

## **GRADE 9 SPACE UNIT PROJECTS:**

I have found that most people stick to the textbook when teaching grade 9 Science. But, where's the fun in that?

So, I used a variety of resources from the H.R. Macmillan Planetarium and my own creativity to create a ton of projects for the students to complete during this unit.

The cool thing about these projects is their variety. Most students can find a project that would interest them and help them tap into their specific talents, be it writing a story or building a working model or creating something completely unique.

The projects are done individually and are quite unique. This helps reduce the chances of plagiarism!

I usually do the projects in my grade 9 class but my sister has also used them in her middle school grades. They could probably be adapted for elementary school.

Have fun! I hope you like the idea ☺

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## SPACE PROJECT PROPOSALS:

In order to ensure success at the Junior Science level, students should be provided opportunities that focus on their strengths. Doing this, however, is extremely difficult when all students have different needs and strengths. The purpose of these project proposals is to ensure that all student have the chance to do well at the project they choose. It also ensures that students will enjoy the project they ultimately complete and thus, do a better job on it.

### *Here's how the process works:*

- 1) All project possibilities are posted around the room. Criteria for the projects are posted with the information. (Students may choose to propose their own project idea and criteria.)
- 2) Students read all project ideas and choose 3 projects they feel they could do well on. (ie, they have the skills to complete the project at a high level).

***The wide diversity of projects ensures that most students strengths are targeted!***

- 3) Students write a proposal listing their 3 top choices in order of priority and explain why they will do a good job on their project.
- 4) Teacher assigns students one of their top three choices based on how persuasive their arguments are. Teachers should ensure that a variety of projects are being completed in the class to reduce the possibility of plagiarism.

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## Timeline of Events

Space exploration has only been happening for approximately 40 years. Within this time frame, a number of major advancements have occurred.

a) Research the major events in the history of **NASA** and the **CSA** (Canadian Space Agency)

Include: space shuttle launches, launches of space vehicles and space probes, missions to repair the Hubble Space Telescope, and any other interesting/important information.

b) Create a Timeline to represent these events

- The timeline should be long enough to fit around the back wall of the classroom and wide enough to see from a distance.
- Include colour, diagrams, pictures, headlines, etc.

c) Indicate on your timeline why each event was significant.

d) Explain what future space travel will be like. What are the current goals of **NASA** and the **CSA**? What types of vehicles, flights, missions, etc. will occur in the future? (Include researched information and your own ideas).

***TIMELINE MUST BE IN YOUR OWN WORDS!!!!***

### Marking Scheme:

#### **Content:**

Significance of events are explained in own words	/10
Explanation of future of space travel clear and concise	/7

#### **Style:**

Timeline is unique and creative	/3
Timeline is neatly and professionally done	/5
Drawings are included and coloured	/2
Bibliography completed accurately	/3

**Total:** /30

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## ***Design a mission***

One of the current missions underway at NASA is to build the International Space Station. However, there have been many other missions in the past, including landing on the moon, sending space probes to other planets, and building large telescopes in space. Before starting this project, research some of the other missions (manned or unmanned) that NASA has completed. This will help you determine uses for further missions.

a) Create a mission to another part of the universe (ie. The moon, a planet, the sun, etc.)

- What will your mission explore?
- What must you do to prepare prior to the mission launch?
- What will you expect to find on your mission?
- How will your mission lead you to further missions?

b) Design a Mission Patch to represent your mission: (Research mission patches designed by NASA for ideas)

- The Patch should be drawn and coloured on blank paper and should fill the whole page
- Explain what each component of the patch symbolizes and why you chose them.

### Marking Scheme:

#### ***Content:***

Mission is relevant and plausible	/7
Mission questions answered clearly and concisely	/7
Mission Patch explanation clear and concise	/5

#### ***Style:***

Mission Patch neatly drawn and coloured	/3
Mission and Patch are professionally done	/5
Mission and Patch are unique and creative	/3

***Total***      ***/30***

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## **Model of Space Shuttle**

a) Research the components of the Space Shuttle

- What are the functions of each component?
- How does the Space Shuttle fly into space?
- What parts are reusable and what parts aren't reusable?

b) Design and build a model of the Space Shuttle using common household materials

- Label each part
- Ensure that parts that are removed during flight can be removed from model

### Marking Scheme:

#### **Content:**

Space Shuttle questions answered clearly and concisely	/10
Model is complete and labeled	/7
Model is well done and built to last	/5

#### **Style:**

Project neatly and professionally done	/5
Ideas are unique and creative	/3

**Total:** /30

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## ***Model of the Solar System***

All the planets in our solar system are different sizes and different distances away from the sun and each other. Observing a real-life visual representation of the solar system is the easiest way to fully appreciate these varying sizes and distances.

- a) Research the relative sizes of the planets.
- b) Research the distances of each planet from the sun.
- c) Build a model of each planet in terms of its relative size. (ie. Determine an appropriate scale factor)
- d) Set up the planets within the classroom so that the distances between them and the sun are accurate.

**- You will need to develop an appropriate scale factor so that the entire solar system will be accurate and fit within the classroom.**

### Marking Scheme:

#### ***Content:***

All components of the solar system are included	/4
Relative sizes of the planets are accurate	/6
Relative distances of the planets are accurate	/6

#### ***Style:***

Planet models are accurate representations of actual planet (ie. Planet colours, shapes, etc. are accurate)	/5
Project is unique and creative	/4
Project is professionally done	/5

***Total: /30***

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***L. Checkley, 2001 (Coquitlam School District)***

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## **Cosmic Adventurers**

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Remember the recent mission that sent the Mars Pathfinder to the surface of the moon? Imagine what it would have been like if scientists hadn't already determined the substances found on the surface of the moon. What would it be like to land on a Gas Giant? What kind of vehicle would be needed to land on that type of surface?

- a) Create a substance that might be found on an unknown planet. Describe the substance using as many senses as possible.
  
- b) Design a spacecraft that would be able to land on this substance and would still be able to explore the planet. The lander must also have the ability to land on a targeted site.
  - Explain the components of your vehicle (ie. How do you think each component will help the vehicle land on and explore the planet?)
  
- c) Build your model of the Space Vehicle with common household materials.
  - What factors affected your choice of building materials?
  - How would you test your vehicle?

### Marking Scheme

#### **Content:**

Observations of substance	/3
Design of spacecraft accurate	/4
Explanation of components clear and concise	/4
Part C questions answered clearly and concisely	/4

#### **Style:**

Model of spacecraft well done and built to last	/5
Project unique and creative	/5
Project professionally done	/5

**Total:        /30**

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**L. Checkley, 2002 (Adapted from H.R. Macmillan Planetarium Resources)**

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## Colonization of Mars

What will humans do if the Earth is no longer habitable? NASA has been researching options and are looking to Mars as the site of the next human planet. Why do you think Mars is the next best option?

Imagine you are one of the first humans to arrive on the new colony of Mars.

- a) What are the conditions on Mars? (ie. Gravity, atmosphere, oxygen level, water, radiation, weather, temperature).
- b) How are the conditions on Mars similar to those on Earth?
- c) What are some factors that will affect our ability to live on Mars?
- d) What are scientists currently doing to help us learn how to colonize Mars?
- e) Based on all the information you have researched, what do you think the first Mars colony will look like? Draw a detailed diagram showing your own ideas of how this colony will look. Include labels, colour and an explanation of each component's function. **BE CREATIVE!!!**

### Marking Scheme:

#### **Content:**

All questions answered	/5
Questions answered clearly and concisely	/10
Drawing complete and coloured	/5

#### **Style:**

Project unique and creative	/5
Project professionally done	/5

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**Total: /30**

**L. Checkley, 2001 (Coquitlam School District)**

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## Storybook Project

What would it be like to take a trip through the solar system? Suppose you won the lottery right now and NASA had developed a way to travel to all the planets in the solar system. Imagine starting from the sun and write a story describing all the adventures you encounter as you travel through the solar system.

Be sure to include accurate details of the planets you pass. You'll need to research these details.

Be creative and include any other adventures you may discover ☺ For instance, maybe hop a ride on a passing comet, or view an asteroid from afar.

Have fun with this project, the possibilities are Endless!!

Please include a title page and coloured pictures to illustrate your story.

### Marking Scheme:

#### **Content:**

All planets included	/4
Information included is accurate	/5
Illustrations are coloured and relevant to the story	/4

#### **Style:**

Story is interesting to read	/5
Story is clear, concise and well-organized	/4
Story is neatly and professionally done	/4
Story is unique and creative	/4

*Total:* /30

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## **Create A Planet**

What are the chances that there is life on other planets? So far, we have not found any.

a) Describe, draw and color a fictional planet unlike any in our solar system

- What are the major characteristics of this planet?
- What special features can be found on this planet?
- How could these features have originally been formed?

b) Describe, draw and color 5 different forms of life on this planet

- How are these life forms adapted to live in the conditions of this planet?
- How do these life forms interact with each other?
- Do you think any other life forms could exist on this planet?

### Marking Scheme

#### **Content:**

Description of planet clear and concise	/7
Description of life forms clear and concise	/7
Drawings accurate depictions of life forms and planet	/6

#### **Style:**

Project unique and creative	/5
Project neatly and professionally done	/5

**Total: /30**

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## **Model of the International Space Station**

- a) Research the components of the ISS.
- What are the functions of each component?
  - Who is contributing each component?
  - How much will each part cost? What is the total cost of the space station?
  - When will the space station be complete?
- b) Design and build a model of the Space Station using common household materials
- Label each part
  - Describe which parts are currently functional and which parts are planned for the future
- c) What impact will the Space Station have on future space flight?
- d) What impact will the explosion of the Space Shuttle Columbia have on the ISS?

### Marking Scheme:

#### **Content:**

Space Station questions answered clearly and concisely	/10
Model is complete and labeled	/7
Model is well done and built to last	/5

#### **Style:**

Project neatly and professionally done	/5
Ideas are unique and creative	/3

**Total:** /30

