

Chapter 7

Taking Inspiration from Astronomy for Visual and Verbal Projects

ABSTRACT

The chapter comprises projects about some basic concepts related to astrophysics presented in a visual, verbal, or both ways, for example in the form of comics. The reader is encouraged to envision particular events, processes, and products, and then transform the concepts into another level of understanding. Projects involve visualizing or describing the relationship between frequency, wavelength, and energy, and the energy of light as the electromagnetic wave. Themes for projects include the solar system, Kepler's explanation of the forces acting on the solar system's motion and planetary movement, creating frames for animation about the expansion of the universe, a travel to the sun's center to explore nuclear fusion, examination of light and electromagnetic spectrum, elementary particles and quantum mechanics, and visualizing and designing one's own household and its objects and appliances.

INTRODUCTION: PROJECTS ABOUT COSMOS

In order to better understand abstract concepts, people create visualizations. This project invites you to develop a graphical presentation of a specific theme to show the physics-related concepts, forces, processes, and products. Think about making graphics to display the data. To design the visual content, apply textures, signs, symbols, and metaphors in order to envision the forces guiding particular events; color-code the material objects, organize, code, and present

knowledge. The data and information is easier to understand with the use of metaphors. In the first two projects we will start with some analogies. Our resulting confidence might be seen as our ability to understand and perceive connections among particular science themes. The following projects attempt presenting some basic concepts, using astrophysics as an example, and encouraging the reader to actively react in a visual, verbal, or both ways. Short background information provides introduction to each project. Visual projects involve applying various methods of imaging, and verbal projects represent different literary genres.

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Written texts by my student Wes Thorpe illustrate the verbal projects, which comprise.

- **Project 1. About planets:** a still life presented in front of a house and conversation at a theatrical stage
- **Project 2. The planetary movement:** a design for a stain window and a text for a storyteller
- **Project 3. The expanding universe and the gravitational equilibrium:** designing and describing four key frames for an animation
- **Project 4. Nuclear fusion:** now inside of the Sun and in the Era of Nucleosynthesis: picturing and describing the center of the Sun
- **Project 5. Light and electromagnetic spectrum:** a portrait of a person in a forest, powerful animals, and a limerick about this scene
- **Project 6. Cosmic background radiation:** drawing and describing a concept map and a comics
- **Project 7. About mass and energy:** sketches about kinds of energy on a fictional star and a storyline for a game
- **Project 8. About elementary particles:** visualizing and designing seven household objects and appliances; over the phone narration
- **Project 9. About astronomy related tools:** assembling a picture of a telescope using matches

When working on visual projects, it's up to you what kind of tools or media you choose. You may want to create your projects by computing or using software, hand draw with pencils, brushes, or pens, or make the 3-D modeling projects. While working on a computer, it is also possible to use graphic programs downloaded from the Internet on your computer, such as (free download) Gimp

(<http://www.gimp.org/>), InkScape – free download graphic editing software, or the Adobe 30 day trial version, before you decide to buy these programs, of Adobe Photoshop, Illustrator, or Fireworks. You may also draw single key frames for animation, scan, copy-and-paste images (but being conscientious about the copyright rules), or use photographs and combine them with your works. If you'd like to program your work, an open source programming language Processing.org can be downloaded without any charge. The MIT alumni Ben Fry and Casey Reas created this award-winning program for anyone willing to try one's exploratory way of programming. In this program, the image, animation, or an interactive work is presented along with a code, and the user is welcome to alter the code and see the changes made to the visual data provided by the authors, or write the own code following the rules provided in the added manual.

PROJECT 1: ABOUT PLANETS

Background Information for the Planets Project

Some data about the Solar System may be helpful in finding a general idea how to design this project. Before beginning the project it might be useful to recall some basic information (Bennett, Donahue, Schneider, & Voit, 2011).

- Astronomical unit (AU) is the average distance of Earth from the Sun, which is about 150 million km (93 million miles).
- Light year is a measure of distance; it is the distance that light can travel in vacuum 1 year, which is 9.46 trillion kilometers or 5.88 trillion miles. It means that a light minute – the distance light travels in a vacuum in one minute equals approximately 18 million kilometers.

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