

# Learning Design for: Our Solar System

Lorena Elena Olaru

## Context

Topic: Solar System, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

Total learning time: 150

Number of students: 30

Description: At the beginning the students will familiarize with the main concepts that describe the planets who forms the Solar System. Then they will be able to formulate specific hypotheses to investigate the planets from Solar System using WorldWideTelescope. Before conducting there investigations, they will form expert groups to investigate a single planet. This will allow them to share there conclusions with peers and experts, in order to exchange knowledge they have gained and reach a final conclusion - witch planet is suitable for human colonization. Finally, at the end of the lessons, they will need to reflect and think critically about the learning process followed.

## Aims

This lessons aims to introduce to students the concepts of star, planet and our Solar System. Students will look in detail at images of numerous the planet of our Solar System using WorldWideTelescope. They will establish the the characteristics of each planet.

## Outcomes

Knowledge(Knowledge): -Students will be able to recognize each planet by its unique features. -Students will be able to compare the characteristics of the planets.

Application(Application): The students will use WorldWideTelescope and other educational software.

Synthesis(Synthesis): Students will establish the interrelationships among science, technology, and human activity.

Evaluation(Evaluation): The students will create additional documentation with valid information.

## Teaching-Learning activities

### Orientation

*Read Watch Listen    25 minutes    students    Tutor is available*

Our solar neighborhood is an impressive and fascinating place. The Solar System is full of planets, moons, asteroids, comets, and many other fascinating objects. In this activity, the students are going to explore our Solar System. Their goal is to learn basic information about the objects that are part of our Solar System. The students learn more about the concepts related Solar System watching the following videos and writing down all the concepts and keywords that they think are related to our topic.

The students can work collaborative online on a Google Documents or Google Presentation, OneNote online etc.

Pre-Assessment:

- KWL chart
- Astronomy Vocabulary
- Quiz

### **Conceptualization**

*Collaborate                      30 minutes      students      Tutor is available*

In this phase the students will use the concepts they noted in the Orientation phase in order to create a concept map about planets, stars, our solar system, and form groups to create specific hypotheses they will investigate in the next phase. Students discuss with the teacher about the conceptual map who they are created based on the following questions:

- What are the components of the Solar System?
- What is the difference between a star and a planet?
- What is the difference between planets and asteroids?
- What characteristics of planetes and Sun do you think we need to explore?

The Toolkit criteria:

- mean of the name of each heavenly body studied;
- gravitational characteristics;
- the distance from the Sun;
- presence or absence of water;
- the existence of the atmosphere;
- physical parameters: temperature, mass, pressure, volume, size, density, orbit, day etc;
- the structure of Sun and each planet.

Concept map can be realize by students online, collaborative on Google Drawings or PowerPoint online etc.

Formative assesment:

- Checklist
- Exit Slip
- Peer/Self Assessments: Two star and a wish.

### **Investigation**

*Investigate*                      *35 minutes*    *students*            *Tutor is available*

In the Investigation phase they will form groups in order to design and carry out our investigation. First they will familiarize with the WorlWideTelescope, educational software in order to identify the commands and design there investigation. Then they will proceed by carrying out there investigations and collecting data and informations. The students discuss with the teacher and peers how you will carry out there investigation in order to confirm or reject there hypothesis. They can now form expert groups. Each expert group is going to specialize on a Sun, and a different planet. The teacher will provide more instructions on how to form the expert groups. The students watch the videos in order to familiarize with the WorldWideTelescope. Every team will investigate one planet from our Solar System according to criterias established in conceptualization phase.

WorldWide Telescope (WWT) is an open source set of applications, data and cloud services, originally created by Microsoft Research but now an open source project. The teacher will provide more instructions on how to form your expert groups.

Formative assessement:

- Checklist
- Exit Slip
- Peer/Self Assessments: Two star and a wish

### **Conclusion**

*Produce*                              *30 minutes*    *students*            *Tutor is available*

In this phase the students will use your there previous work (hypothesis, data etc.) and form the conclusions. The conclusions should be justified based on the evidence collected during the Investigation phase. Now, in your expert group they have to prepare a 5 minute presentation (PowerPoint, Sway, Google Presentations, Prezi etc) about there expert conclusions. They have try to give enough evidence in order to reject or confirm the hypotheses. Now they have completed the work as experts.

Formative assessement:

- Checklist
- Exit Slip
- Peer/Self Assessments: Two star and a wish

## **Communication**

*Discuss*                      *20 minutes*    *students*            *Tutor is available*

In the Communication phase the students will return to home group and share their conclusions. After investigation shows results based on parameters. Will appreciate the characteristics of each planet. They have to share the results with groupmates. Each expert must inform the other members of his/her team about his/her conclusions. As a group they will come to a final conclusion. The discussion concerns the exchange of information on the research process and results. This involves the process to describe, criticize, evaluate and discuss the whole process of investigation or a specific phase. Each cycle stage of investigation, the teacher is to generate discussion, to ask questions, to stimulate students and to provoke their curiosity. Now students have completed work as experts. After task-communication phase follows; from each group of experts, students specialized each in a specific part of the investigation, returning in groups and teach their colleagues the initial training (other experts). Each group initially of students are specialized each in a different part of the investigation and each of them will teach him. Students can use the expert presentations.

Formative assessment:

- Checklist
- Exit Slip
- Peer/Self Assessments: Two star and a wish

## **Reflection**

*Discuss*                      *10 minutes*    *students*            *Tutor is available*

In the Reflection phase the students will engage in reflection activities which will help you to think critically about their learning process.

Sumative assessment:

- Self-evaluation collaboration;
- Scoring Rubric for Mind Maps;
- Multimedia Presentation Assessment.