

EU Universe Awareness Programme Evaluation Guide

Summary

This document contains materials to support National Managers (NM) visiting at least one school, to gather evidence for evaluation of the EU-UNAWE-Program.

There are four main ways proposed for gathering **general** information:

- Observations using an Astronomy Awareness Framework evaluation template, for children who are too young to write
- Pre and post visit mind maps/drawings for 7-10 year olds
- Quick evaluation with an Astro-poster
- By means of a card game where children can identify objects and find correlations between them

For the **evaluation of the specific** activities developed by each EU-UNAWE-partner we propose some playful activities (games).

In addition, survey templates linked to the framework are supplied for gathering evidence from teachers, and pupils who are old enough to write. These can be used whether or not NM are able to visit the school.

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EU-UNAWWE project goals

An evaluation concept of the European Universe Awareness programme (EU-UNAWWE) must be strongly linked to the general and specific goals of the programme. In resume these are the following:

- 1 The Programme is addressed specially to **disadvantaged children** in different social environments.
- 2 The program intends to stimulate through images, playful activities, experiments, models and artistic activities the **children's awareness of astronomical objects** and the place of the Earth as part of the Universe in a way of broadening the children's view of the world. In doing so try to use daily-life materials in the activities, experiments and models such that children can reproduce them at home.
- 3 Awaken the awareness of the **uniqueness of the Earth** and of the need for environmental preservation.
- 4 Motivate children to **appreciate other cultures** via stories and twinning activities with children living in other countries, making them aware of the place in which other children live, their common cultural features and differences.
- 5 Throughout stimulate **children's curiosity** giving them the occasion and time to formulate their own questions related to the Universe.
- 6 Develop EUNAWWE-contents to **be linked to daily school curricula** via training of the teachers.

To achieve these goals the partners of the project have developed diverse materials for teacher training workshops and subsequently children's class activities.



Evaluation Methodology

These evaluation materials focus on two key stakeholders: children and teachers. The project goals cover a range of domains of learning: *motivation, scientific skills, knowledge, and intercultural attitudes*. A framework for evaluation specific to UNAWE, 'Astronomy Awareness', is proposed as the basis for gathering evidence.

Care has been taken to design a research methodology that acknowledges the strengths in a multi-national project and also allows for data from different locations and activities to be combined. Therefore, it is intended that this document supports National Managers (NM) to gather evidence with the aim of demonstrating a full range of impacts for teachers and pupils.

Gathering evidence about children's learning

This data collection will require a visit to at least one school. In order that data collection is realistic, a number of qualitative evidence collection routes are proposed in anticipation that National Managers (NM) will select appropriate methods to suit children, capacity, hardware and activity. It is hoped that NM *will use pre/post activity drawings or an observation template* supplied to gather qualitative information about children's actions about astronomy. In addition, card games, photos, video, recordings, and notes are all admissible as evidence and will help to build a clear understanding of the activities undertaken throughout the lifetime of the project.

There is a survey for teachers (with e-form) and an optional follow up survey activity for children, suitable for 8-10 year olds. These can also be sent to schools independently of visiting, in order to gather more evidence.

National Managers are most welcome to share other examples of evaluation methods.

Understanding programme development

Clearly, detailed reflection has been essential to develop both children's resources and activities, and teacher workshops. This reflection and improvement process has the potential to be a rich source of learning for future projects. A paper template and e-form are provided for National Managers to complete, in order that others can gain insight into programme development, as a legacy from EU-UNAWE.

Gathering evidence from teachers

Excellent practice is already taking place around teacher evaluation using quantitative and qualitative questions on survey forms. Based on good examples supplied by NM, questions have been modified in order that data can be collated and logically correlated with the Astronomy Awareness framework for children's learning.

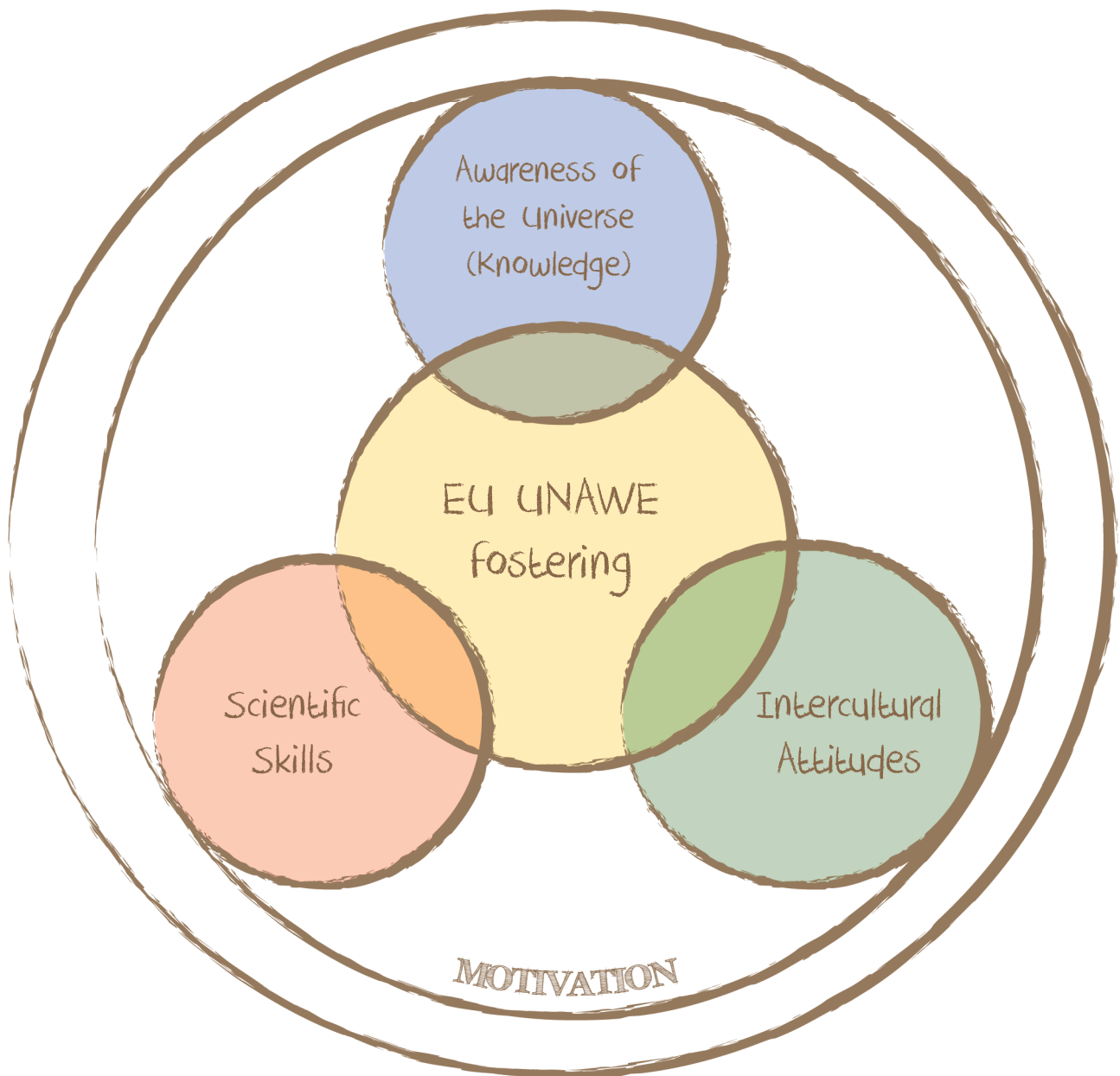
Paper and e-forms are supplied for dissemination to teachers.

Pre-existing evaluation data in different formats is welcome: eval@unawe.org

Instructions show the process for visiting and collecting qualitative evidence from one school. It is expected that this is the minimum, and greater statistical significance will be achieved for your project if you can visit more schools or use volunteers to assist in gathering more data.

Framework for children: Domains of active learning (DAL) of EU-UNAWE

Using the general program goals, it is clear that the concepts underlying UNAWE cover several domains of active learning:



The inspiration for assigning domains of learning for UNAWE evaluation is based on Information from the Museums' Libraries and Archives Framework 'Inspiring Learning for All' generic learning outcomes and Nichols' framework '(2012) Earthsmarts socioecological literacy'.

UNAWE Domains of active learning

	Objectives	Evidence
Motivation	<p>Enjoyment, Inspiration Curiosity Tenacity</p>	<ul style="list-style-type: none"> • Children are doing the tasks with pleasure • Children seem enchanted • Children react with diligence in front of the proposed activities • Children demonstrate attention • Children apply perseverance / tenacity • Children manifest inquisitiveness • Children introduce some complex questions
Scientific Skills	<p>Develop Scientific Thinking & Problem Solving Techniques; Planning & Conducting Investigations Observation, Identification, Classification, Making interconnections, Changing Perspective & Communication From curriculum: example of school wording of this section Discussing and Questioning Ask questions which can be answered through an investigation Use scientific language regularly in discussions Planning Plan and carry out a test to collect evidence Select information from a range of resources Observing Decide what observations need to be made Select appropriate equipment for observation or measuring results Interpreting Draw conclusions linked to scientific knowledge and understanding. Recognise patterns and trends based on the observation or investigation Ideas and Evidence Recognise that scientific ideas are based on evidence which can be verified by observations Use the imagination together with scientific knowledge to understand and think about why something happen Recording Decide on an appropriate method of recording Present results using tables, graphs, pictures Evaluation Review the work and reflect on the results</p>	<ul style="list-style-type: none"> • Correct use of vocabulary or gesture to name objects and phenomena observed in sky • Grouping objects/ phenomena to indicate developing understanding of astronomy concepts • Making conjectures available to be contrasted • Developing some experiences related to the hypothesis • Linking new information with existing conceptions of the same or different areas • Removing previous points of view according to new inputs • Sharing with others their new knowledge

Objectives

Evidence

Knowledge & Understanding

Observing, exploring and discovering:

1. The Sun, Sun relative position, Sun light (shadows), Day/night cycle, time zones, the seasons, the Moon, the Earth as a planet, awareness of the existence of water and of the Earth atmosphere and Sun light for the development of life on Earth, Solar and Moon eclipses,...
2. The Solar system: planets characteristics and movements, dwarf planets, asteroids, comets,...
3. The Stars in the night sky, the constellations, orientation, the Life-cycle of stars, the formation of stars and planets,...
4. Our place in the Milky Way, Family of galaxies,...
5. Current developments in astronomy
6. Magnetic fields (compass, northern lights,...)
7. Several complementary questions

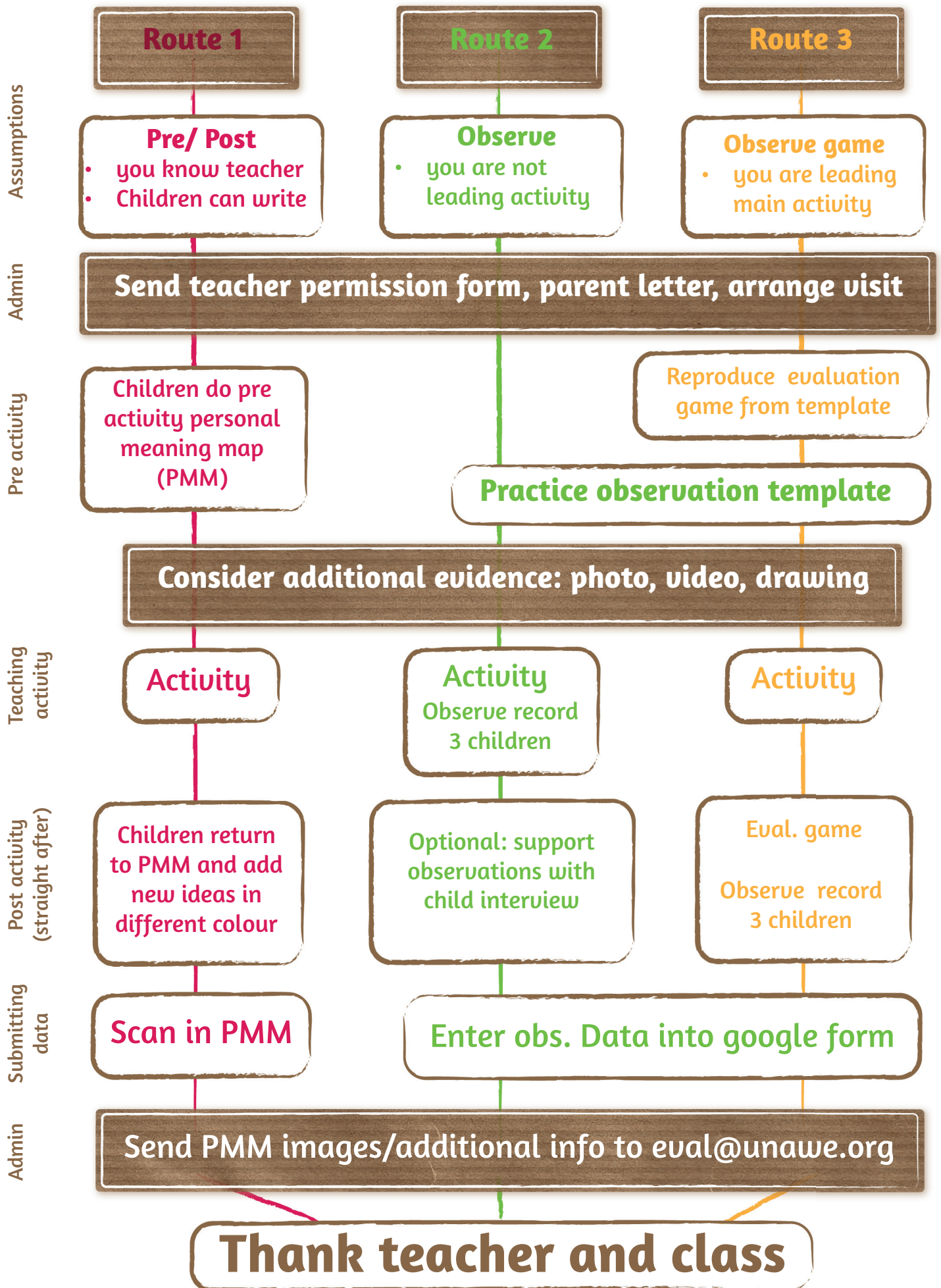
Direct observation and/or recording of naming, first explanations, discussing, drawing, construction, creative responses, movements and dances, etc. to demonstrate knowledge of one of the features listed. left

Valuing different cultural perspective. Recognising different physical perspectives. Positive attitude towards astronomy. Valuing inclusive education

Working Individually & in Teams

- Demonstrating awareness of different cultures
- Ability to observe and explain differences in phenomena in different countries
- Statements of future activity with regards to astronomy
- Act on an appropriate way in a frame of diversity

Gathering evidence: Process diagram



Name: _____

Pretends it is night! Draw the sky. What do you see?

PMM

Personal meaning map
template to photocopy



Date Location

Activity being evaluated

Child ageM /F Languages:.....

School.....

Instructions:

Children add ideas as writing or drawing, pre activity,
using a pencil. After their activity, return and add new
ideas using a PEN or BLUE coloured pencil

Name: _____

PMM

Personal meaning map
template to photocopy

What do you know about the
sky and space?

Have you got any questions?

Write or draw



Date Location

Activity being evaluated

Child age M / F Languages:

School.....

Instructions:

Children add ideas as writing or drawing, pre activity,
using a pencil. After their activity, return and add new
ideas using a PEN or BLUE coloured pencil

Child observation template (4-7 years)

Name of observer: Location:

Date of observation: Time:

Activity being evaluated:.....

Child age.....M/F Languages:.....

School.....

	Tally / score (e.g. III)	Total	Evidence (e.g. "smiled on seeing moon"
Motivation			
Scientific Skills			
Knowledge			
International Attitudes			

Submit information online: <http://goo.gl/2eFfW>

Pupil survey (8-10 years)

Name: Date:

School:

Teacher: Age:

1 What activities have you done in class about space?

2 What did you enjoy about this topic?

3 Is there anything you did not like?

4 Would you like to find out more about astronomy and space in future?

5 Have you got any questions about space?

6 If you were going to make a Space Museum or a space display for your class, what topics and objects would you put in?

Write or draw to explain your plan.

Work on the back of this paper.

Evaluation materials

Astro-Cards classification games

Card game “Astro-Cards”: Identification and classification game of astronomical objects.

Exercise 1

Age: 8

Materials: Card set “Astro-families” (24 cards)

Goal: Evaluate children’s awareness of the existence of different astronomical objects and of the place of the Earth among them by asking them just to identify those that they know and to name them. In doing so, children can group them in families (planets, comets, stars, nebula, constellations, galaxies, etc).



Link to Astronomy and scientific skills:

Astronomy relies strongly on the observation, identification and posterior classification of objects into family classes, and on their location in space at different scales and distances. Observation and classification skills play therefore a key role .

8

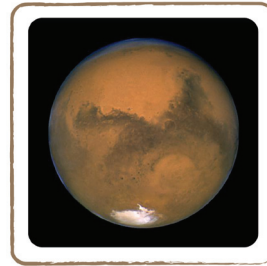
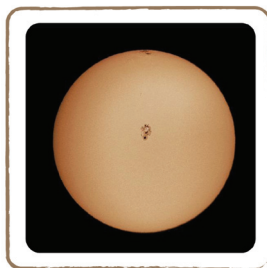


Astro-cards evaluation games

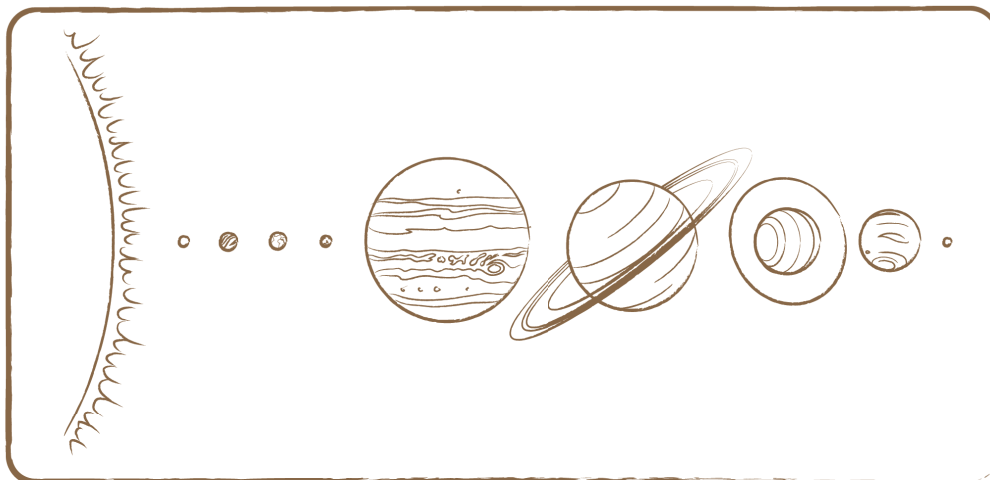
Exercise 2

Identification of objects belonging to the **Solar System**

Ask children to identify some objects among the cards belonging to the Solar System.



Objects belonging to the Solar system



Link to Astronomy and scientific skills:

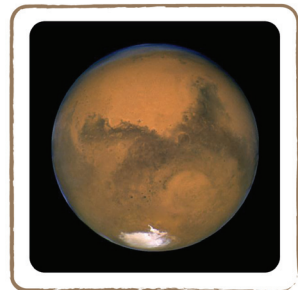
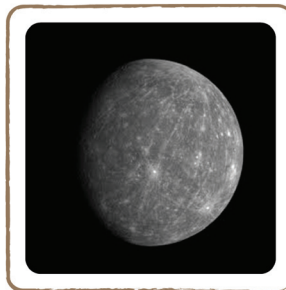
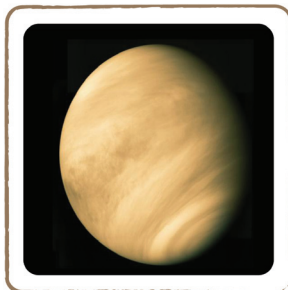
To learn about our cosmic adress and our neighbourhood it is important that children gain a idea of all objects belonging to the Solar System

Astro-cards evaluation games

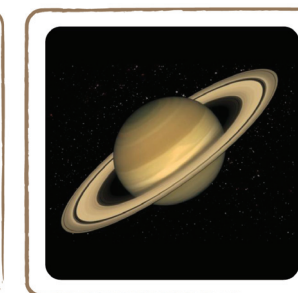
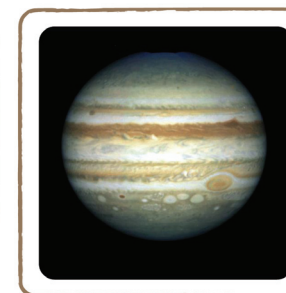
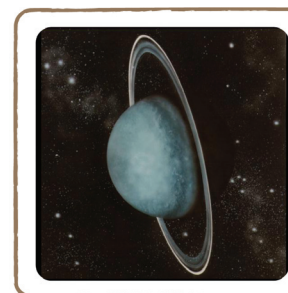
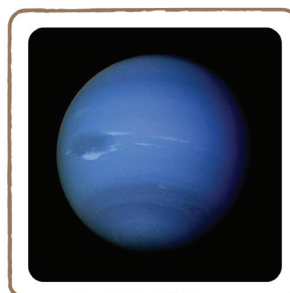
Exercise 3

Identification and classification of planets

Ask children to identify among the cards the planets, to name them and group them into solid and gaseous planets according to their distances to the Sun.



The solid planets of the Solar System



Gaseous planets

Link to Astronomy and scientific skills:

The distinction between solid (rocky) and gaseous, and their distance to the Sun plays an important role when discussing the habitability of planets. Therefore this classification is fundamental of the discussion about life in the Solar System. Also, the uniqueness of the Earth among the planets can only be understood in this classification context.

Astro-cards evaluation games

Exercise 4

Identification and classification of **asteroids** and **comets**

Ask children to identify among the cards the asteroids and comets and to discuss about their differences and location in the Solar System.



Link to Astronomy and scientific skills:

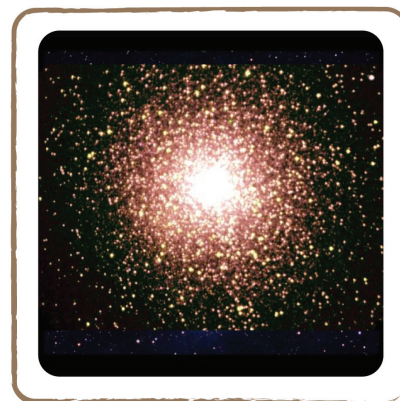
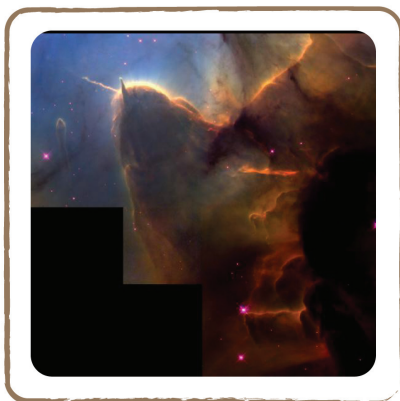
Both asteroids and comets are considered as fossils objects of the Solar System and are connected to its formation history. Planets formed in the past from the collisions of hundred of thousands of asteroids which had in turn formed out from dust grains of the protoplanetary disc surrounding the Sun. Comets are icy objects that, when close enough to the Sun, displays a visible coma (a thin temporary atmosphere) and a tail. It is thought that the Earth water came from lots of comets impacting its surface.

Astro-cards evaluation games

Exercise 5

Identification and classification of **nebula** and **star clusters**

Ask children to identify among the cards the nebula (birth place of stars) and the open and globular star clusters.



Astro-cards evaluation games

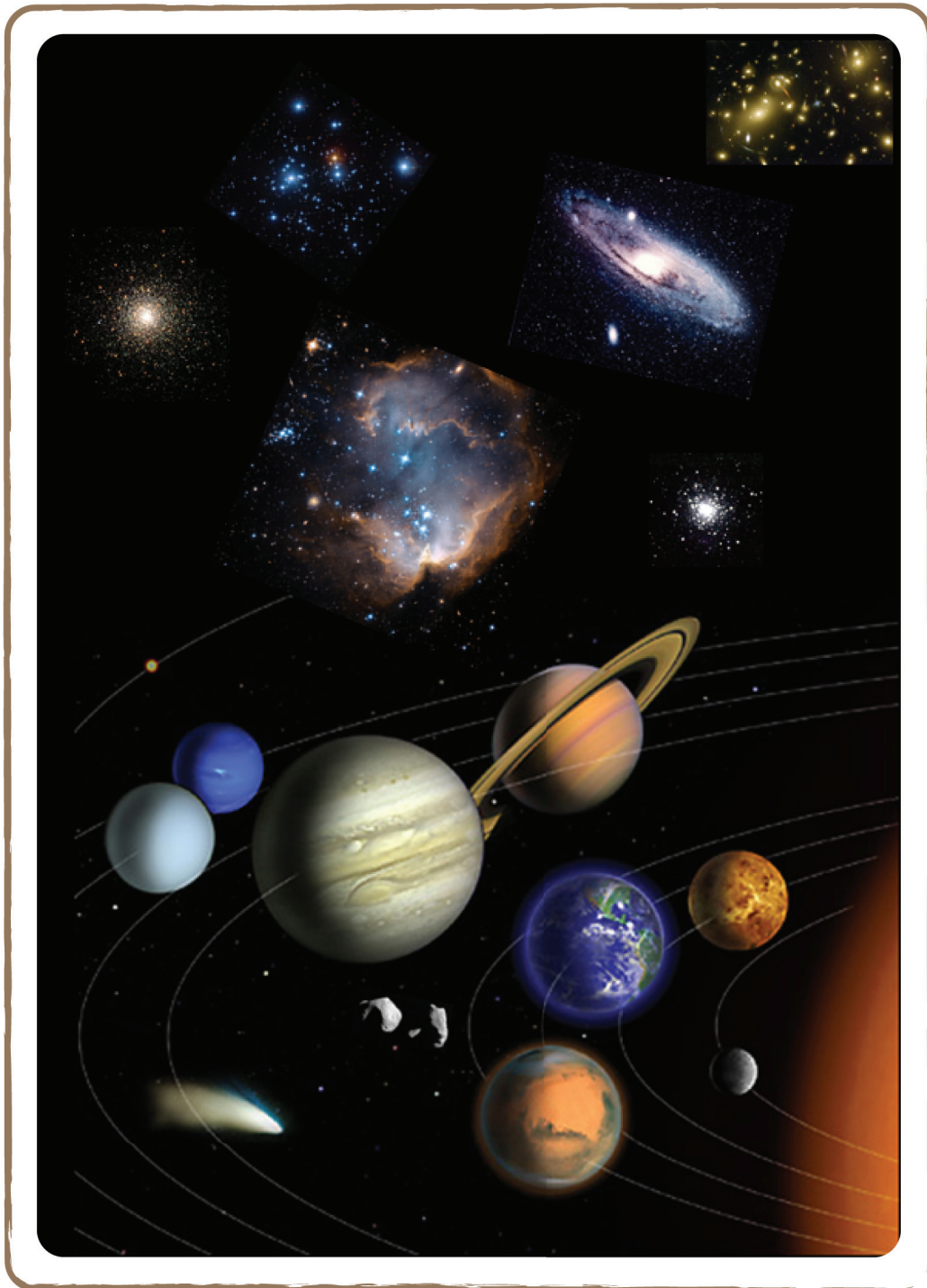
Exercise 6

Identification and classification of galaxies, galaxy families and galaxy clusters

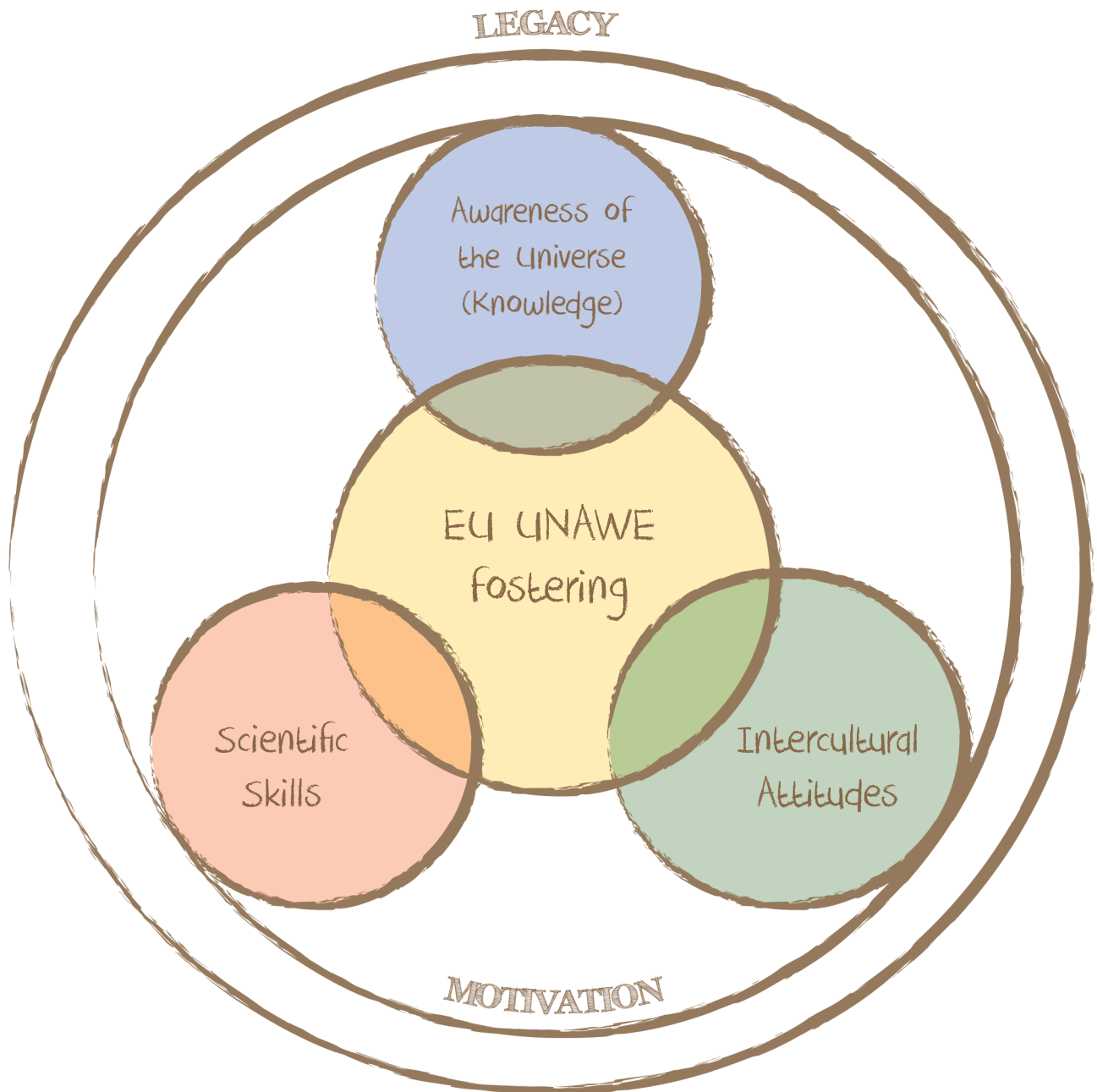


Quick evaluation: Astro-Poster

Another possibility of performing a quick evaluation is to show children the poster bellow and ask them to identify as many objects as possible. In doing so they could describe their size and location (e.g. within the Milky Way, outside the Milky Way).



Astronomy Awareness Framework for teachers



Teacher additional area for impact: **Legacy**

Teachers gain subject knowledge for teaching their pupils in the domains previously explained. In addition there is potential for the impact of the project to be multiplied through:

- Teachers disseminating knowledge
- Teachers critically appraising resources and activities, in order to make recommendations for future projects
- Embedding astronomy activities into curriculum

Astronomy Awareness Framework for teachers: Detailed description

Definition

Motivation

1. *Enjoyment*
2. *Inspiration*
3. *Creativity*
4. *Persistence*

Scientific Skills

1. *Curiosity*
2. *Observation*
3. *Identification*
4. *Classification*
5. *Making interconnections*
6. *Changing perspective*
7. *Communication*

Knowledge

Observing, exploring and discovering:

1. *The Sun, Sun light (shadows), Day/night cycle, the seasons, the Moon, the Earth as a planet, awareness of the existence of water and of the Earth atmosphere and Sun light for the development of life on Earth, Solar and Moon eclipses.*
2. *The Solar system: planets characteristics and movements, dwarf planets, asteroids, comets.*
3. *The Stars in the night sky, the constellations, the life-cycle of stars, the formation of stars and planets*
4. *Our place in the Milky Way, Family of galaxies*
5. *Current developments in astronomy*

Intercultural Attitudes

1. *Valuing different cultural perspectives*
2. *Positive attitudes towards astronomy*

Legacy

1. *Disseminating knowledge to other teachers*
2. *Recommendations for improvements*
3. *Embedding new materials in curriculum*

Teacher workshop survey (page 1/2)

Name: Date:
Workshop Location: Time:
Date of teacher workshop:.....
Age of class taught:School name:
School adress:.....
Your email adress:
School.....

We would prefer that this is completed online at: <http://goo.gl/XejyP>

About you

- 1 What did you enjoy about the course?
- 2 Did you gain knowledge about the universe? Please explain.
- 3 Did you develop any new skills or practice existing skills?
- 4 Did the course make you consider cultural perspectives differently?
- 5 Did you share aspects of this course with other staff? How?
- 6 Have you got any recommendations for improvements to your course?
- 7 Have you embedded any new materials into the curriculum as a result of this course?

Teacher workshop survey (page 2/2)

About your pupils

8 How did you interpret the activities for your pupils?

9 What did they enjoy about the activity?

10 Were there any constraints to implementing the activity?

11 What do you think your pupils learnt?

12 Did they have the opportunity to try out any new skills?

13 Did they have opportunities for cultural learning?

14 Which aspects of curriculum assessment did the activities address?

15 Please rate the UNAWE resources out of 10, (10= excellent):

16 How could future projects support opportunities for children to be involved in astronomy?

Any other comments?

Teacher letter/email template

Send to teachers before visit

Universe Awareness Activity observation

Dear **insert teacher name**,

Thank you for taking the opportunity to attend the recent Teacher training course on **<insert date>**.

I am looking forward to your class participating in activities which aim to increase their understanding and excitement about astronomy.

As part of the programme, and to allow it to continue free of charge, UNAWE are obliged to gather information about the activities and how children respond to them.

I hope you do not mind me contacting you to request assistance. I have chosen your school because **<insert specific reasons here >**

I would like to ask permission to visit you for an evaluation activity. I do not anticipate that this would detract from your normal class activities,. I hope to gather evidence about children's learning in the form of a short activity and some observations. These may also be useful for teacher assessment. I would also like to find out your opinions about implementing the activities.

If you are happy for this activity to take place, I would be grateful if you could circulate the letters attached to parents; I would like to collect them when I visit.

Here are some dates which might be suitable for a visit:

<Dates>

If none of these suit you then please let me know good alternatives.

Please feel free to contact me by email: **<email address>** or phone **<number>** at a convenient time to check times and dates.

With best wishes and thanks for your support,

National Manager name

National Manager <insert location>

UNAWE

www.unawe.org

Parent letter template

Send/email to teachers before visit
NB recommend sending a class set to teachers

Dear parent,

Your son/daughter's teacher <insert name> has recently taken part in a workshop aiming to increase children's understanding and excitement about astronomy.

Owing to your teacher's enthusiasm for astronomy, we have chosen your child's class for a follow up visit, so that we can see activities taking place in the classroom.

As part of the programme, and to allow it to continue free of charge, Universe Awareness are obliged to gather information about the activities and how children respond to them.

I would like to ask permission to gather information in different ways. I would be grateful if you could indicate on the attached form whether you are happy for anonymous evidence to be gathered as shown below.

If you have noticed your child speaking about astronomy topics recently, I would be very interested to hear about it. <email here> if you have any questions please do not hesitate to contact me:

With best wishes and thanks for your support,

National Manager name

National Manager <insert location>
UNAWA
www.unawe.org



Name of child / children	
School	
Your name	

We would like to gather evidence about UNAWA children's astronomy programme. This may be used in communicating the benefits of the trip; for example it may go on a website for researchers, educators, parents or teachers to look at. It may be used to persuade other organisations to run a similar project, which may involve press coverage. Children will not be identified by name.

Please indicate if you are happy for evidence (photo/video/microphone/written) to be gathered.

We will not use the images taken, or any other information you provide, for any other purpose.

Contact details will only be used to communicate with you, and all conditions of the Data Protection Act 1998 will be adhered to.

I give permission for my son/daughter to take part in the 'Universe Awareness' school activity during class time, at school, and for evidence to be collected as indicated above.

Signed:

Data:

Teacher letter template

Send to teachers after visit

Dear **insert teacher name**,

Thank you very much for allowing me to visit on **<insert date here>**.

I would like to thank you and the class for making me feel welcome, and for facilitating collection of vital evidence about learning. This data will be used to improve the programme, and also to develop future Programmes.

In case you have not yet completed the online survey, here is the address:
<http://goo.gl/XejyP>

Children's opinions are of key importance and likewise, I am keen to see the children's opinions from their survey activity. (NB delete if children are under 8)

The results will be made available in a full report towards the end of 2013, and if you would like a copy please send your contact details to eval@unawe.org

If you have any questions please do not hesitate to contact me:
<insertemail here>

National Manager name

National Manager <insert location>
UNawe
www.unawe.org

Tracing resources/activity development

In order to better understand your programme development process, we would like to ask you to reflect on and complete the following information online. Please complete one form per activity including teacher workshop activities you have developed.

Information can be brief.

We would prefer that this is completed online at: <http://goo.gl/yJQY5>

Here are the questions:

- 1 Your name:
- 2 Your location:
- 3 Activity title:
- 4 Audience: Children age ./Teachers
- 5 Number of participants
- 6 Activity type: Festival, workshop, game, lesson, drop in, outreach, other
- 7 Where did it take place?
- 8 Date of activity
- 9 Time of activity
- 10 How did you develop this resource? (conception and delivery)
- 11 Image file name

(Please send an image of the programme to eval@unawe.org)

Evaluating long term impact

We recognise that long term impact is a question frequently asked in evaluation. Whilst demonstrating long term impact was not stated as an evaluation outcome in this EU proposal, if you wish to gather supporting information then it would be possible using the following interview methodology:

Interviewing to assess long term impact

- 1 Search records for a class that you can still contact, who have taken part in previous UNAWE activities.
- 2 Contact a teacher at the school and request an interview with a group of pupils.
- 3 Use the following questions for a semi-structured interview (This means encourage conversation around the four key questions). :
 - Record age, date, name, school and year of UNAWE participation.
 - On a scale of 1-10, where 1= dislike and 10 = like very much, how do you feel about astronomy?
Discuss responses with the group.
 - If you were planning to teach younger children about astronomy, what would you like to tell them about?
 - Do you ever observe the night sky?
 - Do you think you will use what you know about astronomy in future?

In addition, it is then necessary to find a control group of pupils the same age, who have not taken part in UNAWE activities.

If you submit notes about interviews with both groups, these can be included, correlated with the Astronomy Awareness framework, as part of the final report.

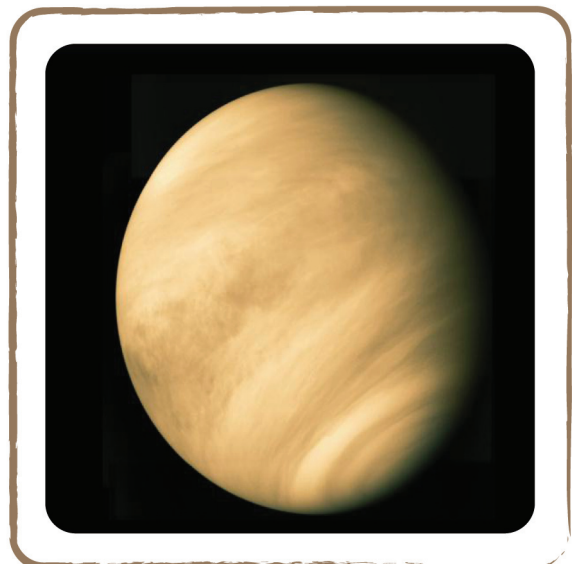
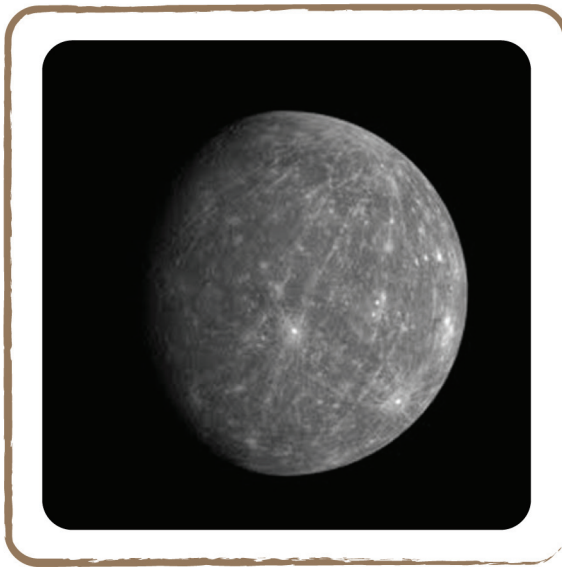
There is a google form here to submit information.

Checklist for the evaluation

Task	Date planned	Completed
<i>Task</i>		
<i>Decide which route is suitable for you</i>		
<i>Identify school (s) to observe</i>		
<i>Send teacher letters together with parent information</i>		
<i>Set observation dates</i>		
<i>Produce evaluation game using template</i>		
<i>Practice observation schedule</i>		
<i>Consider video recording or sound/photos as additional material</i>		
<i>Agree activity, timing and pupils to observe with teacher. You may need to explain evaluation game or pre visit materials. Discuss photography and video with teacher</i>		
<i>Photocopy PMM</i>		
<i>Photocopy teacher survey</i>		
<i>Photocopy pupil survey if pupils are over 8</i>		
<i>Recharge digital camera/dictaphone</i>		
<i>Take game/PMM/observation sheets/ teacher survey/pupil survey to school, together with any recording hardware</i>		
<i>Route 1: Pre visit PMM</i>		
<i>Route 2: Observe activity and record 3 pupils minimum</i>		
<i>Route 1: Post visit PMM OR Route 3: post visit evaluation game plus observations</i>		
<i>Give teacher survey and pupil survey</i>		
<i>Collect teacher survey (if not eform), pupil surveys and parent permission forms</i>		
<i>Route 1: scan in PMMs</i>		
<i>Route 2 and 3: submit observation data</i>		
<i>Download and email any supporting video/photo/drawing evidence</i>		
<i>Thank teacher and class</i>		

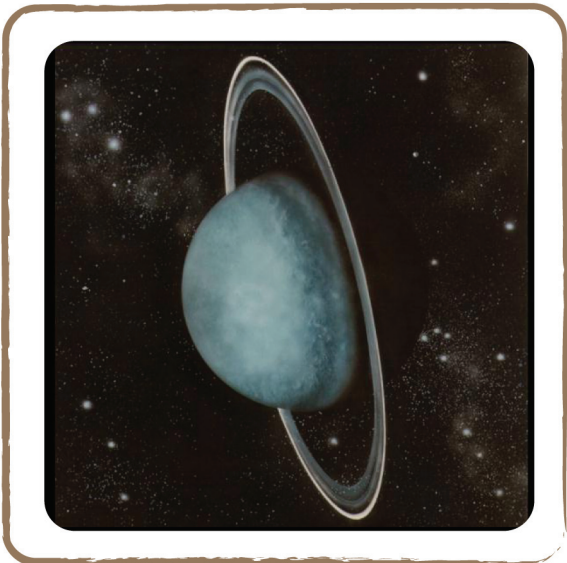
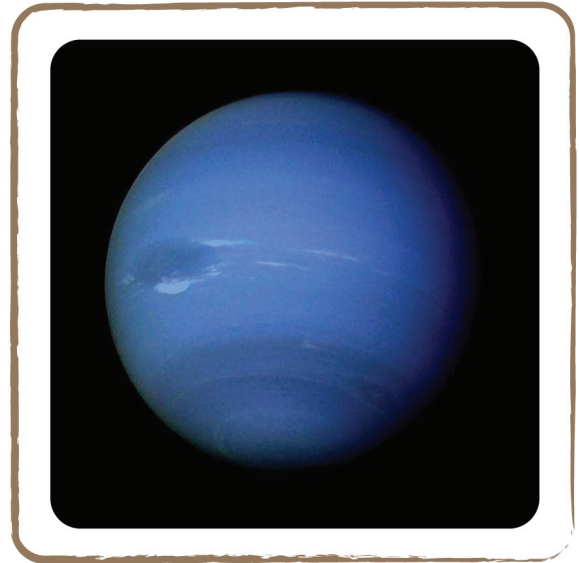
Astro-Cards

Moon - Terrestrial - Planets



Astro-Cards

Gaseous Planets



Astro-Cards

Asteriods



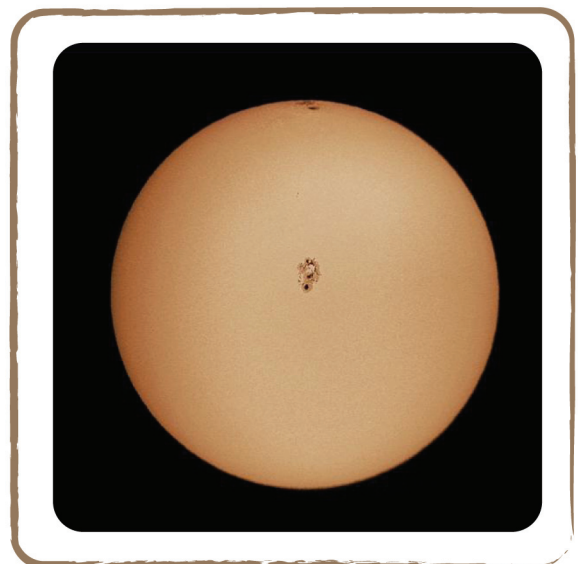
Astro-Cards

Comets



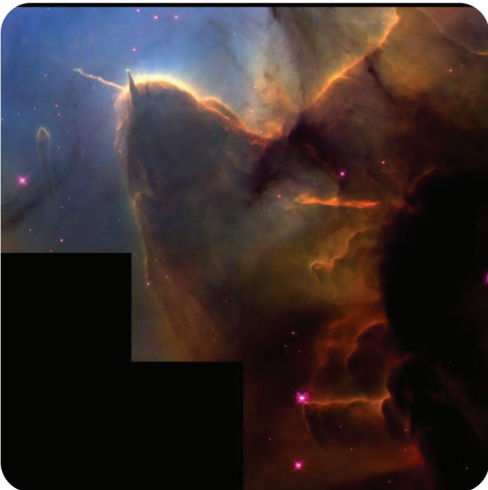
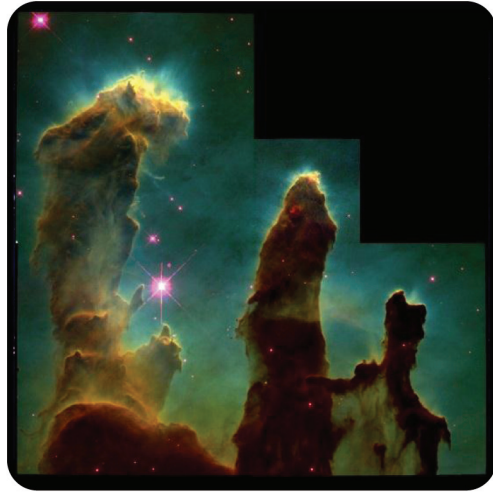
Astro-Cards

Sun - Stars - Clusters



Astro-Cards

Nebula



Astro-Cards

Galaxies



Authors: Cecilia Scorza and Grace Kimble

Coordination: Pedro Russo

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