



2014 Student Program Lesson Plan

For step-by-step help in completing this document, please see the accompanying guide.

Date:	July 29, 2014	Class:	LEGO-Robotics & Astronomy Project. Lesson 5 “Creating LEGO-robot which can solve target goal of team project”
--------------	----------------------	---------------	---

Definition and Guiding Question

LESSON	LEARNING EPISODE
For the purpose of this STARTALK template a <i>lesson</i> is defined as a single learning experience lasting no more than ninety minutes. Learning experiences occur both in the classroom and/or in other settings. Longer blocks of time will involve several learning episodes and lesson plans.	For the purpose of this STARTALK template a <i>learning episode</i> is defined as a learning experience that addresses a specific aspect of a learning target or can-do statement. Learning episodes typically provide a limited amount of input with time allowed for guided and independent practice. The amount of time allotted for a learning episode is approximately equivalent to the age of the learner and will rarely be more than twenty minutes.

Questions to Consider Before and During Lesson Planning

<p>Do the activities in the lesson</p> <ul style="list-style-type: none"> ▪ provide sufficient opportunities for understanding new words <u>before</u> expecting production? ▪ provide multiple, varied opportunities for students to hear new words/expressions used in highly visualized contexts that make meaning transparent? ▪ provide students with an authentic purpose for using words and phrases?
--

- engage all students (as opposed to just one or two students at a time)?
- give students a reason for needing to/wanting to pay attention and be on task?
- vary in the level of intensity and the amount of physical movement required?
- take an appropriate amount of time considering the age of the learner?
- make the learner, not the teacher, the active participant?

STAGE 1: What will learners be able to do with what they know by the end of this lesson?

<p style="text-align: center;">DO</p> <p style="text-align: center;"><i>What are the learning targets for this lesson?</i></p>	<p style="text-align: center;">KNOW</p> <p style="text-align: center;"><i>What vocabulary, grammatical structures, language chunks, cultural knowledge, and content information do learners need to accomplish the lesson can-do?</i></p>
<p>Interpretive Listening</p> <p>The students can understand teacher's presentation with some unexpected details on topics related to Physics&Math&Astronomy. Int. H.</p>	<p>Terms related to Astronomy, Physics, Math:</p> <p><i>Physics terms:</i> плотность, ускорение, расстояние, время, сила тяжести, сила реакции, период, масса;</p> <p><i>Astronomy terms:</i> планета, атмосфера, поверхность, радиус, окружность, сфера, сфероид, Марс, Земля, динамические характеристики, траектория, орбита, оборот, сутки, год;</p> <p><i>Math terms:</i> объем, формула, длина окружности, эллипс, фокус, эксцентриситет.</p>
<p>Interpersonal Communication</p> <p>The students can get and discuss factual information from articles and teacher's presentation. Adv.M.</p>	<p>The students work in groups. The students ask and answer each other's questions on Astronomy topics and do research on existing problems in Mars exploration</p> <p><i>The main stages of research:</i> поставить задачу, сделать исторический обзор, провести исследование, провести эксперимент, наблюдение, опыт, сделать обзор литературы, сделать выводы, проанализировать полученный результат;</p> <p><i>Planetary science:</i> поставить задачу, определить условия существования, определить начальные и конечные условия, температура поверхности, рельеф, период обращения, состав, гора, равнина, каньон, кратер.</p>

<p>Interpretive Listening</p> <p>The students can ask for, follow, and give directions in process of coding robotics program and in some complicated situations during math problem solving Int. H.</p>	<p>The students solve math and computer science problem and exchange their findings during the astronomy research project.</p> <p><i>Math terms:</i> длина окружности, радиус колеса, пройденное расстояние, угол поворот, число, значение, отношение, уравнение, множество, переменная, функция, радиус, диаметр, длина окружности;</p> <p><i>Engineering terms:</i> устройство, управление, зарядка, технические характеристики, меню управления, сенсоры, мотор, соединительный кабель, детали, шестеренки;</p> <p><i>Terms related to Computer Science:</i> цикл, если...то..., пока... делай..., повторить, переменная, константа, связи, блок, подпрограмма, язык программирования, отладка, скачать, запустить, окно, проект.</p> <p><i>Understanding the structure of a math problem genre</i> (“body”-narration and a question): Определите расстояние; нанесите полученные данные на график, найдите отношение (наклон, угол), построить график зависимости скорости от времени, заполните таблицу данных для нескольких испытаний, найдите среднее значение</p>
---	--

STAGE 2: How will learners demonstrate what they can do with what they know by the end of the lesson?

<p>What will learners do (learning tasks/activities/formative assessments) to demonstrate they can meet the lesson can-do?</p>
<p>Study of the physical and dynamical characteristics of Mars related to chosen research project theme.</p> <p>LEGO robotics research: Building and programming LEGO robots which can solve target goals of the team project.</p>

STAGE 3: What will prepare learners to demonstrate what they can do with what they know?

<p>How will you facilitate the learning?</p> <p>What activities will be used to ensure learners accomplish the lesson can do? What will the teacher be doing? What will the students be doing?</p>

Opening Activity

<p>Teacher sets the main goal of the lesson for the students by briefly discussing “Comparing the two space objects: Mars and the Earth. What is similar and what is different”</p>	<p>Time: 10 min</p>
---	---------------------

Learning Episode

The students read and understand articles about the different physical characteristics of Mars and the Earth. The students then discuss the characteristics and fill out rubrics.	Time: 15 min
---	--------------

Learning Episode

The students studying write code on manipulating the EV3 software: continue study the simple programming options such as forward, backward, and turning robot movements	Time: 25 min
---	--------------

Learning Episode

The students discuss design of their LEGO robot which can solve target goals of the team project. The students turn their base robot into a challenge model.	Time: 30 min
--	--------------

Materials needed for this lesson

- PowerPoint Presentation about the main characteristic of Mars and the Earth
- LEGO EV3 educational software
- LEGO EV3 educational kit

Reflection/Notes to Self

--