

## Introduction

This lesson and its associated resources were originally designed as a way of teaching rule order to 7-11 year olds. However, this proved to be too hard a concept for the majority of the 7 and 8 year olds, so we have divided the content into two alternative lesson plans. The first bypasses the concept of rule order altogether, using the sim to teach character animation and reinforce earlier concepts, whilst the second addresses rule order in some depth. Rule order is quite an advanced concept (analogous to precedence in conventional programming languages) and the issues that it raises can often be avoided by including more of a character's surroundings in each rule (compare the rules in the two versions of the sim). You will have to decide on the best approach based on the abilities of your own group.

### Reignhead Lesson 4A: Animating Characters

**Ages: 7-11**

#### Objectives:

- To understand that switching the appearance of a character each turn gives the illusion of the character being animated.
- To know that a single rule can contain many actions for changing a character's appearance, and that each change is remembered as you create the rule.
- To know the steps for making a rule which animates a character.

#### Resources:

- StageCast Creator installed on each child's computer.
- Access to the "Flying Machines A" example sim from each child's computer. Delete all rules for **all characters**.

Approx. Times	Teacher	Class / Demonstration
3:30	<p><b>Introduction:</b> Recap on last week's lesson. This week we are learning about character animation. What is animation?</p> <p>Introduce Flying Machines sim. Ask children how to check that men have no rules. Show his many appearances and ask children if they can make a rule to make him spin around on spot.</p> <p>Show how to create "Spin" rule for Hovering Man that changes appearance many times in one rule. Stress that each appearance change is remembered, so must cancel mistakes and start rule again. Stress that rule must end with same appearance as it started with, or rule will not work next turn.</p> <p>Ask children how to make "Spin Right" rule for Spinning Man. Press play until man stops against cliff.</p> <p>Ask children how to make "Turn Left" rule for Spinning Man. Stress that cliff must be included in rule.</p>	<p>Grouped around demonstration computer, with Flying Machines A sim already loaded.</p> <p>Double click on green man. Right click on man.</p> <p>Click on <b>rule tool</b>. Click on man. Right click man and select "Spin 2" appearance. Right click man and select "Spin 3" appearance. Right click man and select "Spin 4" appearance. Right click man and select "Spin 1" appearance.</p> <p>Begin as above but after selecting "Spin R4" appearance: Drag right <b>spotlight handle</b> one square right. Drag man into square. Right click man and select "Spin R1" appearance.</p> <p>Click on <b>rule tool</b> click on man. Drag right <b>spotlight handle</b> one square right. Right click man and select "Spin L1" appearance.</p>

3:45	Send them to their own computers to complete rules for Hovering Man and Spinning Man.	Independent work at their own computers.
4:00	Whilst children are working, complete rules for Flying Man and Hovering Man. Show to children and ask them to make their characters do the same.	Grouped around demonstration computer.
4:05	Send them to their own computers to complete the rules for Flying Man and Hovering Man.  <b>Extension:</b> Complete rules for Roaming Man and ask them to make their character do the same.	Independent work at their own computers.
4:25	<b>Plenary:</b> Quiz children on the main points: <ul style="list-style-type: none"> <li>• How do we change a character's appearance?</li> <li>• How do we create a rule to make a character animate?</li> <li>• What must we remember about the way the rule starts and finishes?</li> <li>• What do we do if we make a mistake?</li> </ul>	Answering questions grouped around the main computer.

**Objectives:**

- To understand why the order of a character’s rules can make an important difference to the way they behave.
- To be able to identify when a character’s rules are not working properly and change the rule order to try and solve the problem.
- To be able to use the rule test

**Resources:**

- StageCast Creator installed on each child’s computer.
- Access to the “Flying Machines B” example sim from each child’s computer. Delete all rules for **Spinning Man** and delete him from the stage. Reorder rules for **Flying Man** to: 1<sup>st</sup> = “Turn Right”, 2<sup>nd</sup> = “Fly Left”, 3<sup>rd</sup> = “Turn Left”, 4<sup>th</sup> = “Fly Right” and delete him from the stage.. Reorder rules for **Jetpack Man** to: 1<sup>st</sup> = “Turn Off Jetpack”, 2<sup>nd</sup> = “Fly Backwards”, 3<sup>rd</sup> = Turn On Jetpack”, 4<sup>th</sup> = “Walk Right”, 5<sup>th</sup> = “Fall Down”. Reorder rules for **Umbrella Man** to: 1<sup>st</sup> = “Fix Umbrella”, 2<sup>nd</sup> = “Fall Down”, 3<sup>rd</sup> = Break Umbrella”, 4<sup>th</sup> = “Fly Up” and delete him from the stage.

Approx. Times	Teacher	Class / Demonstration
3:30	<p><b>Introduction:</b> Recap on last week’s lesson. This week we are learning why the order of a character’s rules is important.</p> <p>Introduce Flying Machines sim. Ask children how to check if green man already has rules. Show that he does. Stress that he has many rules, so how does he know which rule to use?</p> <p>Introduce rule order visual aide. Recap that in every turn (= single step button) each character performs one rule. Explain that when they have more than one rule they start of the top of rule list and work down until a ‘before’ picture matches. Talk through each turn until scorpion catches Eric. Reset Eric.</p> <p>Ask children what they could do to rule order to help Eric get safely to entrance ‘C’. Ask children which rule Eric uses each turn until he escapes.</p> <p>Ask children how to get Eric from ‘B’ to bottom exit to collect bastet. Ask children which rules Eric uses at key points until he escapes. Reset Eric. Ask what they could do to help Eric escape with all the treasure (swap rule order around and repeat).</p> <p>Show that Jetpack Man behaves very strangely. Explain what he should be doing, but that he doesn’t because his rules are in the wrong order. Open Rule Maker for Jetpack Man and show you can use <b>single step button</b> to see which rules he uses each turn.</p>	<p>Grouped around demonstration computer, with Flying Machines B sim already loaded.</p> <p>Double click on green man.</p> <p>Put Eric on square ‘A’. Rule 1 = “Move Right”. Rule 2 = “Move Up”. Turns 1-4 = Rule 1 ×, Rule 2 ✓ so Eric moves up. Turn 5 = Rule 1 ✓ so Eric moves right.</p> <p>Put Eric on square ‘A’. Rule 1 = “Move Up”. Rule 2 = “Move Right”. Turns 1-7 = Rule 1 ✓ so moves up. Turn 8-10 = Rule 1 ×, Rule 2 ✓ so moves right.</p> <p>Put Eric on square ‘B’. Rule 1 = “Move Down”. Rule 2 = “Move Left”. Turns 1-7 = Rule 1 ✓ so moves down. Turns 8-12 = Rule 1 ×, Rule 2 ✓ so moves left. Turns 14-15 = Rule 1 ✓ so moves down. Press play. Press stop. Double click on green man. Press single step. Observe green marker to left of rule. Repeat and stop when jetpack is off.</p>

	<p>Show that he uses “Turn On Jetpack” rule when he should “Walk Right”. Ask children how to fix this. Show that he now uses “Walk Right” rule when he should use “Fall Down”. Ask children how to fix this.</p> <p>Show that he uses “Turn Off Jetpack” rule when he should “Fly Backwards”. Ask children how to fix this.</p>	<p>Move “Walk Right” rule above “Turn On Jetpack”. Press single step button. Repeat. Move “Fall Down” rule above “Walk Right”. Press single step button. Repeat. Press play until he gets stuck again at base of cliff. Press stop.</p> <p>Move “Fly Backwards” rule above “Turn Off Jetpack”. Press play.</p>
3:55	<p>Send them to their own computers to reorder the rules for the Jetpack Man.</p> <p><b>Extension:</b> Fix rule order for Flying Man and Umbrella Man. Fix rules on demonstration machine so that they can see what they should be aiming for. What happens when characters collide? Why?</p>	<p>Independent work at their own computers.</p>
4:10	<p>Put Spinning Man back onto stage. How are Flying Man’s copter blades made to look as if they are spinning? Changing their appearance very quickly looks like they are moving.</p> <p>Show how to create “Spin” rule for Spinning Man that changes appearance many times in one rule and moves right. Stress that each appearance change is remembered, so must cancel mistakes and start rule again. Stress that rule must end with same appearance as it started with, or rule will not work next turn.</p>	<p>Grouped around demonstration computer. Right click on Flying Man. Look at appearances.</p> <p>Click on <b>rule tool</b>. Click on man. Right click man and select “Spin 2” appearance. Right click man and select “Spin 3” appearance. Right click man and select “Spin 4” appearance. Drag right <b>spotlight handle</b> one square to the right. Move man into empty square. Right click man and select “Spin 1” appearance. Click done.</p>
4:15	<p>Send them to their own computers to complete the Spin rule.</p> <p><b>Extension:</b> Delete the Flying Man’s “Fly Left” and “Fly Right” rules and make them again.</p>	<p>Independent work at their own computers.</p>
4:25	<p><b>Plenary:</b> Reload the sim and ask children how to reorder the rules for Flying Man and Umbrella Man to make them work properly.</p>	<p>Answering questions grouped around the main computer.</p>