| THEME:                  | The Water Cycle                         |
|-------------------------|---|
| SCOPE & SEQUUENCE UNIT: | Run-off                                 |
| OBJECTIVE:              | The downhill pathway of surface run-off |
| ACTIVITY:               | Map the school yard                     |

| Notes:         | Outside in the school yard  |
|----------------|---|
| Teacher Prep.: | This is a great activity to do immediately after a rain or<br>during the rain to see run-off in action. |
| Time:          | 45 minutes (15 minutes inside; 30 minutes outside & reflection)   |

#### Skills:

- Ecological literacy
- Critical and creative thinking

#### **Objectives:**

- To observe how different impervious surfaces influence run-off
- To observe where run-off waters in the school yard go

## **Background Information:**

Run-off travels across surfaces and flows downhill. Hard man-made surfaces, such as asphalt, concrete and roofing, are impervious to water, and the rainwater runs off. (Some natural surfaces can also be too hard to allow water absorption). Some buildings have rain gardens or ponds for the run-off to settle into, or green roofs or porous pavements that allow infiltration. Otherwise, stormwater is often directed into storm pipes that drain directly into a nearby water body like a creek, lake or ocean. In these situations run-off influences the natural water body in a number of ways. The amount of run-off has the potential to be too great a volume for the creek to handle and the creek may overflow its banks. This increased creek flow can cause erosion. The increased water volume may be so great as to scour the bottom of the creek, carrying away everything on the bottom – gravel, young fish and salmon eggs. Run-off is a major source of pollution into natural water bodies, bringing with it toxins it has picked up, such as pesticides, oil and gas, fertilizer, and waste. If water is running off that means it is not going into the ground and recharging the water table.

## Vocabulary:

**Run-off:** rainwater that is not able to flow into the soil (infiltrate) or other surface material and flows over the surface

**Impervious surfaces:** do not allow the penetration of water (and other liquids) and are most often artificial or human-made structures, such as roofing, pavement, glass, and concrete.

**Impermeable:** material that does not allow the flow through of liquid such as water

## Materials:

clipboard with student page, & pencil for each student (if it is raining have a plastic sheet or plastic bag over the clipboard to protect the student page)

## **Introductory Discussion:**

This activity requires a brief period of time inside to establish the map of the school yard and set the intention of the activity outside – to investigate impervious surfaces in the school yard and the pathways that run-off takes. As a class, draw the general layout of the school yard from memory. A large drawing can be made on the front board while students follow along drawing their own on their student page. Include the location of the school, playing fields, pavement areas, fences and any landmarks.

Briefly review the four pathways of rainfall (See Rain Pathways Unit). Run-off is the water from rains that is not absorbed but runs off the landscape. Some surfaces are impervious and do not allow water to permeate or flow into them. What are some examples of impervious surfaces that can be found in the school yard? Where does rainwater on the school roof go? Does it ever go into the ground? Does it go into a creek? Are there any rain gardens or ponds to catch and retain the stormwater? Where does rain on the pavement and concrete go? What is a major force influencing where the run-off travels beyond impervious surfaces?

Using the Student Page, students make predictions about where the run-off from the school will go.

## **Outside Activity:**

1. As a class together, go to a place in the schoolyard to observe the rainwater on the roof to start the pathway of run-off, draw on the map downspouts, eaves, discover where water in the downspouts goes, if possible continue off the school ground to storm drains; walk the driveway of the school to note other pathways of stormwater, are there storm drains here? Draw/mark these on the map, note if and where any of it runs-off to natural surfaces for infiltration or if it is piped to the storm drain system.

#### **Reflection Discussion:**

Where did most of the stormwater go? Was there anywhere where the stormwater was directed to a natural surface for infiltration? If lots of stormwater runs off, what does that mean to the creek/river or lake? What might be in run-off that then gets added to the creek? Use illustrative resources to show pathways and consequences of run-off.

#### **Student Page:**

Run-off

#### **Resources – Gulf Islands Specific:**

Water Run-off Illustration by Briony Penn Waterscape Gulf Islands Poster

This is a large poster image with many small images for study. Move around the image and resize it as needed to locate images of run-off. This image can also be ordered.

Date:

(mm/dd/yyyy)

# <u>Run-off</u>

What is run-off?: \_\_\_\_\_\_

The slope of the land determines where run-off will go. I predict that run-off from our school will go \_\_\_\_\_

Create a drawing of the school and school yard and its boundaries. Mark downspouts from the roof, drain pipes, both on school and in school yard, and any other details of run-off.

The water on the school roof ends up:

Three negative things about run-off going into storm drains and into streams are:

| т. |  |
|----|--|
| 2. |  |
| 3  |  |

Two reasons why it is better if rainwater soaks into the ground are:

| 1. |  |  |  |
|----|--|--|--|
| 2. |  |  |  |