



2014 Student Program Lesson Plan

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

Date:	July 22, 2014	Class:	Building Mars Rovers
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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

Do the activities in the lesson

- provide sufficient opportunities for understanding new words before 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&Robotic&Astronomy. Int. H.</p>	<p>Terms related to Robotics, Astronomy, Physics:</p> <p><i>Physics terms:</i> скорость, сопротивление воздуха, ускорение, расстояние, время, сила тяжести, плотность, сила;</p> <p><i>Robotic terms:</i> устройство, управление, зарядка, технические характеристики, меню управления, сенсоры;</p> <p><i>Astronomy terms:</i> планета, атмосфера, поверхность, Марс, Земля, динамические характеристики, траектория.</p>
<p>Interpretive Writing</p> <p>The students can understand other students' oral presentations and take some critical notes using rubrics provided. Int. H.</p>	<p>Lexical and morpho-syntactic means to say 'think/consider/believe/it seems to me/ from my point of view/from the perspective of': я думаю, полагаю, считаю; мне кажется, с моей точки зрения;</p> <p>Rubrics:</p> <p><i>Результаты тестовых описаний:</i> дистанция преодолена успешно;</p> <p><i>Дизайн:</i> конструкция робота оригинальна и соответствует заранее заданным техническим характеристикам объекта;</p> <p><i>Устная презентация:</i> выступление не повторяет визуальную информацию, а дополняет ее: дает пояснения, объяснения, факты, даты, данные, имена, события и т.д.</p>

<p>Interpersonal Communication</p> <p>The students can exchange with peers detailed information related to technical and astronomical fields during oral communication Adv.M.</p>	<p>The students work in team, design and build Mars rovers and test them.</p> <p><i>The main parts of a rover:</i> собрать корпус, использовать сенсоры, передавать изображение, поддерживать связь, системы передвижения по поверхности Марса, шасси, антенна, автономный компьютер.</p> <p><i>The main physics characteristics of a moving object:</i> уравнение движения, зависимость скорости от времени, реактивное ускорение, масса объекта.</p>
<p>Interpretive Listening</p> <p>The students can ask for, follow, and give directions in some complicated situations during engineering problem solving Int.H.</p>	<p>The students solve Math, Engineering and Physics problems and exchange their findings during STEM lesson.</p> <p><i>Math terms:</i> число, значение, отношение, уравнение, функция, радиус, диаметр, длина окружности, угол наклона;</p> <p><i>Physics terms:</i> скорость, ускорение, расстояние, зависимость, масса, сопротивление.</p> <p><i>Understanding the structure of Math and Physics problem genre (“body”-narration and a question):</i> Определите расстояние; нанесите полученные данные на график, постройте график зависимости, найдите отношение (наклон, угол), составьте таблицу зависимости, повторите опыт, усредните полученный результат.</p>
<p>Presentational Speaking</p> <p>The students can present findings from research projects and math problem solving. Adv.M.</p>	<p><i>Math terms:</i> формула зависимости пройденного расстояния от скорости, найти ускорение, диаметр колеса, длина окружности;</p> <p><i>Physics terms:</i> реактивное движение, законы Ньютона, сопротивление воздуха, атмосферное давление, сила притяжения;</p> <p><i>Engineering terms:</i> машина, двигатели, шасси, колеса, конструкция машины, ходовая часть, корпус, приборы и инструменты, манипуляторы.</p>

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

What will learners do (learning tasks/activities/formative assessments) to demonstrate they can meet the lesson can-do?

Students compare main features of Mars rover and a car to get an idea about constructions of the main parts of rover. The students work in groups designing and building their own rovers, then test them and fill out testing chart. After that, every group of students present and describe their rovers to others and judge rovers using rubrics provided to determine a winner.

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

How will you facilitate the learning?

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?

Opening Activity

Teacher sets the main goal of the lesson for the students by a brief discussion about Mars and Robotics.	Time: 5 min.
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Learning Episode

The students work in teams to compare Mars rover and Earth car. The main goal of this episode is determine the main design features that Mars rover should have.	Time: 10 min.
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Learning Episode

The students work in groups designing and building their own rovers with the predetermined characteristics from materials provided.	Time: 20 min.
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Learning Episode

The students test rovers using testing chart.	Time: 5 min.
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Learning Episode

Every group of students present and describe their rovers to others and judge rovers using rubrics provided to determine a winner. Robot winner should pass the maximum distance in a certain time.	Time: 20 min.
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Materials needed for this lesson

- PowerPoint Presentations about Mars planet and Mars rovers
- Kits with building materials and details
- Judging rubric for students

Reflection/Notes to Self