



**T e a c h e r   w o r k s h o p  
f o r   t h e   d e s i g n   o f  
A s t r o n o m y  
I n t e r d i s c i p l i n a r y  
s c h o o l   l e s s o n s**

3rd Shaw-IAU Workshop on  
Astronomy for Education  
12<sup>th</sup>-15<sup>th</sup> of October 2021



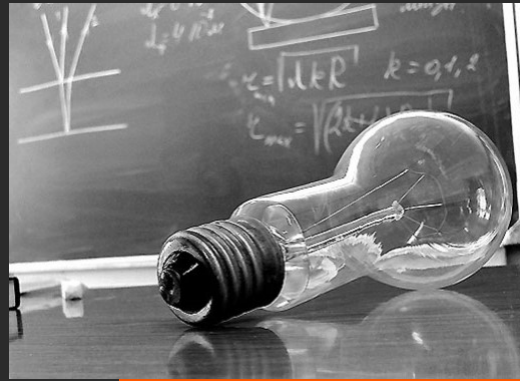
**RITTY**

**Why**  
**interdisciplinarity?**



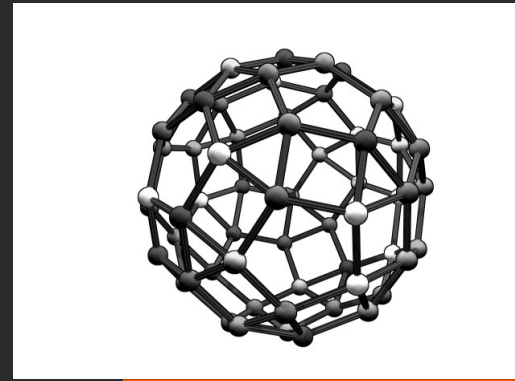
**01**

Astronomy is an interdisciplinary science



**02**

To know and promote astronomy



**03**

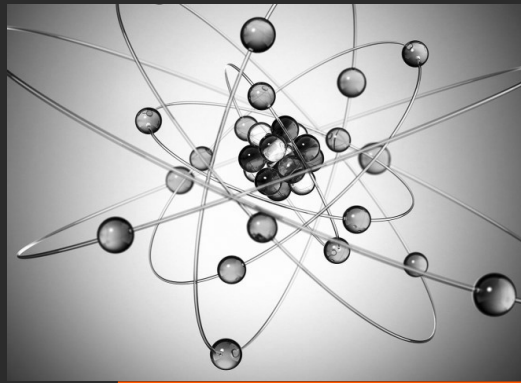
Knowledge is integrated



**04**

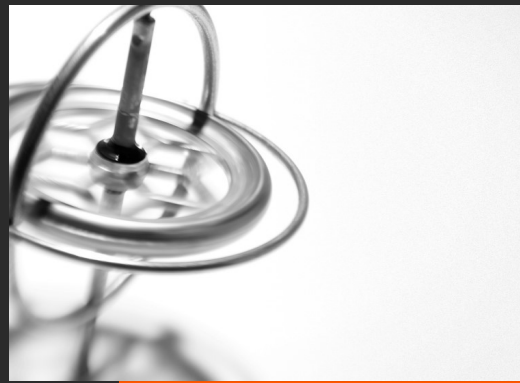
We need solutions to more complex problems

# Motivation



**01**

Build bridges  
across disciplines



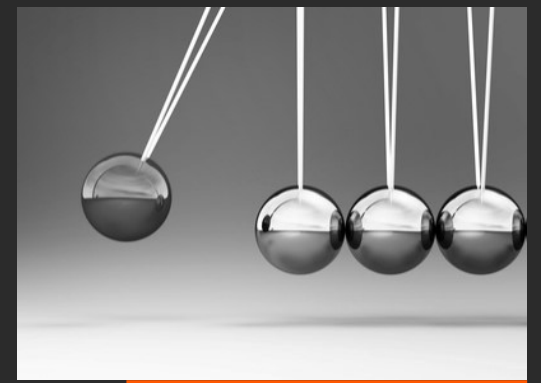
**02**

Create support to the  
project across the  
institution



**03**

Create interdisciplinary  
spaces



**04**

Official recognition  
of interdisciplinary  
work

# Conditions

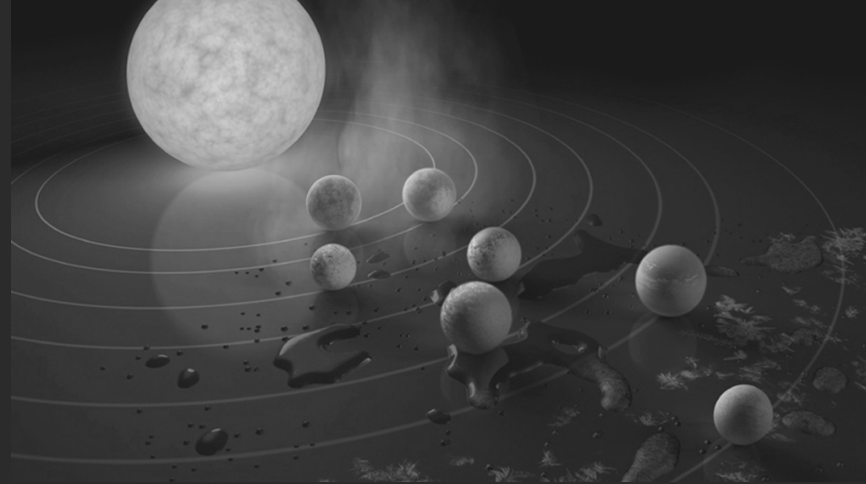
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**Teacher Workshop**  
**Astronomy**  
**Interdisciplinary school**  
**lessons**

**ONS**

# Our Proposal



## Starting with a news

A news that triggers students' interest is chosen, then it is transformed into a scientific question that needs to be answered by the students

## Disciplinary Activities

Each disciplinary teacher designs an activity that is aligned with its subject's LO and that allows to gather evidence for answering the scientific question.



## THE WORLDS WE KNOW

Many of the exoplanets discovered to date are startlingly different from the worlds in the eight-planet architecture of our Solar System. They range from bloated gas balls close to their stars to ice worlds looping far beyond — and in between is a handful of Earth-like planets in the 'Goldilocks zone', where conditions are just right for life as scientists know it.

2 -

**51 Pegasi b**  
The first exoplanet found orbiting a Sun-like star

HOT JUPITERS

## Integrated Answer

The evidence gathered in every activity is integrated at the final (evaluative) activity to finally answer the scientific question



# Structure

## Week 1

### Unit definition

Presentations in disciplinary areas  
Workshop objective  
Focusing question  
Expected response

## Week 2

### Activities

Creation of activities.  
At least one per discipline  
Each activity provides evidence to answer the focusing question

## Week 3

### Activities

Presentation of activities between disciplines  
Feedback to each work team  
Discussion of how activities connect to each other

## Week 4

### Integrated assessment

Evaluation of each activity  
Final evaluation of the unit  
Review coherence between activities, their evaluations and integrated evaluation

## Weeks 5-6

### Assembly

Learning path  
Defining the implementation  
Inventory of activities' resources  
Unit schedule



**Astronomy**  
**Interdisciplinary**  
**lesson**

**SON**



# 93%

of your body mass is, in fact, stardust.

The majority of the elements in your body were created by stars.

facebook.com/AllScienceAllTheTime



What does it mean that **we are stardust?**

## Joni Mitchell

1970

Woodstock song

*We are stardust*

<https://youtu.be/cRjOCvfcXn0>

## Carl Sagan

1973

Book

*The cosmic connection*

1980

TV Documentary

*Cosmos. A personal voyage*

## María Teresa Ruiz

1987

Book

*Hijos de las estrellas*

## José Maza

2017

Book

*Somos polvo de estrellas*

# 8 Lessons

1	2 hours	Art, Biology, and Physics		Game of astronomical definitions	Scientific Language
2	4 hours	Art	LO 05	Artistic representation of definitions	Visual arts outreach projects
3	4 hours	Biology	LO 06	Game of biogeochemical cycles	Scientific explanation of biogeochemical cycles
4	4 hours	Physics	LO 16	Astronomical observation	Astronomical image
5	4 hours	Art	LO 05	Artist's rendering of an astronomical image	Class Art Installation
6	4 hours	Biology	LO 06	Debate over the existence of life on Venus	2 teams debate
7	4 hours	Art, Biology, and Physics		Team competition using a board game with the unit's learning	Board Game
8	4 hours	Art, Biology, and Physics		School	School Outreach project
#	Time	Discipline	LO	Description	Evaluation

# Future

# challenges



Ciencias Naturales

Programa de Estudio  
Primer medio  
Ministerio de Educación

# 1



## After hours program or school lesson?

It is necessary to approach the school at early time so that it is included in the annual planning o assure the unit implementation as a school lesson. An alternative is to do it as an extracurricular workshop

## Learning Objectives for other grades

We currently have developed units for 4<sup>th</sup> and 11<sup>th</sup> grade, but we hope to develop more lessons for other grades

## New topics

Expand unit topics to other astronomical topics as describe by Lara Rodrigues' talk "Interdisciplinary links between the curriculum and the Big Ideas in Astronomy: a case study in Chile", in the Astronomy across disciplines session of SHAW-AUI

# Thanks

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Liceo 1 Javiera Carrera