



## A STEM Curriculum for 4-H Clubs User Guide

Developed by:

Tonya G. Bain, Crockett County

Matt Adams, Lawrence County

Reviewed by:

Jennifer Richards, Curriculum Specialist, 4-H Youth Development

# 4-H Adventures

## Traveler Information

Name: \_\_\_\_\_

Issue Date: \_\_\_\_\_

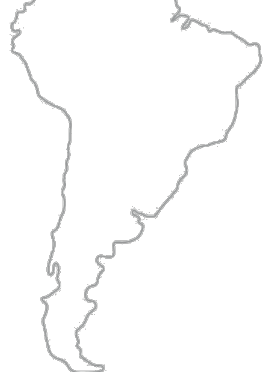
Signature: \_\_\_\_\_



North America



South America



Africa



Australia



# 4-H Adventures

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Issue Date: \_\_\_\_\_

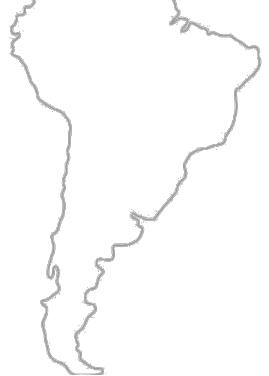
Signature: \_\_\_\_\_



North America



South America



Africa



Australia



# PASSPORT



4-H Adventures

# PASSPORT



4-H Adventures



## Assignment #1

Congratulations! You have been selected by a national wildlife magazine to travel the globe and take amazing pictures of some of the world's most beautiful and dangerous animals. Each month you will be given a new task and a new location. Success will depend up your ability to communicate and work with others to complete the task at hand. Good luck! We know you can do this!

Your first challenge is to get prepared for your travels. You must construct a traveling trunk that will safely and securely hold your valuables.



## North America



## Assignment #1

Congratulations! You have been selected by a national wildlife magazine to travel the globe and take amazing pictures of some of the world's most beautiful and dangerous animals. Each month you will be given a new task and a new location. Success will depend up your ability to communicate and work with others to complete the task at hand. Good luck! We know you can do this!

Your first challenge is to get prepared for your travels. You must construct a traveling trunk that will safely and securely hold your valuables.



## North America





## Assignment #1 — Exploration Preparation — Build a Trunk

**Objective:** As a group, you must construct a storage trunk with a hinged lid and two handles.

### Assignment Criteria & Constraints:

- Your trunk must have a working, hinged lid that opens and closes.
- Your trunk must have two handles.
- Your trunk must support the weight of and hold one tennis ball.
- Time Limit: 30 minutes
- Budget: \$15

### Material Price List:

- |                                   |                        |
|-----------------------------------|------------------------|
| • Craft Sticks (30) — \$5         | • Scissor Rental — \$1 |
| • String (2 feet) — \$2           | • Markers (2) — \$1    |
| • Cardstock Paper (1 piece) — \$1 | • Glue — \$5           |
| • Paper Clips (2) — \$1           | • Ruler Rental — \$1   |
| • Tape (3 feet) — \$5             |                        |



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# Exploration Preparation #1

## Build a Trunk

Budget for this  
Challenge:

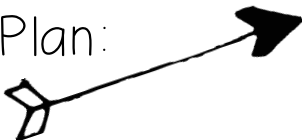
\$ \_\_\_\_\_

Team  
Members:



Supplies Needed & Cost:

Design Plan:



# *Exploration Preparation #1*

## ***Test Results***

***Build a  
Trunk***

Pros & Cons of this Design

What could be changed to improve our design?





## Assignment #2

You have now arrived in Brazil and will be heading to the beautiful Amazon Rainforest. Your assignment on this trip is to capture photographs of the elusive 3-toed sloth. This sloth enjoys napping in the upper canopy of the rainforest; therefore, it can only be seen from a bird's-eye view.

To accomplish this task, you must construct a zip line that will stretch through the canopy. It must support the weight of your equipment and yourself.



## South America



3-Toed Sloth

## Assignment #2

You have now arrived in Brazil and will be heading to the beautiful Amazon Rainforest. Your assignment on this trip is to capture photographs of the elusive 3-toed sloth. This sloth enjoys napping in the upper canopy of the rainforest; therefore, it can only be seen from a bird's-eye view.

To accomplish this task, you must construct a zip line that will stretch through the canopy. It must support the weight of your equipment and yourself.



## South America



3-Toed Sloth





## Assignment #2 – Canopy Construction – Build a Zip Line

**Objective:** As a group, you must construct a zip line container that will safely transport objects from one end to the other.

### Assignment Criteria & Constraints:

- Your container must safely transport items of different weights from one end to the other.
- Transport items may include a ping pong ball, 3 marbles and 2 bean bags.
- The items must stay inside the container.
- Time Limit: 30 minutes
- Budget: \$7

### Material Price List:

- |                         |                        |
|-------------------------|------------------------|
| • Paper Clips (2) – \$1 | • Scissor Rental – \$1 |
| • Paper (1 sheet) – \$1 | • Markers (2) – \$1    |
| • Straws (4) – \$2      | • Glue – \$1           |
| • Tape (3 feet) – \$3   |                        |



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# *Canopy Construction #2*

## *Build a Zip Line*

Budget for this  
Challenge:

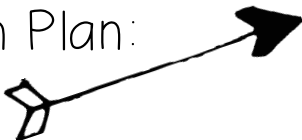
\$ \_\_\_\_\_

Team  
Members:



Supplies Needed & Cost:

Design Plan:



# *Exploration Preparation #2*

## ***Test Results***

***Build a  
Zip  
Line***

Pros & Cons of this Design

What could be changed to improve our design?



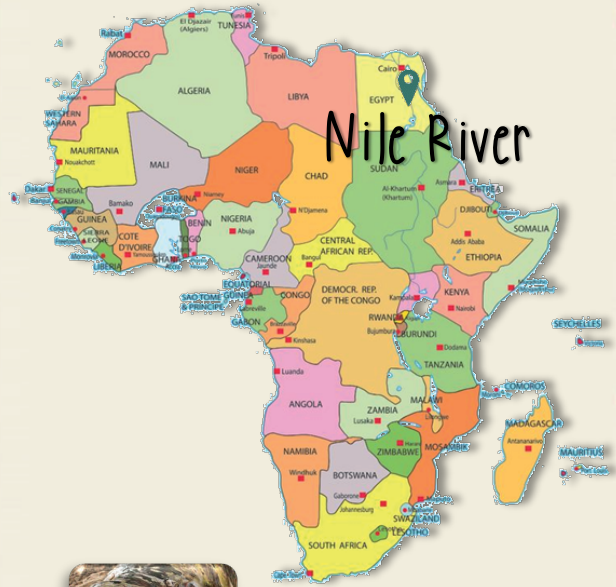
### Assignment #3

Welcome to Africa, home of the world's longest river, the Nile. Your assignment will be to capture a Goliath Tiger Fish, who likes to live in turbulent waters.

You will need to construct a net that will withstand the turbulent waters and hold the giant Goliath Tiger Fish! Be careful, those teeth are huge and can reach up to 1-inch in length.



## Africa



Goliath Tiger Fish

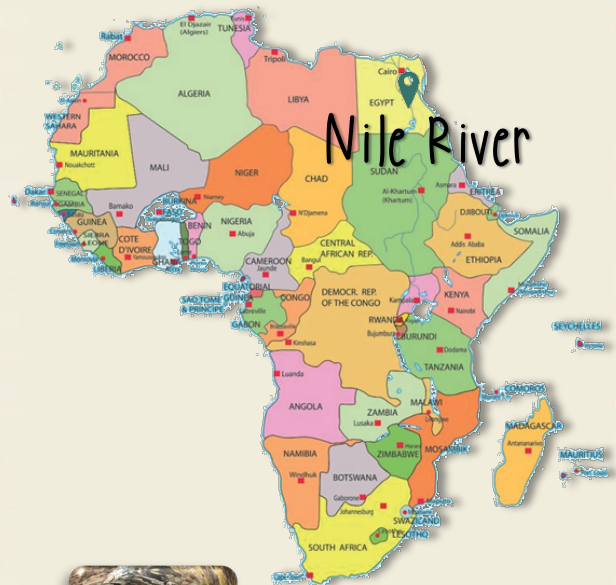
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## Africa



Goliath Tiger Fish





## Assignment #3 – Fabricating Fish Net – Build a Net

**Objective:** As a group, you must design and construct a fishing net.

### Assignment Criteria & Constraints:

- Your net can be no more than 4 feet in diameter, with a handle of at least 6 feet in length.
- Your net must be able to lift at least 2 fish from the water without breaking.
- Your net must not hold water.
- Time Limit: 30 minutes
- Budget: \$15

### Material Price List:

- |                          |                         |
|--------------------------|-------------------------|
| • Craft Sticks (4) – \$5 | • String (3 feet) – \$3 |
| • Ziploc Bag – \$2       | • Tape (3 feet) – \$5   |
| • Paper Clip – \$3       | • Scissor Rental – \$1  |
| • Rubber Band (2) – \$1  | • Markers (2) – \$1     |
| • Pipe Cleaner (1) – \$1 | • Ruler – \$1           |



## Assignment #3 – Fabricating Fish Net – Build a Net

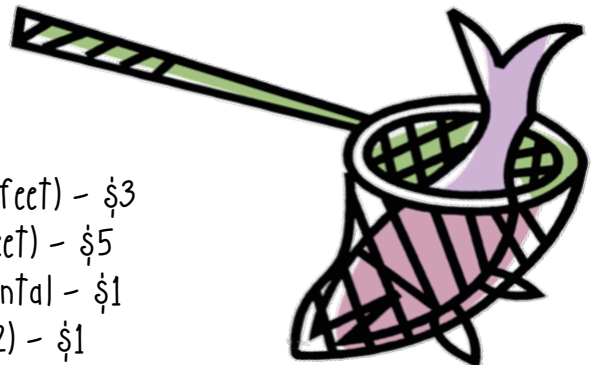
**Objective:** As a group, you must design and construct a fishing net.

### Assignment Criteria & Constraints:

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- Your net must be able to lift at least 2 fish from the water without breaking.
- Your net must not hold water.
- Time Limit: 30 minutes
- Budget: \$15

### Material Price List:

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|--------------------------|-------------------------|
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| • Ziploc Bag – \$2       | • Tape (3 feet) – \$5   |
| • Paper Clip – \$3       | • Scissor Rental – \$1  |
| • Rubber Band (2) – \$1  | • Markers (2) – \$1     |
| • Pipe Cleaner (1) – \$1 | • Ruler – \$1           |



# *Fabricating Fish Net #3*

## ***Build a Net***

Budget for this  
Challenge:

\$ \_\_\_\_\_

Team  
Members:



Supplies Needed & Cost:

Design  
Plan:



# *Exploration Preparation #3*

## ***Test Results***

***Build a  
Net***

Pros & Cons of this Design

What could be changed to improve our design?



## Assignment #4

For your final assignment, you will travel to the great Outback in Australia, the land down under. There you will be on the lookout for the world's largest spider that can reach up to 12 inches in diameter. This spider is known as the "Giant Huntsman."

In order to catch a glimpse of this spider, you must create a suspended bucket that will support the weight of you and your equipment. Good luck!



## Australia



Giant Huntsman Spider

## Assignment #4

For your final assignment, you will travel to the great Outback in Australia, the land down under. There you will be on the lookout for the world's largest spider that can reach up to 12 inches in diameter. This spider is known as the "Giant Huntsman."

In order to catch a glimpse of this spider, you must create a suspended bucket that will support the weight of you and your equipment. Good luck!



## Australia



Giant Huntsman Spider





## Assignment #4 — Watch Tower — Build a Bucket

**Objective:** As a group, you must construct a suspending bucket and frame.

### Assignment Criteria & Constraints:

- Your bucket must be suspended from a frame you create.
- Your bucket must hold as much weight as possible without tipping or breaking.
- The bottom of the bucket must be at least 3 inches from the ground or tabletop.
- The frame may be secured to the ground or tabletop.
- Time Limit: 30 minutes



### Material Price List:

- |                         |                         |                     |
|-------------------------|-------------------------|---------------------|
| • Paper Clips (2) - \$1 | • String (3 feet) - \$4 | • Hole Punch - \$2  |
| • Pipe Cleaner - \$2    | • Scissor Rental - \$1  | • Cup - \$2         |
| • Straws (2) - \$2      | • Ruler - \$1           | • Rubber Band - \$1 |
| • Tape (3 feet) - \$3   | • Glue - \$1            |                     |



## Assignment #4 — Watch Tower — Build a Bucket

**Objective:** As a group, you must construct a suspending bucket and frame.

### Assignment Criteria & Constraints:

- Your bucket must be suspended from a frame you create.
- Your bucket must hold as much weight as possible without tipping or breaking.
- The bottom of the bucket must be at least 3" from the ground or tabletop.
- The frame may be secured to the ground or tabletop.
- Time Limit: 30 minutes
- Budget: \$15

### Material Price List:

- |                         |                         |                     |
|-------------------------|-------------------------|---------------------|
| • Paper Clips (2) - \$1 | • String (3 feet) - \$4 | • Hole Punch - \$2  |
| • Pipe Cleaner - \$2    | • Scissor Rental - \$1  | • Cup - \$2         |
| • Straws (2) - \$2      | • Ruler - \$1           | • Rubber Band - \$1 |
| • Tape (3 feet) - \$3   | • Glue - \$1            |                     |



# Watch Tower #4

## Build a Bucket

Budget for this  
Challenge:

\$ \_\_\_\_\_

Team  
Members:



Supplies Needed & Cost:

Design  
Plan:



# *Exploration Preparation #4*

## ***Test Results***

***Build a  
Bucket***

Pros & Cons of this Design

What could be changed to improve our design?





# Student Evaluation

Please answer each question honestly by placing a checkmark in the appropriate box. In addition, please answer the questions located at the bottom of the page.

Because of my experiences with "Passport Adventures in 4-H"...	Strongly Disagree	Disagree	Agree	Strongly Agree
I get excited about new discoveries.				
I like experimenting and testing new ideas.				
I like to see how things are made or invented.				
I do science activities that are not for school.				
I am good at science.				
I like science.				
I want to learn more about science.				
I would like to have a job related to science.				
I believe that a team can accomplish more than an individual.				
I enjoy working with others toward a common goal.				
I think that everyone on a team is important.				
I think that I have something to contribute to the success of the team.				
I understand that other ideas may be just as important as my own.				

What was your favorite STEM challenge and why?

What do you think is the most important thing you learned from "Passport Adventures with 4-H"?





## A STEM Curriculum for 4-H Clubs *User Guide*

Developed by:

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Jennifer Richards, Curriculum Specialist, 4-H Youth Development

# Passport Adventures with 4-H

## A STEM Curriculum for 4-H Clubs

### Grade Level

- Designed for 4-H members in the fourth and fifth grades.
- Activities can be easily modified for sixth to eighth grade club meetings.

### Curriculum Description

- This curriculum is designed to focus on science, engineering and math through hands-on activities conducted in small group settings.
- Small groups typically consist of four to six students.

### Content Standards

- 4.ETS1: Engineering Design
- 4.ETS2: Links Among Engineering, Technology, Science and Society
- 4.MD.A.1: Estimate and Solve Problems Involving Measurement
- 5.ETS1: Engineering Design
- 5.ETS2: Links Among Engineering, Technology, Science and Society
- STEM Standards of Practice Framework: Problem-Resolution Skills, Critical Thinking in Context, Cause and Effect Relationships between STEM Disciplines, and STEM Fields Exploration

### What Is Included

- 4-H Adventures Passport — represents passport needed to travel to different countries; given once to members at start of first lesson; stamped each month once activity is complete.
- Assignment Card — given to teams at the start of each activity as a reminder of the monthly challenge, supplies available and budget given.
- Planning Sheet — given to teams at the start of each activity to help with planning and design.
- Test Result Sheet — can be printed on back of Planning Sheet; used to evaluate design.
- 4-H Clover Money — used with each activity, as students must budget and purchase items needed to create their monthly challenge.
- Student Evaluation — given at the end of school year to evaluate success of curriculum.

Lesson	Concept/Notes	Materials Needed	Time
Exploration Preparation	<p>Construct a storage trunk with a hinged lid and two handles.</p> <p>The first challenge typically takes longer, as students are learning to work together and solve a task.</p>	<ul style="list-style-type: none"> <li>Planning Sheet/Test Result Sheet</li> <li>Assignment Card</li> <li>4-H Clover Money (\$15 for this challenge)</li> <li>Items needed per team: craft sticks (30), cotton string (2 feet), cardstock paper (1 piece), paper clips (2), masking tape (3 feet), scissors, markers, glue, ruler</li> <li>Tennis Ball</li> </ul>	30 - 45 minutes
Canopy Construction	<p>Construct a zip line container that will transport objects of various weights.</p> <p>Recommend stringing fishing line across the classroom for more effect.</p> <p>Students must design a mechanism to attach container to existing zip line.</p>	<ul style="list-style-type: none"> <li>Planning Sheet/Test Result Sheet</li> <li>Assignment Card</li> <li>4-H Clover Money (\$7 for this challenge)</li> <li>Items needed per team: paper clips (2), copy paper (1 piece), straws (4), masking tape (3 feet), scissors, markers, glue</li> <li>Fishing line to string across classroom (door to door across a room works well)</li> <li>Items of various weights for zip line (ping pong ball, marbles, bean bags, tennis ball, etc.)</li> </ul>	30 - 45 minutes
Fabricating Fish Net	<p>Construct a fishing net that will hold or lift fish.</p> <p>Optional: Bucket of water for catching fish</p> <p>This activity can be completed rather quickly, so it may be a good one for 4-H Speech month.</p>	<ul style="list-style-type: none"> <li>Planning Sheet/Test Result Sheet</li> <li>Assignment Card</li> <li>4-H Clover Money (\$15 for this challenge)</li> <li>Items needed per team: craft sticks (4), Ziploc bag (1); paper clip, rubber band (2), pipe cleaner (1), cotton string (3 feet), masking tape (3 feet), scissor rental, markers, ruler</li> <li>Plastic or stuffed animal fish</li> <li>Plastic container for water (optional)</li> <li>Paper towels (only if using water)</li> </ul>	20 - 40 minutes
Watch Tower	<p>Construct a suspending bucket and frame.</p> <p>Consider using the "Pink Eraser" for weight instead of items that may roll or scatter easily.</p>	<ul style="list-style-type: none"> <li>Planning Sheet/Test Result Sheet</li> <li>Assignment Card</li> <li>4-H Clover Money (\$15 for this challenge)</li> <li>Items needed per team: paper clips (2), pipe cleaner (1), straws (2), masking tape (3 feet), cotton string (3 feet), scissors, ruler, glue, hole puncher, disposable cup (1), rubber band (1)</li> <li>Items of weight for bucket testing</li> </ul>	30 - 45 minutes