special education teacher and have assigned tasks, keeping always in mind their special education students' needs.

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Activity 1: The teacher will have to allot few minutes at the beginning of the lesson to present the first level of the embodied learning app to the students as well as to explain how they will work during the lesson. It is also noted that at this phase students will not be asked to name the formed angles. Focusing on the students with disabilities, is recommended not to be the first ones to use the app so that they can imitate and follow the example of the other students. In this way students with disability might have a more positive attitude towards the app.

The teacher is also called to continuously diversify the activity to prevent monotony using the following strategies:

- In the early stages, students will be called to make angles individually. It is important for the teacher to motivate each student to make a different angle from the previous student (e.g. an angle of different size or different orientation)
- In the second half of the activity (since all students have experimented with the application individually), the teacher can change the app settings so that students can create angles collaboratively (in pairs). It is recommended to include a student with disability in each pair. This strategy is expected to support students with disabilities during the activity, creating inclusive opportunities.

Also, it is important for the teacher to give enough time to all students to get involve in the embodied learning app, either individually or in pairs. As it will be the first time to experience such technologies, it is expected that all students will be excited and therefore it is important to give everyone the chance to use the application.

Activity 2: During the second activity, students will not use the technology because the main purpose of the activity is to promote children's understanding about angles through different representations. It is recommended to include a student with disability in each pair. This strategy it is expected to support students with disabilities during the activity, promoting inclusion.

Activity 3: It is recommended to include a student with disability in each pair. This strategy it is expected to support students with disabilities during the activity, creating opportunities for inclusion. Also, different role could be given to students: e.g. a student could be the "Tracer" and be responsible for finding angles and the second member of the pair could be the "Recorder" and be responsible for writing down the angles. Finally, the students could have the opportunity to exchange roles during the activity in order both of them be actively engage in the activity.

Activity 4: This is an evaluation activity. During this activity, the students can make an additional angle using their pencil and rule on the same cardboard. As this activity is coming to an end, students are asked to write down their names and teacher collects everything. Finally, the teacher should store student's cardboards as they will be using them to the next lesson (see Lesson 2, Activity 6).

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Lesson 2: Introduction to the different types of angles

During the second lesson the students are introduced to the different types of angles. Specifically, through a sequence of actvities they identify, name and create right, straight, acute and obtuse angles .

Learning activity	Learning goals	Attainment targets/ Adequacy targets
Activity 1 Students are asked to share what they have learned during the previous lesson. Then, students are introduced to the right and the straight angles as shown in their student's book (page 12). **Duration** 10 minutes **Classroom organization** Whole class discussion **Material** • 3rd grade student's book, unit 4, lessons 2&3, page 12.	The introductory activity aims to support students to understand the right and straight angles in comparison to the rest of the types of angles.	**Attainment targets** **G2.2** Identify angles and name right angles. **Adequacy targets** Identify right, acute and obtuse angles using various learning tools and software. Student use the 90 degrees angle to compare, classify and estimate angles.
Activity 2 Students are introduced to the second level of the "Angle makers" application in order to create right and straight angles. At the beginning, the teacher asks from 3-4 students to make right and straight angles individually. Then, the teacher asks from 4 students to create right and straight angles in pairs (two pairs). **Duration** 15 minutes **Classroom organization** Individually/Pairs	The activity aims to support students understand the right and straight angles.	**Attainment targets** **G2.2** Identify angles and name right angles. **Adequacy targets** Identify right, acute and obtuse angles using various learning tools and software.

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Learning activity	Learning goals	Attainment targets/ Adequacy targets
Materials • Projector & Computer • Kinect camera • “Angle makers” application [Level 2]		
Activity 3 Students are introduced to the second level of the “Angle makers” application in order to make obtuse angles. At the beginning, the teacher asks from 3-4 students to make obtuse angles. Then, teacher asks from 4 students to make obtuse angles collaboratively (in pairs). **Duration** 15 minutes **Classroom organization** Individually/Pairs **Materials** • Projector & Computer • Kinect camera • “Angle makers” application [Level 2].	The activity aims to support students understand the obtuse angles.	**Attainment targets** **G2.2** Identify angles and name right angles. **Adequacy targets** Identify right, acute and obtuse angles using various learning tools and software.
Activity 4 Students are introduced to the second level of the “Angle makers” application in order to make acute angles. At the beginning, the teacher asks from 4-5 students to make acute angles. Then, theteacher asks from 4-6 students to make acute angles collaboratively (in pairs). **Διάρκεια** 15 minutes **Classroom organization** Individually/ Pairs	The activity aims to support students understand the acute angles.	**Attainment targets** **G2.2** Identify angles and name right angles. **Adequacy targets** Identify right, acute and obtuse angles using various learning tools and software.

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Learning activity	Learning goals	Attainment targets/ Adequacy targets
Materials • Projector & Computer • Kinect camera • "Angle makers" application [Level 2].		
Activity 5 Students solve exercise 1a and 1b, in which they are asked to identify right angles, compare them with the acute and obtuse angle and put them in order according to their size. A whole class discussion is followed. **Duration** 10 minutes **Classroom organization** Individually/ Whole class discussion **Materials** 3rd grade student's book, unit 4, Lessons 2&3, page 12.	The activity aims to support students understand, compare and classify the three types of angles (right, obtuse, acute).	**Attainment targets** **G2.2** Identify angles and name right angles. **Adequacy targets** Identify right, acute and obtuse angles using various learning tools and software.
Activity 6 For evaluation purposes, teacher gives back the student's angles from activity 4 (previous lesson stick two straws together to make an angle). Each student observe, identify and name his/her angle.	This hands-on activity aims to support students connect and understand all the new concepts better. Also, this is an evaluation activity as the teacher can evaluate students' misconceptions and learning gains.	

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Tips for a successful lesson implementation

General information: To keep your activities running smoothly, within the established time frames, it is important for the teacher to:

- Be familiar with the "Angle Makers" embodied learning app (It is clarified that students will be able to use the app individually or in their pairs-The rest of the students need to be away from KINECT's field of view).
- Set up the equipment (kinect camera, computer, projector) and prepare the digital application before the lesson.
- Classify all the materials needed for the activities (ahead of time) and especially to keep the learning stations running smoothly.
- Divide students in groups before the lesson. Here, it would be useful to include a student coming from special education in each group. In this way, the student will take part in a supportive system during the activities and the teacher creates opportunities both for his/her inclusion and acceptance.
- Study the lesson plan carefully in collaboration with the special education teacher and have assigned tasks, keeping always in mind their special education students' needs.

Activity 1: During activity 1, teacher can print out the support tool for the students (students' book, page 12), on a white cardboard. It is noted that this tool it could be enlarged, cut and laminated.

Activity 2-4: The teacher will have to allot few minutes at the beginning of the lesson to present the first level of the embodied learning app to the students as well as to explain how they will work during the lesson. Teacher will choose the appropriate angle each time (right, straight, acute, obtuse angles). Focusing on the students with disabilities, is recommended not to be the first ones to use the app so that they can imitate and follow the example of the other students. In this way students with disability might have a more positive attitude towards the app.

The teacher is also called to continuously diversify the activity to prevent monotony using the following strategies:
• In the early stages, students will be called to make angles individually. It is important for the teacher to motivate each student to make a different angle from the previous student (e.g. an angle of different size or different orientation)
• In the second half of the activity (since all students have experimented with the application individually), the teacher can change the app settings so that students can create angles collaboratively (in pairs). It is recommended to include a student with disability in each pair. This strategy is expected to support students with disabilities during the activity, creating inclusive opportunities.

Also, it is important for the teacher to give enough time to all students to get involve in the embodied learning app, either individually or in pairs. As it will be the first time to experience such technologies, it is expected that all students will be excited and therefore it is important to give everyone the chance to use the application.

It is important to be noted that right and straight angles and then obtuse angles should be taught before acute angles due to their different level of difficulty.

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Finally, according to the students who will not actively participate in the app, they are called to use straws to imitate the different angles (e.g. in front of them on a white cardboard).

Activity 5: If you have time, students can also solve exercise 2 (3rd grade students' book, Unit 4, Lessons 2&3, Page 13).

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