



# Creating “Frogger”

You are a frog. Your task is simple: hop across a busy highway, dodging cars and trucks, until you get to the edge of a river, where you must keep yourself from drowning by crossing safely to your grotto at the top of the screen by leaping across the backs of turtles and logs.

**Created by: Susan Miller, University of Colorado, School of Education**

This curricula has been designed as part of the Scalable Games Design project.

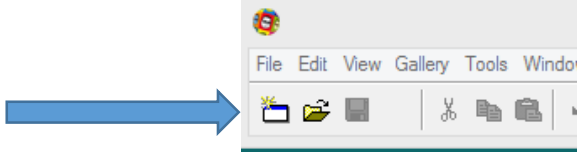
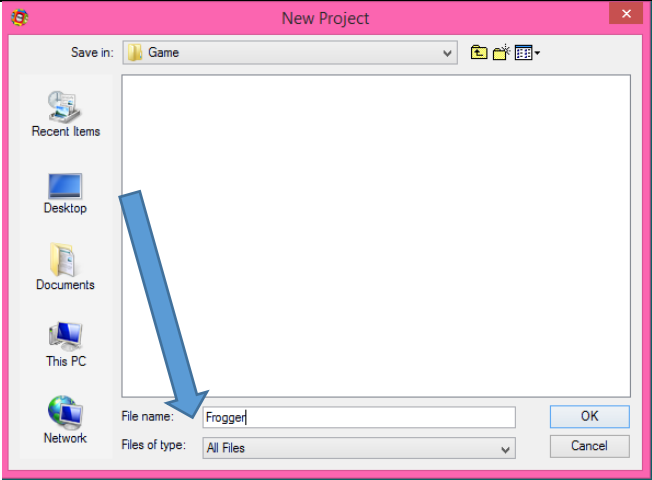
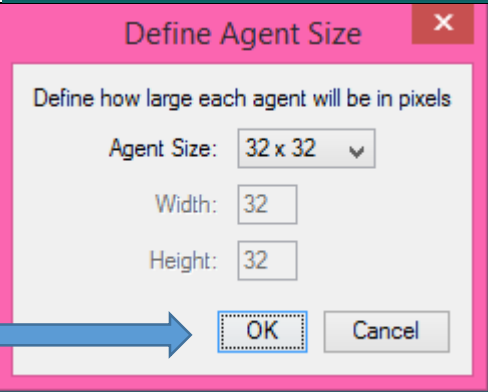
It was created using ideas from and portions of prior work completed by Fred Gluck, Cathy Brand, Carla Hester-Croff, Jason Reub, Sandy Wilder and Mark Shouldice.

This material is based upon work supported by the National Science Foundation under Grant No. DRL-1312129 and CNS-1138526. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

## Vocabulary/Definitions

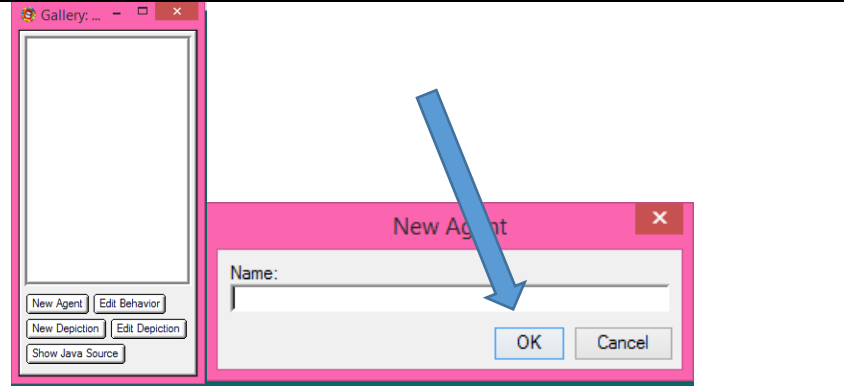
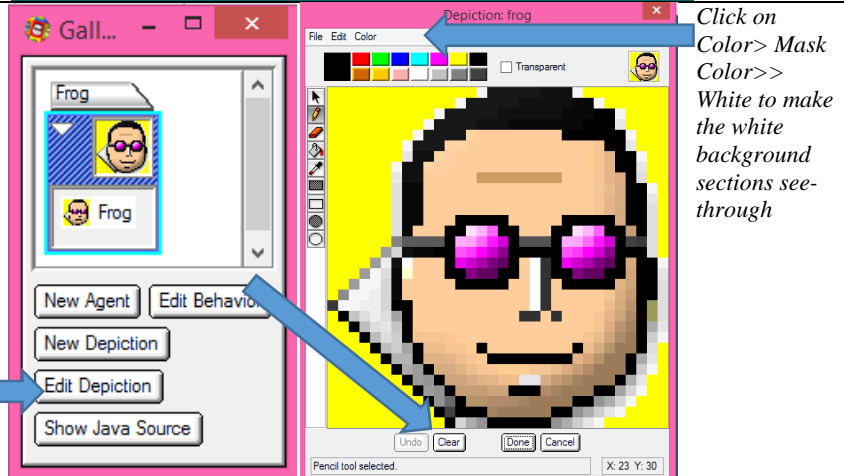
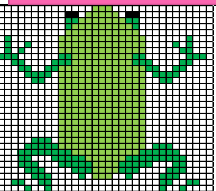
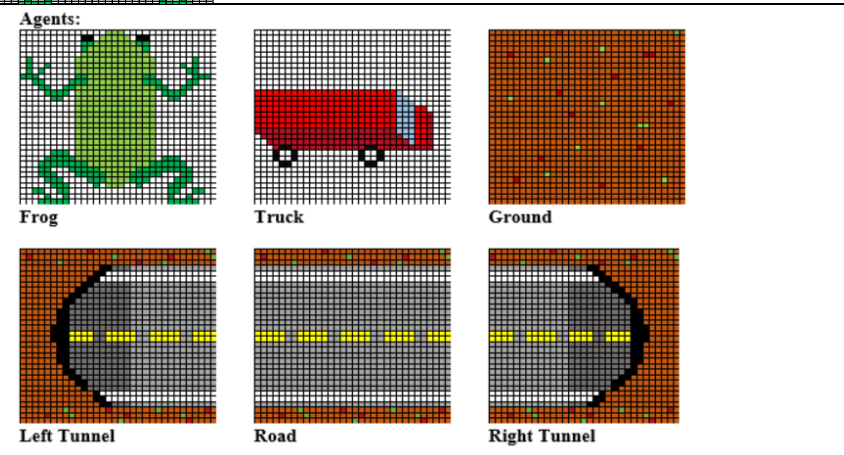
- Absorb.....**This is the opposite pattern of Generate. Instead of an agent generating other agents, an agent absorbs a flow of other agents in the absorption pattern (i.e. a tunnel absorbing cars), making them ‘disappear’
- Action .....**the requested behavior of an agent if the conditions are true
- Agent .....**a character in the game
- Array .....**a rectangular arrangement of agents
- Collision .....**the situation when two agents physically collide.
- Condition .....**the situation that must be ‘true’ for an action to occur
- Depiction.....**a second image of the original agent. For example, the frog can have two depictions: what it usually looks like, and what it looks like after it has been squished
- Generate.....**the ability to create a new agent. To satisfy this pattern, an agent is required to generate a flow of other agents; for example, cars appearing from a tunnel
- Grotto.....**the land where the flag is located, which must be reached to win the game
- Transport.....**represents the situation when one agent carries another agent; the ability of an agent to be on top of, and move with, another agent

## Student Handout 1A: Create a game

<p><b>Step 1</b></p>	<p><b>Create Game</b></p> <p>Click on the new game icon (far left)</p>	
<p><b>Step 2</b></p>	<p><b>Name the Game</b></p> <p>Name it Frogger and click OK</p>	
<p><b>Step 3</b></p>	<p><b>Define Agent Size</b></p> <p>Do not change - Click OK</p>	

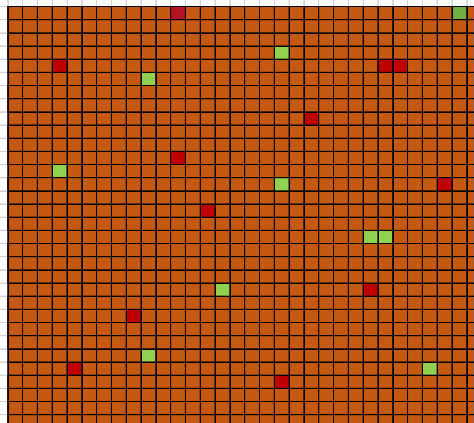
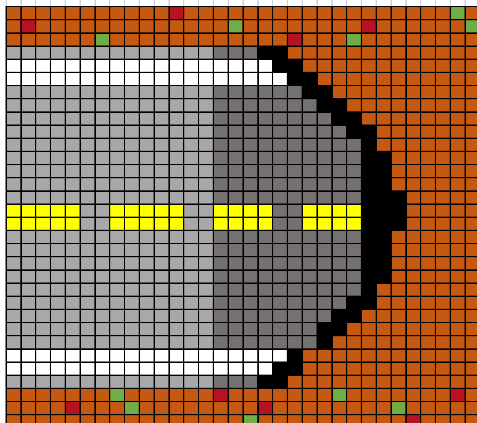
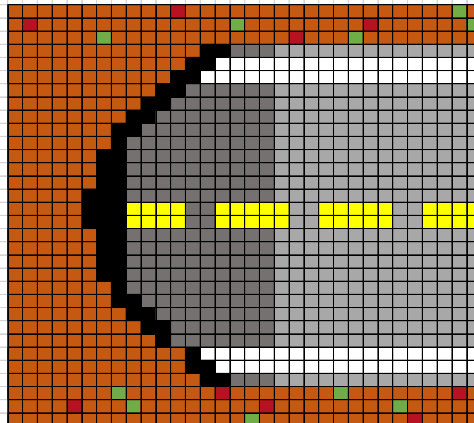
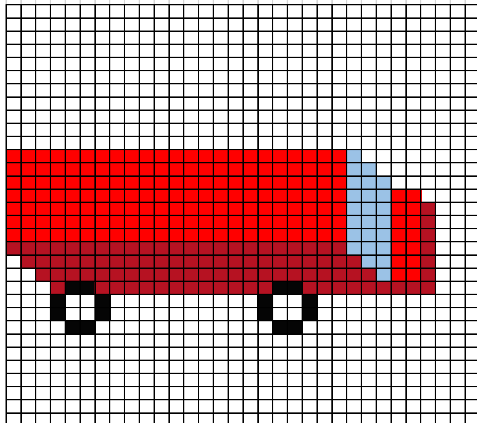
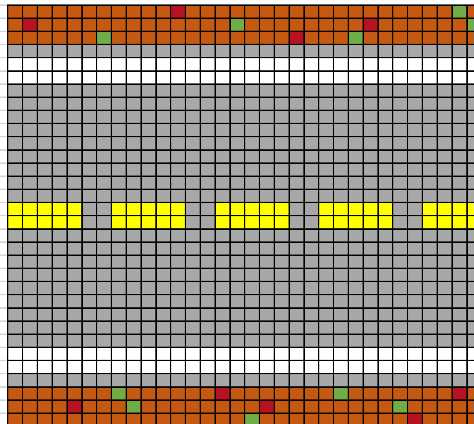
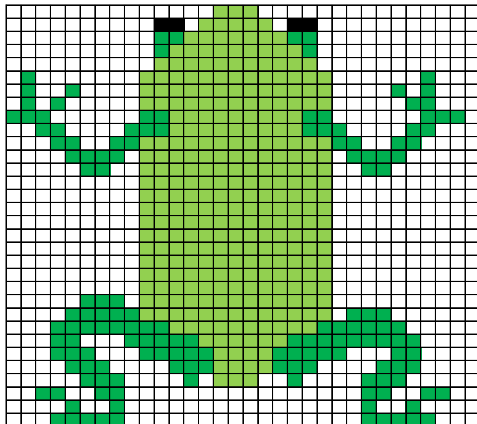
# Frogger (Continued)

## Student Handout 1B: Create agents

<p><b>Step 4</b></p>	<p><b>Create Agent</b></p> <p>Click on New Agent</p> <p>Name it Frog</p> <p>Click ok</p>	
<p><b>Step 5</b></p>	<p><b>Edit Agent</b></p> <p>Click Edit Depiction</p> <p>Click Clear to erase the current image.</p>	 <p><i>Click on Color&gt; Mask Color&gt;&gt; White to make the white background sections see-through</i></p>
<p><b>Step 6</b></p>	<p><b>Draw Frog</b></p> <p>Click Done</p>	 <p>Here is an example of one way to draw the frog. You can be creative. If you make a mistake, use the eraser or click CLEAR to clear the whole area.</p>
<p><b>Step 7</b></p>	<p><b>Draw remaining agents</b></p>	<p>Agents:</p>  <p>Frog      Truck      Ground</p> <p>Left Tunnel      Road      Right Tunnel</p>

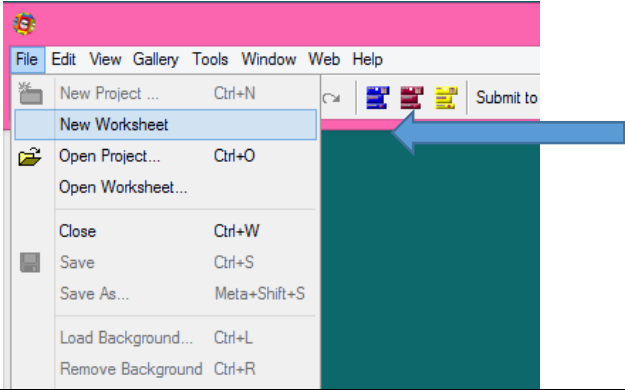
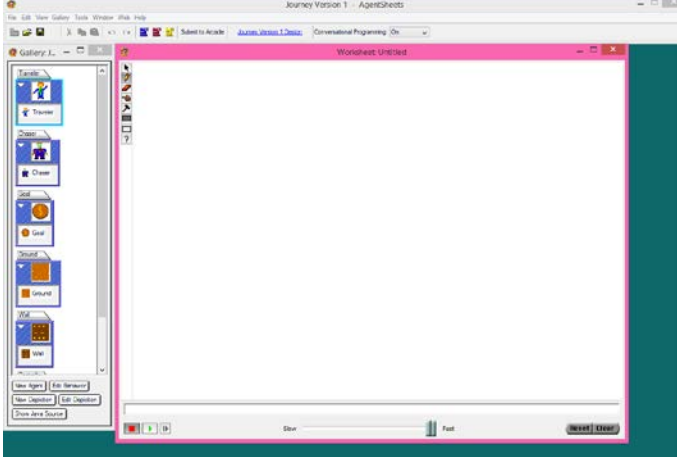
## Student Handout 1C: Agent Creation Models

Use these as quick starting points for your own agent. They don't have to look exactly like the model!



## Student Handout 2: Part 2 – Create Worksheet

The worksheet is the game space –  
it is where the agents will perform their actions.

<p><b>Step 8</b></p>	<p><b>Make the worksheet</b></p> <p>Click <b>File&gt;&gt;New Worksheet</b></p>	
<p><b>Step 9</b></p>	<p><b>Make the worksheet bigger</b></p> <p>Notice it is big, but not so big that it fills up the whole space.</p>	



**Select Tool**

**Pencil Tool** – places a single agent on the worksheet

**Eraser** – erases agents from the worksheet

Will be defined later


Will be defined later

**Draw Rectangle** – places agents in an array (rectangle)

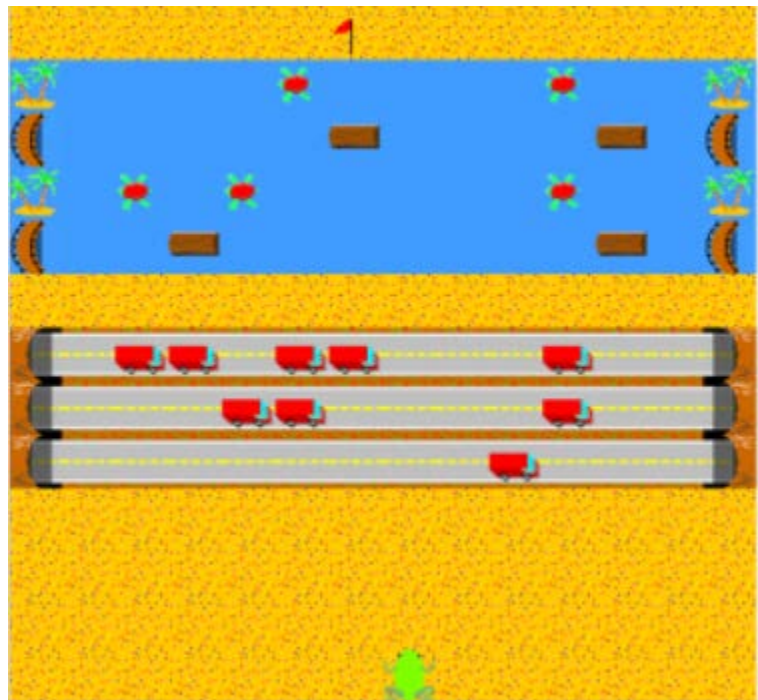
**Erase Rectangle** – erases agents in an array

Will be defined later

## Frogger (Continued)

<b>Step 10</b>	Use the tools to place items on the worksheet.  <b>Pencil:</b> places agents one at a time  <b>Filled in Rectangle:</b> Places agents in an array.	 <p>It is important that you do not draw over the Frog with the Street agent.</p> <p>This means if you place a Frog on the worksheet, do not draw the Street over it without erasing the Frog first.</p>
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You should have only this much of your worksheet filled in for now!



**This is a good time to save the worksheet!**

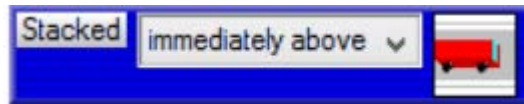
## Student Handout 3: Understanding Conditions and Actions

Explain each condition or action below

Conditions:



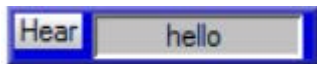
A \_\_\_\_\_



B \_\_\_\_\_



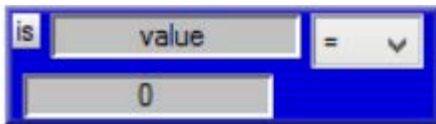
C \_\_\_\_\_



D \_\_\_\_\_



E \_\_\_\_\_



F \_\_\_\_\_



G \_\_\_\_\_

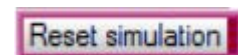
Actions:



A \_\_\_\_\_



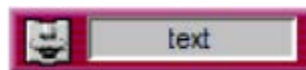
B \_\_\_\_\_



C \_\_\_\_\_



D \_\_\_\_\_

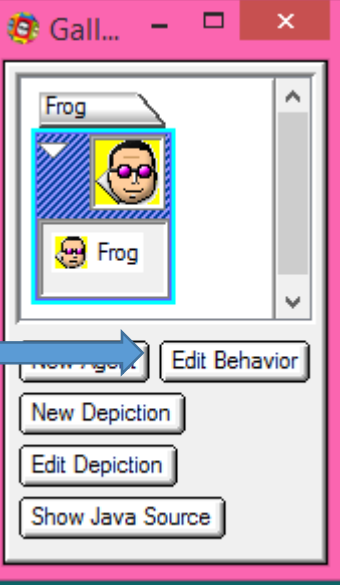
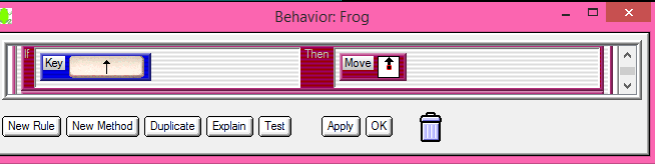
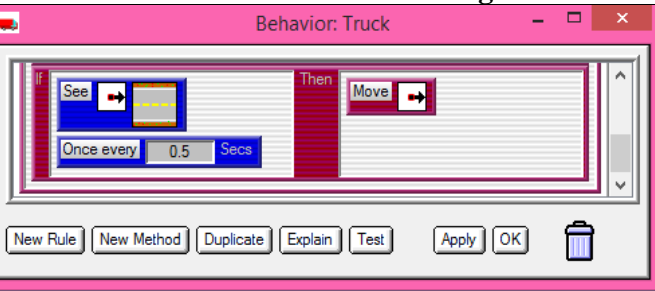
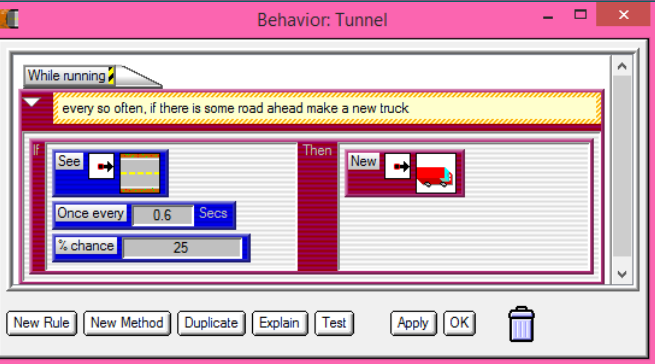


E \_\_\_\_\_

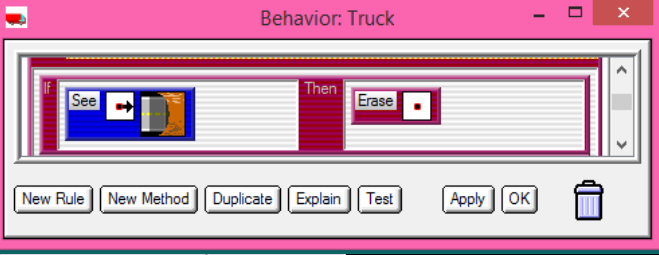
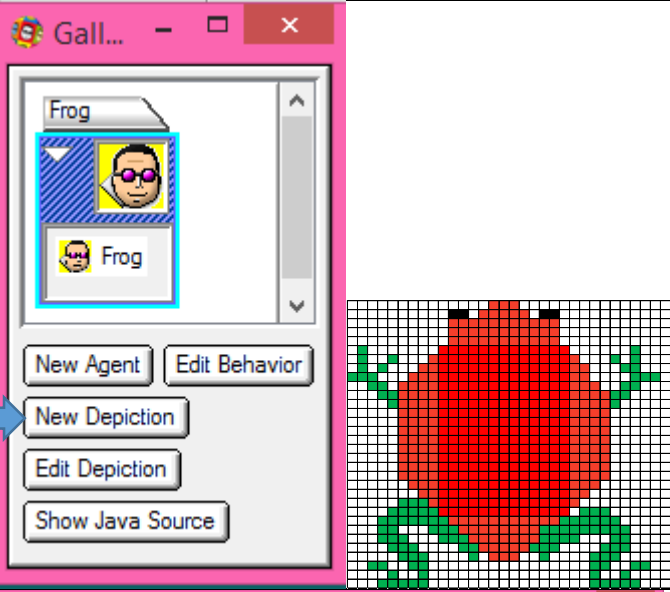
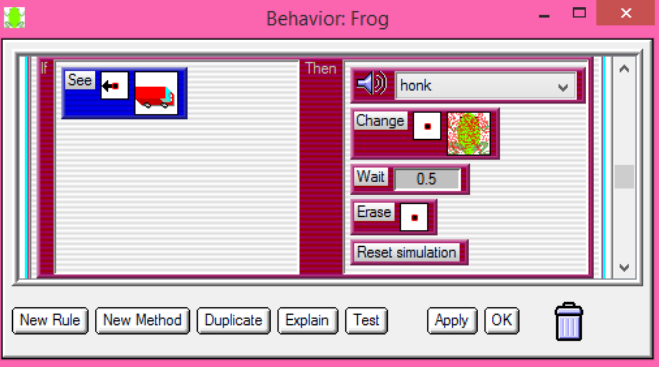


## Student Handout 4: Creating Agent Behaviors

*Click on the agent to add behaviors to that agent*

<p><b>Step 1</b></p>	<p><b>Create behavior for the frog</b></p>	
<p><b>Step 2:</b></p>	<p><b>Cursor Control for <u>F</u>rog</b></p>	 <p><b>This makes the Frog move UP when you push the UP arrow. Create the rest of the rules for the frog</b></p>
<p><b>Step 3:</b></p>	<p><b>Make the trucks move</b> <b><u>Click on the Truck Agent.</u></b> <b>Add this behavior</b></p>	
<p><b>Step 4:</b></p>	<p><b>Make the <u>left tunnel</u> generate trucks</b></p>	

## Frogger (Continued)

<b>Step 5:</b>	<b>Make the right tunnel ABSORB the <u>trucks</u></b>	
<b>Step 6:</b>	<b>Create a 'squished frog' depiction</b>	
<b>Step 7:</b>	<b>Honk a horn and erase the <u>frog</u> when it collides with the truck</b>	

**You are ready to move on once the following items work correctly...**

- Does the frog move all directions?
- Do the trucks get generated (created) and absorbed (erased)?
- Does the Frog-Truck collision work correctly?

## Student Handout 5: The River

You are tasked with creating the river scene of Frogger. Here are the rules:

### Agent: River

- The Frog must drown if it falls in the river.

### Agent: Log

- Float On Water. We'll have the logs float from left to right
- Logs must TRANSPORT frogs
- Logs Must Disappear when it reaches the end of the river

### Agent: Log\_Maker (Bridge)

- GENERATES Logs if there is water to the right (Logs Float from Left to Right)

### Agent: Turtle

- Float On Water. Unlike the Logs, we'll have the Turtles float from right to left.
- Frog Must Be Able to hop on top of the Turtle
- Turtles Must Disappear when it reaches the end of the river

### Agent: Turtle\_Maker (Island)

- Creates Turtles if there is water to the left (because we want our Turtles to go from right to left).

### Agent: Frog :We must update the Frog Agent

- Jump on top of and move with the Logs and the Turtles
- The player loses if the frog falls in the water (the Frog Drowns)

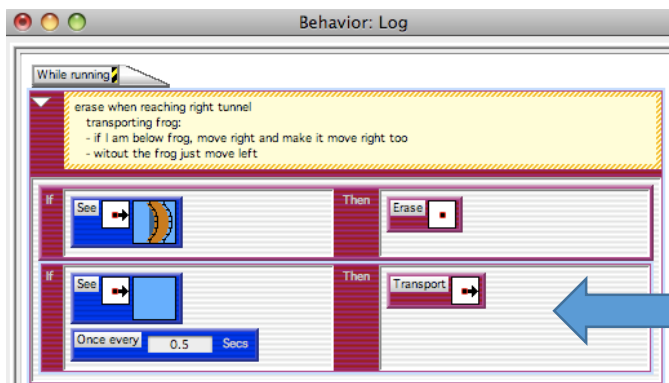
### Agent: Grotto

- If the Frog gets to the grotto, the player wins!

**Step 1: Create missing agents (river, log, bridge, turtle, island, grotto) and add them to the worksheet.**

**Step 2: Program the bridge to generate logs. Program logs to disappear when they reach the end of the water.**

**Step 3: Program the log to float down the river, from left to right.**



Notice that we used TRANSPORT, not MOVE. This is so that the log can carry a frog!

## Frogger (Continued)

**Step 4: Test the program. You are ready to move on when you can answer YES to these questions:**

- Do Logs get created?
- Do the Logs Move across the river and disappear when they reach the Log Maker Agent?
- Does the Frog Get Transported when it jumps on the log?

**Step 5: Program the island to generate turtles. Program turtles to disappear when they reach the end of the water.**

**Make sure the turtles float from RIGHT to LEFT.**

**Step 6: Test your program. You are ready to move on when you can answer YES to these questions:**

- Do Turtles get created?
- Do the Turtles Move and disappear when they reach the Turtle Maker Agent?
- Now, Control the frog and try to jump on a turtle, What happens? Does the Frog Move with the Turtle?

**Step 7: Program the game so that you win when the frog reaches the flag. Give the frog this behavior:**



**Step 8: Test your program. You are ready to move on when you can answer YES to these questions:**

- Does a message get played or appear when the frog reaches the Grotto?
- Does everything else work like you expect it to?

## End of Unit Review Sheet - Frogger

- A) The main computational thinking patterns we covered are:
- 1) **Cursor Control**: intentionally moving an agent.
    - a. Using keyboard keys to move an agent.
    - b. Example is moving the frog.
  - 2) **Generate**: create new agents on the screen.
    - a. Use the “New” action in AgentSheets.
    - b. Examples are generating new trucks, turtles, logs in Frogger.
  - 3) **Absorb**: deleting agents on the screen.
    - a. Use the “Erase” action in AgentSheets.
    - b. Examples are erasing the trucks, turtles, and logs on the other side of the screen.
  - 4) **Transport**: transporting an agent along with another, as if one agent is carrying the other.
    - a. Use the “Transport” action in AgentSheets.
    - b. Examples are transporting the frog on the logs and turtles.
  - 5) **Collision**: when 2 agents collide (run into each other).
    - a. Use the “See” condition
    - b. Use the “Stacked” condition, OR
    - c. Use the “Next to” condition.
    - d. Examples are the truck colliding with the frog.
- B) Other concepts we covered in AgentSheets are:
- 1) Creating projects, worksheets, and agents.
  - 2) Changing depictions for different circumstances, such as the ‘squished frog’ depiction.
  - 3) Stopping and resetting the simulation.
  - 4) Troubleshooting the simulation, and considering rule order.
  - 5) Using sounds and messages in the game.
  - 6) Timing our actions using the “Once every” condition.
  - 7) Creating some random actions using the “% chance” condition, like when we wanted to generate trucks but not always to avoid too much traffic!
  - 8) Creating comments or notes that explain what you are doing in the code. It helps you remember what the code does when you read it later in the future, or share the code with other users.

## Student Handout:

### Challenge 1.0: Alligators

#### Before you start this challenge:

You must have a complete basic Frogger game with a street and river. The Frog should die if it is hit by a truck or if it falls in the river.

#### Design Challenge:

Frogs should be able to jump on the alligators back and travel on them just like they are logs. BUT...frogs should die if they are in FRONT of the alligator.

#### Gamelet Design Activity:

Circle nouns to identify the agents and underline the verbs to identify actions associated with each agent. Mark adjectives to identify new shapes for an agent.

**Create new agent:** alligator

#### Create agent behaviors:

- The frog can ride on the alligators back
- The frog dies if it runs into the mouth of the alligator

#### Alligators



Add alligators to the river.

## Student Handout:

### Challenge 2.0: Prevent Cheating

#### Before you start this challenge:

You must have a complete basic Frogger game with a street and river. The Frog should die if it is hit by a truck or if it falls in the river.

#### Design Challenge:

Create controls so that there is no cheating to win the game...

The frog should die if he rides all the way to the end of the water  
The frog should not be able to walk on tunnels or islands

#### Gamelet Design Activity:

Circle nouns to identify the agents and underline the verbs to identify actions associated with each agent. Mark adjectives to identify new shapes for an agent.

#### Create agent behaviors:

- The frog should die if it rides all the way to the end of the water
  - How can it do this? Which agents need new behaviors?
  - Will you use a new depiction for the frog?
- The frog should not be able to walk on tunnels or islands
  - How will you stop it from doing this?



## Student Handout:

### Challenge 3.0: Dodge Cars and Trucks

#### Before you start this challenge:

You must have a complete basic Frogger game with a street and river. The Frog should die if it is hit by a truck or if it falls in the river.

#### Design Challenge:

Create controls so the frog must not only avoid the trucks, but also the cars going the other direction...

#### New Agents:

Create a car agent

#### Update Worksheet

- Create one (or two!) two lane street(s). Trucks should move to the right, cars move to the left.
- Save the new worksheet

#### Update behaviors

- Cars are generated and absorbed (will you need new tunnels?)
- Cars move to the right
- Frogs are squished if hit by the cars
- Squished frog means the end of the game

