

Ice Arrows 1.0 Programming Challenge

Prerequisite: A complete basic journey game with a Traveler who wins if s/he reaches the treasure and Chasers who either move randomly or chase the Traveler. The Traveler loses if a Chaser gets too close. The worksheet should have walls that the Traveler and Chasers can not cross. You may use the Basic Journey Game saved with this activity as a starting point or use your own game.

Design Challenge:

Your Traveler shoots ice arrows **up** towards the top of the world when the space bar is typed. A Chaser hit by an ice arrow freezes and can't move or kill the Traveler. A frozen Chaser hit by an ice arrow unfreezes and moves again. Ice arrows do not go through walls or pile up on the worksheet.

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: ice arrow

- Use the New Agent button at the bottom of the gallery window.
- Draw an upward facing ice arrow

Create new depiction: frozen Chaser

- Select your Chaser by clicking on it.
- Click on the New Depiction button at the bottom of the agent gallery window.
- Draw a frozen Chaser! Make sure that it looks different enough from a regular Chaser that you can identify from a small picture.
- The Chaser's depiction stores its **state**: frozen or unfrozen.

Create New Rules:

Traveler

- Add a rule so that an ice arrow is fired upwards when the space bar is hit. (generate CTP)
- Where should this rule appear? Above or below the win rule? Above or below the move rules? Remember that special cases appear above default behavior!

Ice Arrow

- Add a rule that makes the ice arrow move up.
- Add a rule so that your ice arrows do not go through walls. (absorb CTP)
- Add rules so that the ice arrow "hits" the Chaser right above it using the Make




action: This action should be read as "make the agent above me check the rules in its "hit" method". The ice arrow must "hit" both frozen **and** unfrozen chasers!

- In what order should these rules appear in the ice arrow while running method? Order your rules with special cases at the top and default behavior at the bottom.

Chaser

- Use the New Method button at the bottom of the Chaser behavior window to add a method named “hit”. The method name must exactly match the name in the ice arrow Make action!
- Add a rule to the hit method that freezes an unfrozen Chaser.
- Add a rule to the hit method that unfreezes a frozen Chaser.
- Does the rule order matter?

Test your new feature

- If the agents’ behavior does not match the changes you have made, click on each agent’s apply button.
- If your Chaser does not stay frozen, add an action to the ice arrow rule so that the ice arrow is erased as soon as it hits the Chaser. Otherwise, the arrow will freeze and then unfreeze the Chaser. Use the Erase action, , which should be read “Erase me”.
- Do frozen Chasers move? Add a condition to the Chaser rule move rule so that only **unfrozen** Chasers can move.
- Does a frozen Chaser kill the Traveler and end the game? Add a condition to the Chaser game-over rule so that only **unfrozen** Chasers kill the Traveler and end the game. Or put the game-over rule in the Traveler’s rules and check whether the Traveler is next to an unfrozen Chaser.
- Does the ice arrow freeze or unfreeze a chaser on the other side of a wall? Reorder your rules so that the rule that erases an arrow over a wall comes first and has priority over hitting a Chaser right above it in the square next to the wall. Then the ice arrow will be erased before it can do anything to a Chaser.
- If your ice arrow does not move across the worksheet, check whether your game is running so fast that the arrow movement is not visible and consider adding a timer condition to the if side of your ice arrow move rule so that the ice arrow moves slowly enough to be visible.
- Do your arrows stack up on the edge of the worksheet? Add walls along the edge of the worksheet to absorb arrows.