

Expedition Title –Nature our Teacher

(The title should generate curiosity to know more about the expedition both among the children and educators. It should capture the essence of the expedition.)

Expedition Summary

This expedition will help students experience and explore the nature with all their five senses. It will help them in understanding how nature adapts to the changes and sustain itself. Children will do a focused research on any one specie/part of the nature and will explore and understand how its form affect the function and how its function shapes the form—and therefore, how it helps the specie to adapt to the changing environment. Children will also experience and explore the inter-relationships and interdependence between the different species in the nature and how the relationships between different species help the nature in sustaining as an ecosystem. Children will further explore how we can learn from nature to solve our day-to-day problems. They will study the discipline of biomimcry i.e. how to take ideas from nature to innovate/invent new technologies. They will read case studies where people got inspired from nature to innovate/invent new technologies.They will connect the form and function of their specie to the technology from their lives that performs the similar function. They will also barinstorm on how we can solve some of our day-to-day problems based on the new understanding/learning from nature. Children will share their learnings and experience to the larger community through a gallery presentation. This expedition will preapre children for the natural sciences which is an important discipline in our curriculum.

| Grade level | Timeframe | Date of creation or revision |
|-------------|---------------|------------------------------|
| Grade 4 | 3 to 4 months | |

Principles underlying the Expedition Designing

Designing an expedition is a creative discipline. It demands lot of rigour both at the thinking and doing levels. It involves mapping, making connections, planning, implementation, reviewing and documentation.

The big idea behind designing an expedition is to keep a track of how it evolves with each planning draft –important is to keep working on it. It takes minimum three years for an expedition to be effective and focused. The design framework helps educators to document each draft of the expedition plan and thus provides structure and space to make their thinking and understanding visible to self and others. It sets the context for shared learning and working together.

Some of the designing principles are:

1. Planning is important and not the plan. The idea is to continuously keep reviewing and modifying the plan and not to get stuck with a plan.
2. Planning is not a sequential process. There is lot of back and forth in the planning process. The structure or framework is to assist educators in initial phases of the expedition and thereafter, educators need to restructure it depending on the context, children's need and the flow inside the classroom.
3. Planning is a learning process. It helps us to make our thinking visible, which enables us to review our plans and others to share their thoughts on it. We can review what happened in the expedition vis-a-vis what we had planned, which is an important source of learning.

Big Idea behind the Expedition

(It is the enduring understanding that we would like to develop in students, which will remain with them for the years to come.)

- Nature has an immense capacity to adapt –it sustains and evolve with time.
- To understand how nature works, we need to understand how its parts function and their interrelationships. The idea of how form affects function and how functions shape forms is important in understanding the working of different parts/specie of the nature and the nature as a system.
- Whenever we are challenged we can look to nature for ideas to solve our problems and create new possibilites. Nature inspires us to innovate and invent.

Guiding Questions for the Expedition

(Guiding questions are generated from the big idea. They give direction, focus and set the boundary for the expedition. We should not have more than 2/3 guiding questions. Projects, case studies, research, activities, etc. in the expedition should help us in figuring out the guiding questions.)

1. How does nature adapts to the change?
2. How does form affects functions and function shapes form in nature?
3. How does interdependence in nature leads to sustainability?
4. How do we get ideas from nature to solve our problems and create new possibilities?

Focus of the Expedition

(Subjects, specific concepts and understanding, skills and values to be addressed in the expedition)

| Subjects | Concepts/Understanding | Skills | Values |
|----------------|--|---|---|
| Science | Form effects functions and function shapes form; adaptation; Ecosystem and interdependence; Nature inspires inventions and innovations –the discipline of Biomimicry | Observation, recording, Asking questions & conducting inquiry, Illustrations, Making connections | Interdependen ce & interconnecte dness |
| Social science | Biographies of inventors/case studies of inventions that were inspired by nature | What does it take to innovate and invent? | Respect for nature |
| Language s | Reading for ideas; Informative writing; Story writing and Persuasive writing | Presentation | Imagination and self-belief |

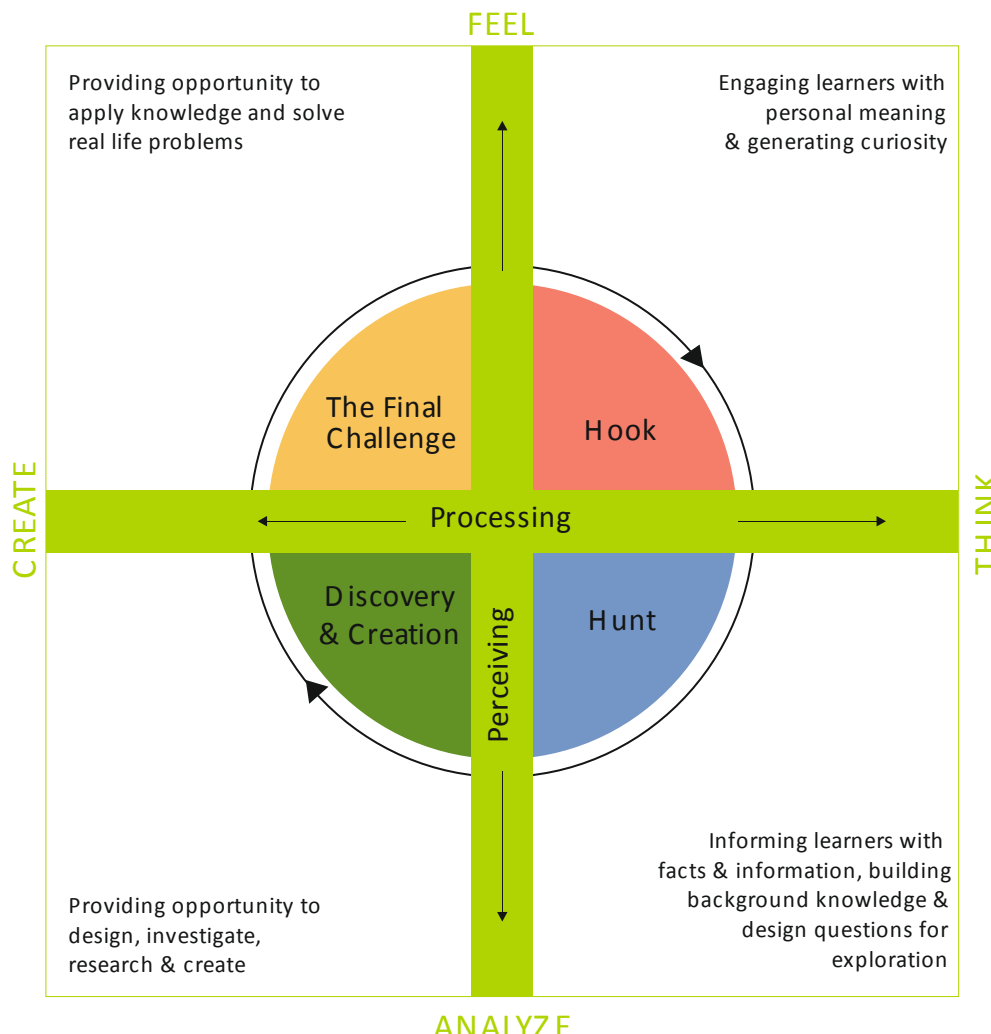
| Art | Illustration of the species | Observation | |
|---------------------------|---|-------------|------------|
| Craftsmanship & character | Working through multiple drafts, Looking at strong and weak samples | | Excellence |

The Learning Targets

Learning Targets to be addressed in the Expedition are (to be finalised with teachers)

| Subjects | Learning Targets |
|------------------------|--|
| Science and Technology | 1a) I can describe the functions that a species needs to perform to survive in its habitat. 1b) I can explain how the form of a living thing helps it to perform a specific function. 2a) I can explain how the function and form of a species change in its habitat. 3a) I can observe natural things around me and identify man made things that have same form and function. 3b) I can describe, with specific examples, how inventions were designed using ideas from nature. 3c) I can develop an idea to solve a problem, using my knowledge of the form and function of my organism. |
| Reading | <ul style="list-style-type: none"> I can use details and examples to explain explicit information and inferences in the text. |
| Writing | <ul style="list-style-type: none"> I can write an informative piece with relevant facts and details using appropriate choice of words. |
| Speaking | <ul style="list-style-type: none"> I can use appropriate verbal and non-verbal expressions to make a presentation in front of an audience. |
| Visual arts | <ul style="list-style-type: none"> I can create an illustration that closely resembles the real object. |
| Craftsmanship | <ul style="list-style-type: none"> I can examine good samples of work and draw out criteria of good quality work. I can self-critique my work based on the given criteria. I can make several drafts of the same piece of work, incorporating feedback given on my previous draft. I can critique other's work objectively and offer feedback that is kind, specific and helpful. |
| Character and culture | <ul style="list-style-type: none"> I can be humble in my areas of strength while working in a crew. |

The Expedition Design Framework



The Hook

A compelling experience from the local context of the child that engages and sparks curiosity in children for the exploration.

The Hunt (Building Background Knowledge)

Critical discussions that let the child seek out important facts, knowledge and more importantly the questions that she wants to inquire further. It is about building the background knowledge for the expedition.

Projects (Discovery & Creation)

Hands on exploratory projects with opportunities to design, investigate, research & create in the local context of the child that will build the required understanding and skills.

The Final Challenge

An integrated experience that lets the child apply the new found knowledge and understanding to real life problem solving or creation.

The Hook

(As the name itself suggests, the 'hook' should be able to create the curiosity and excitement in children for the expedition. The idea is to prepare children for the expedition. The hook should be crisp and engaging for the students. It is imperative that educators have the desired inquiry questions in mind while they design the hook. Often a hook, which by itself is extremely exciting and engaging, can be fruitless if it doesn't lead the children to the desired questions of inquiry and exploration.)

1. A case study on any one invention that has been inspired by nature –and how it happened. It can also be a documentary or movie. (case studies of Wright brothers and flying)
2. A documentary on 'man trying to fly using artificial wings'

Building Background Knowledge (BBK)

(Building Background Knowledge is a protocol through which students become interested to explore the different topics of the expedition, build background knowledge and use this background knowledge to become better and more informed about the expedition. The design of the BBK enables students to quickly engage with the topic and raise questions to further deepen their understanding. The hunt should be short and focused and should help in expanding students' perspective of the big idea by exposing them to diverse aspects, views and theories behind the expedition. This model of building background knowledge adapts easily to content in many disciplines and the design of the workshop ensures that all students read, think and contribute. It is particularly useful in introducing the expedition because it fosters curiosity.)

BBK Design

1. Mystery piece – it should be designed around pictures of some innovations/inventions that were inspired by nature. The idea is to help children connect the inventions to the parts/species of nature that inspired it.
 - a. Help children connect the two at both the function and form levels.
 - b. What is so unique about the design/structure/shape that helps it to perform the required function in nature?
2. Silent Gallery should be on –nature, its parts and their interdependence, form and function, adaptability, biomimicry, process of innovation, some problems from our day-to-day lives, etc
3. Common text –on biomimicry and process of innovation/invention
4. Expert text on –form and function of any one/two parts/species of the nature, how nature adapts, interdependence in nature
5. Finalizing the questions of inquiry

The Launch of the Expedition

| Tasks | How |
|--|--|
| What is the plan for the launch? | Sharing the expedition overview and the flow |
| What we need to communicate to children? How? | Sharing the expedition overview and the flow |
| What we need to communicate to parents? How? | Sharing the expedition overview and the flow |
| Who is responsible for what? | |

Projects (Discovery & Creation)

(It consist of hands on exploratory projects with opportunities to design, investigate, research and create. This is where students do their core inquiry and creation. The aim is to find answers through investigations, experiments, tinkering, research etc. Ideally the students should have a balance of working individually and in groups. Emphasis should be on creating authentic, original and quality work whether it is creating an end product or while working on presenting their findings. For an expedition, we can have 2 to 3 projects depending upon the key concepts and skills that we aim to develop. Each project will have a case study that helps children in building the conceptual understanding of the big idea and key concepts behind the project and making connections across ideas/concepts. The idea is to build a real and engaging context for the project. It also makes the learning targets realistic and tangible.)

Project One

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|--|---|
| <p>Project Title How nature works and adapts?</p> | <p>Big Ideas/Broader concepts</p> <ol style="list-style-type: none"> 1. How nature adapts and sustain? 2. How form affects function and how function shapes form in nature? 3. What is ecosystem? Parts and their relationships |
| <p>Key Steps</p> <ol style="list-style-type: none"> 1. Experience nature with all five senses 2. Focused action research on birds, animals, trees, insects, etc. Studying their form and functions. What will 3. Understanding the ecosystem the interrelationships among different parts of the ecosystem 4. Illustrations 5. Reflections and sharing 6. Solo time and personal reflection 7. Crew work 8. Movies on different spieces and the function that they perform in the nature esp on their form and function. 9. Children Presenting their research | <p>Skills to be developed</p> <ol style="list-style-type: none"> 1. Observation skills 2. Recording 3. Illustration 4. Inquiry |
| <p>Learning targets to be addressed</p> <p>1a) I can describe the functions that a species needs to perform to survive in its habitat. 1b) I can explain how the form of a living thing helps it to perform a specific function.</p> | |
| <p>Case study <i>(For setting the conceptual context for the project)</i></p> <ol style="list-style-type: none"> 1. how nature adapts itself –with a focus on the relationship between form and function. 2. Movie clips on ants, tree, birds, etc | <p>Outbound KHOJ expedition to Bharatpur Bird National Park</p> |

| | |
|---|--|
| 3. What is Ecosystem? | |
| <p>Experts</p> <ol style="list-style-type: none"> 1. Ashish Shah–On Biomimicry and learning from/with nature 2. B S Rana –Naturalist 3. Illustrator | <p>Final product/performance and the audience <i>(What skills & knowledge will students need to complete this product/performance?)</i></p> <ol style="list-style-type: none"> 1. Illustration of their specie <p>Audience: for the presentation to the school children/community in gurgaon</p> |
| <p>Assessment</p> <p>Application based questions pertaining to learning targets.</p> | <p>Service –cleaning the nature trails at the National Park</p> |

Project Two

| | |
|--|--|
| <p>Project Title Biomimcry</p> | <p>Big Ideas/Broader concepts</p> <ol style="list-style-type: none"> 1. How do we learn from nature? 2. What does it take to innovate/invent? 3. The discipline of biomimcry |
| <p>Key Steps <i>(this project will be happen in small crews, we will different specie in each crew)</i></p> <ol style="list-style-type: none"> 1. Connecting the form and function of their specie to the technology/invention in our day to day life that might have been inspired by it. 2. Understanding the discipline and principles of biomimcry 3. Also looking for the possibility of solving some of our problems based on the form and function of the species that they researched 4. Preparing the presentation which will have <ol style="list-style-type: none"> a. Illustration of their specie b. How it functions and the relationship between form and function c. Some of the inventions/innovations that might have been inspired by that specie d. Process of biomimcry e. Some of the problems that can be solved by applying the form and function of the specie that they have researched on. | <p>Skills to be developed</p> <ol style="list-style-type: none"> 1. Making connection 2. Drawing inference 3. Process of inventions/innovation inspired by nature 4. Reading for comprehension 5. Writing 6. Presentation 7. Working in crews |
| <p>Learning targets to be addressed</p> <p>3a) I can observe natural things around me and identify man made things that have same form and function.</p> <p>3b) I can describe, with specific examples, how inventions were designed using ideas from nature.</p> <p>3c) I can develop an idea to solve a problem, using my understanding of the form and function of my organism.</p> | |

| | |
|--|---|
| <p>Case study <i>(For setting the conceptual context for the project)</i></p> <ol style="list-style-type: none"> 1. One more case study which is more recent and relevant. | <p>City bound visit</p> <p>National Science museum –where children can connect the inventions to the parts/species in nature.</p> |
| <p>Experts</p> <ol style="list-style-type: none"> 1. Readers and writers expert | <p>Final product/performance and the audience <i>(What skills & knowledge will students need to complete this product/performance?)</i></p> <ol style="list-style-type: none"> 1. Gallery presentation to the local community and schools on ‘how nature inspire us?’ <p>Audience: primary school students of the local schools, parents and the local community</p> |
| <p>Assessment</p> <p>Formative assessment based on observation of student’s work and participation.</p> | <p>Service</p> <p>Gallery presentation to the local and school community om “How does nature adapt?” How does nature inspire us?</p> |

The Final Challenge

(The final challenge should provide an opportunity to children to apply their new found knowledge and understanding in solving real life problems or creating new possibilities leading to performances of understanding.)

Ideas for invention/innovation

Each crew to make the final presentation to the expert panel. We will have the experts from the local community. Experts will assess the students on the learning targets based on the interview and other evidences. Crews will present their ideas of invention/innovation based on the research they did.

The Expedition Culmination

| Tasks | |
|---|--------------------------------------|
| How are we planning to culminate the expedition? | Gallery presentation |
| What do we want to communicate to the school, parents community and the society at large? | Learning and experiences of children |
| Who all will be part of the culmination? (Audience) | Parents and community members |
| Who all we want to acknowledge and appreciate? | |
| Who is responsible for what? | |
| When? (Timeline) | |

Expedition Planning Grid

| Months | Week 1 | Week 2 | Week 3 | Week 4 |
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“It’s not the plan that is important, it’s the planning.”

Dr. Gramme Edwards