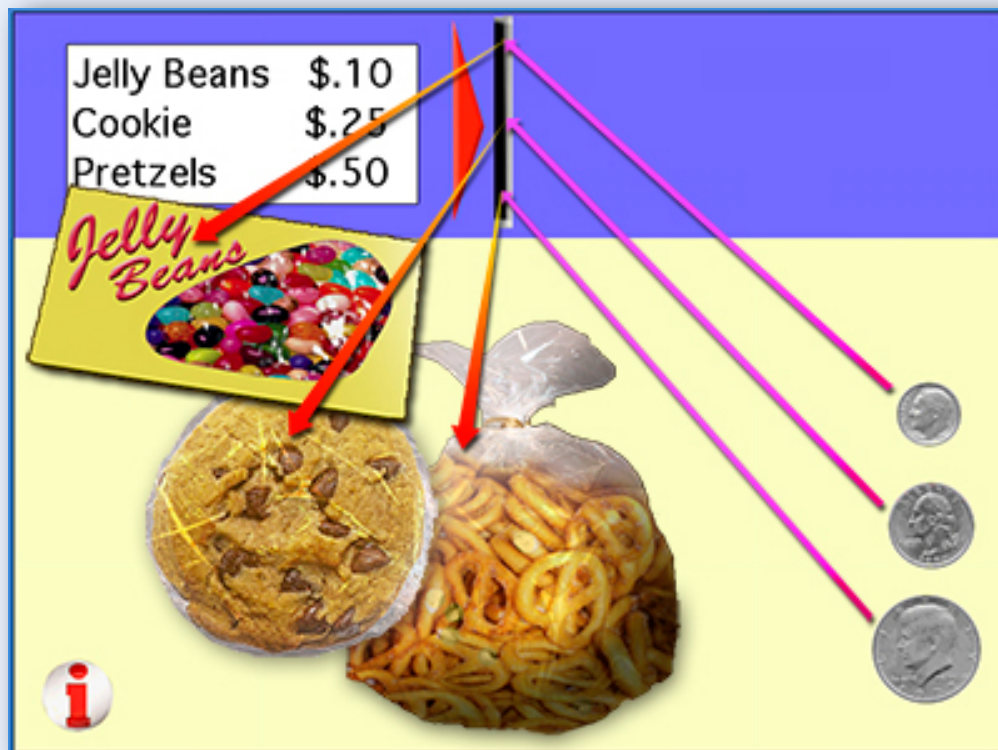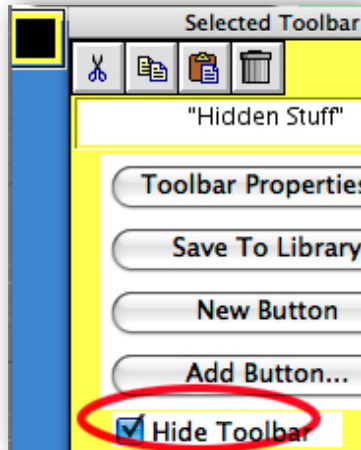## The Vending Machine

If you have not already done so, **Import** the **Vending Machine** into IntelliTools Classroom Suite® and try it out. Select one of the three coins and drop it into the slot, then try it with each of the other two coins. The **Vending Machine** always knows which coin you inserted, and dispenses the correct item.

It looks so simple, just one slot and three coins, but how does it know? Let's take a closer look! Once we understand how this little activity works, you will know an exciting new trick to use in building your own activities.
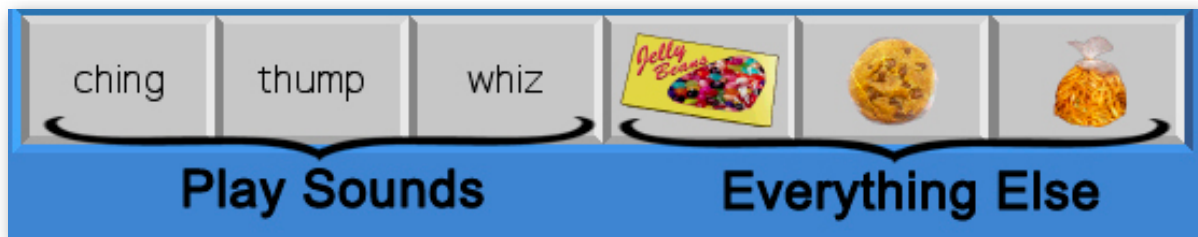

Jelly Beans $.10
Cookie $.25
Pretzels $.50

Just about all the machinery that makes this simple vending machine work is hidden. We'll have to make those hidden items visible before we can investigate further. Under the **Edit** menu, choose **Custom Toolbars And Buttons**, and temporarily make the toolbar **Hidden Stuff** visible by removing the checkmark beside **Hide Toolbar**. That's our starting point to understand how everything works.

Six Hidden Buttons

Hidden Stuff has six buttons, three of them "**Play Sound**" buttons: **ching** (the coin dropping), **thump** (the purchase landing), and **whiz** (effect when the item vanishes). The action of these three buttons is simply to play its sound when the button is selected. The other three buttons, **Cookie**, **Jelly Beans**, and **Pretzels**, take care of all the other actions of the **Vending Machine**.
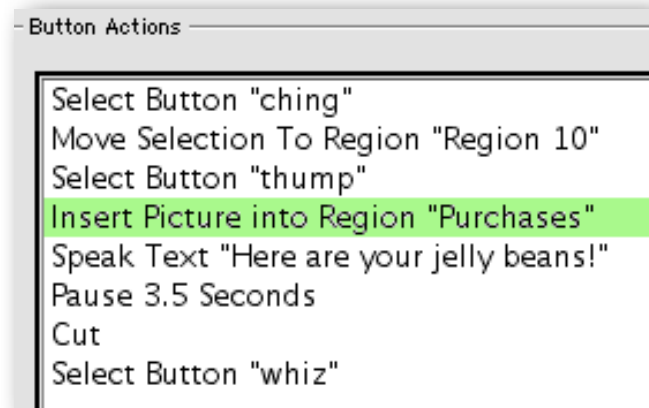
Action Buttons: Jelly Beans, Cookie, And Pretzels

The **Button Actions** lists in these latter three buttons are almost identical, so we'll just look at one of them. **Control-click** any one of the three to open its **Properties** and take a look! Each has its own specific picture to insert, either the jelly beans box, the wrapped cookie, or the bag of pretzels.

Under the **Actions** tab, you see that each button moves the particular coin you just inserted back to its proper starting spot (either Region 10, Region 25, or Region 50). Each button speaks a different sentence identifying what you have purchased.

Otherwise, all three action buttons follow exactly the same routine:

Button Actions

Select Button "ching"
Move Selection To Region "Region 10"
Select Button "thump"
Insert Picture into Region "Purchases"
Speak Text "Here are your jelly beans!"
Pause 3.5 Seconds
Cut
Select Button "whiz"

* Play the coin dropping sound by selecting the hidden button **ching**
* Put the (still selected) coin away by moving it to its home region (in this case, since it's a dime, to **Region 10**)
* Select the hidden button **thump** as the purchase appears
* Insert a picture (in this case, the jelly beans box) and move it into position in another region, **Purchases**. This leaves the purchase clip art selected.
* Speak a line of text to announce what was purchased
* Pause to let the student look at the purchase for a moment
* Delete the purchase picture (which remains selected, luckily!)
* Play the whiz sound effect as the purchase disappears.

Okay, now we know all the functions of the six hidden buttons on the **Hidden Stuff** toolbar. Hide **Hidden Stuff** again by putting a checkmark in the box on the lower left corner of the yellow floating palette, and click **Done** in the upper right of the screen to leave toolbar editing mode.
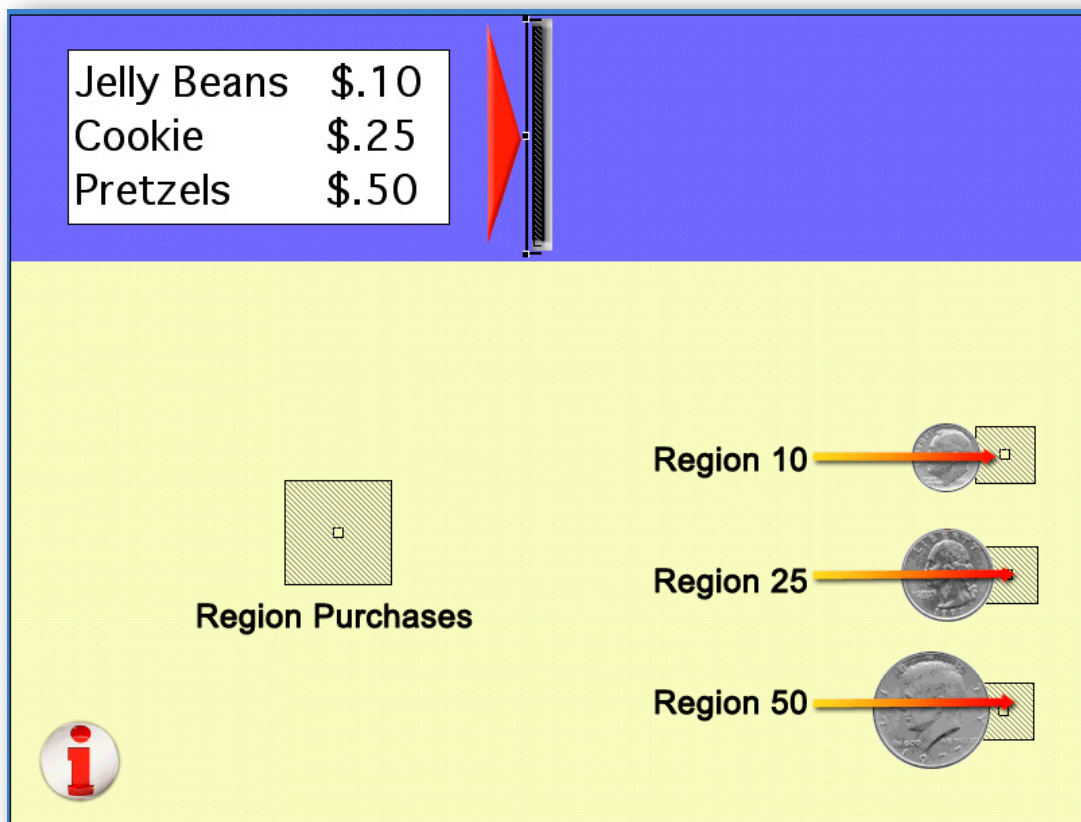
Sleight Of Hand With Regions
You can tell that **Vending Machine** involves a lot of regions. There are two mentioned in the button actions we just examined, and we know there are at least two more, for the home positions of the other two coins, the quarter and half dollar.

Go under the **IntelliPics Studio** menu and choose **Show Regions**, then move all three coins a little to the left. Now you can see the regions

that let the activity reset the positions of the coins, **Regions 10, 25, and 50**. The other region you see off to the left is **Purchases**, the target used by the three action buttons when inserting the three purchases.
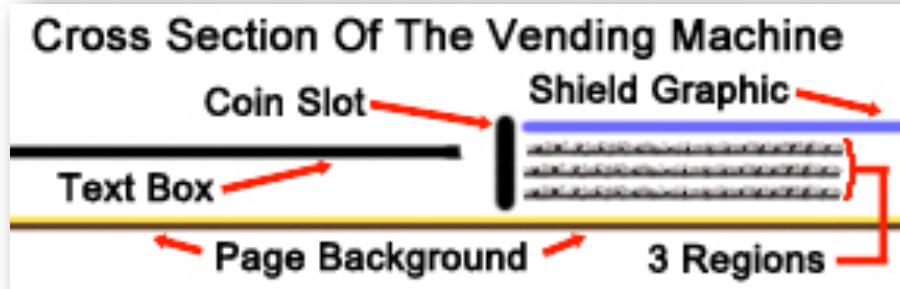
Those two button actions, **Move Selection To Region** and **Insert Picture Into Region**, are very powerful tools. They are helpful for carrying out automatic actions like we are doing here, and equally handy for making it easy for students to put things into a desired position on the page.
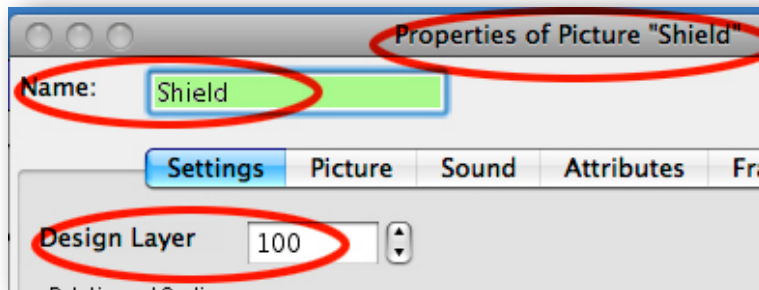

Graphic Used As A Foreground Shield

However, the most important regions on this page are still hidden. They are three regions stacked on top of one another. There is a graphic used as a shield on top of all three regions, so that the coins disappear behind it and really seem to be going into a slot. We need to move the

graphic **Shield** out of the way in order to access those regions we want to investigate. First, go once more under the **IntelliPics Studio** menu and close **Show Regions.**

I didn't want students to interact with the shield; in fact I don't want them to realize it's there. Therefore, I have it set NOT to respond to mouse clicks. However, we should be still able to open its **Properties** by **Control-clicking** on it.

Control-click in the blue area to the right of the slot. When a **Properties** dialog opens, check that it belongs to a picture named **"Shield"**. Notice it's set for **Design Level 100**, the highest level. That's why the coins go behind it and seem to fall into the slot. **Unlock Shield** and put a check in the box for **Respond To Mouse Clicks**. Now you can move the graphic out of the way.
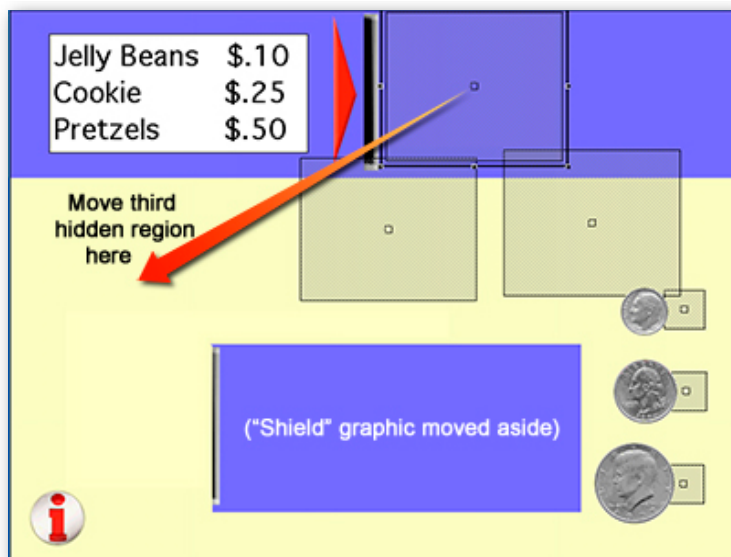
Quick Tip: Control-clicking on an item usually opens **Properties** for whichever item is on top, that is, whichever item is on the highest **Design Layer.** Sometimes if several items are stacked, it's difficult to select the one you want. You always can get to an item via the **Edit** menu. Under **Edit**, choose **Select Object,** open the drop-down menu to its right, and choose the item you want to edit. Let the **Edit** menu close, then immediately open it again and choose **Properties...** This opens a dialog to edit the item you just selected.

A Stack Of Three Regions

Okay, with the graphic out of the way we can take a look at what those regions under it are doing. Return to the **IntelliPics Studio** menu and choose **Regions**. Now you can see the three stacked regions hiding under **Shield** that are doing the real work, identifying which coin you put there and then activating the correct button to produce a picture of your purchase.

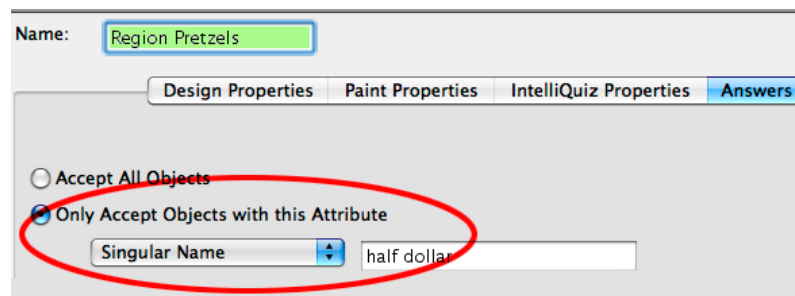**Control-click** to open **Properties**, **Unlock**, and set each region to

Respond To Mouse Clicks in order to move it. Move the three regions so they are lined up across the page. That way we can look at the settings in each one.

Open the **Properties** of each of the three regions now. Notice that in the settings under **Design Properties**, each of the formerly stacked regions has a different designated button to select if the region detects a correct object dropped into it. The names of those three designated buttons should be familiar, because they are the three multi-action buttons on the **Hidden Stuff** toolbar: **Jelly Beans**, **Cookie**, and **Pretzels**. We've already seen what those buttons do.

Under the **Answers** tab, each of these regions is set to accept only one object, with a particular **Singular Name**. These, of course, are the names

assigned to the three coins: **dime**, **quarter**, and **half dollar**.

So these three stacked regions each accept one and only one of the three coins. When one of the regions detects its proper coin, that region selects its matching button, thereby activating the list of actions to play sound effects, insert a picture of the purchase, speak text identifying the purchase, and eventually delete it, resetting the **Vending machine**.

Very important: NONE of the regions have a designated button to select when an incorrect item is rejected. That means each region ignores everything except the unique coin it is watching for.

That last fact makes this entire machine possible. I can stack the three (or more!) regions one atop the other and drop any one of the coins on the stack. For each coin (or other clip art item), two of the regions ignore it and do nothing, while the third region recognizes its correct coin and activates the button that will supply that purchase.

Since all three of the action buttons, as well as those in charge of sound, are hidden, the student using this virtual **Vending Machine** experiences the correct item dropping out as a direct result of the coin he or she chose to put in the slot.

It's like the dummy telephone onstage that rings, and an actor answers it. We in the audience know it's really someone backstage ringing a bell, but it certainly looks and seems real in the middle of a play!

Usually at this point, I remind you to save your work, but not this time. We've torn the poor **Vending Machine apart!** Just close the wreckage without saving it, and keep the healthy copy you imported.

Also give yourself a pat on the back. You've earned it!

I feel that the ability to mimic real life experiences like this is the most powerful and unique educational functionality computers give us. Regions in particular are underused as a tool to stage very realistic and engaging cause and effect experiences for students.

A student playing with this activity is mentally predicting what will happen with each coin, and at the same time practicing making a free choice. Regions are handy for filtering right and wrong answers, but as you can see, they can do much, much more!

A Confession....

Okay, did anybody notice that I swept one thing under the rug? Those stacked regions were marked to bounce out wrong objects immediately... but obviously they did not. Logically, I should have had them set to leave the wrong items in there. However, in the version of ICS I was using, the regions stopped filtering for correct Attributes if I set them that way, even if they were not stacked up. They worked just fine when I set them to bounce out incorrect objects, the default, so I left them set that way.

What We Have Learned

✳ If you have sounds or sets of actions you want to use over and over, or just want them to seem to happen as a natural result of user interaction, place those actions in toolbar buttons and hide the toolbar. To activate hidden buttons, use the **Select Button** action.

✳ If you need an item to go behind something or seem to fall into it, use a foreground graphic, a floating bit of clip art set on a **high design layer**. To hide your foreground scenery, match it to the background, take the checkmarks off Automatic Scan, Step Scan, and **Respond To Mouse Clicks**, and **Lock** it in place. To make the graphic for **Vending Machine**, I went into **Paint** mode and used the

Marquee tool to select and copy a section of background. Then I returned to **Design**, and **Pasted** it as a floating picture.

✳ For more complicated art, I could **Copy** the background under **Page Properties**, then open a graphics program such as PhotoShop Elements® and **Paste** it from the **Clipboard**. There I could use all the tools in the graphics program in editing my foreground art, save it as jpg, and then use **Load Picture From File** to return it into ICS.

✳ Regions can be used as targets to have inserted items go where they should and help students place items on the page. The two actions you use are, **Insert Picture Into Region** and **Move Selection To Region**. The first of this pair inserts a specific picture to the specified spot on the page. The second one could be used when any of several items might be selected at that point. Either action can be in a button on a hidden toolbar.

✳ Be sure to use the power of having regions select buttons for right and wrong items dropped into them. Potentially, a correct item could take a student farther along in a story, while a wrong item could give feedback or a clue, then return to the page to try again. Another possibility is to have a correct item launch an effect or series of actions, like in the **Vending Machine**. Dropping in a key could open a door, giving the dog a biscuit could make it wag its tail.

✳ If regions are stacked one atop another, they can be set so that each one detects a different item. Since each region can select a different button for a correct item, and each of those buttons can have many actions, this gives you almost unlimited possibilities for interactive activities.

Three Challenges

One of the best ways to test if you really understand something is to change it up, so here are two challenges. To work these, first open the **Vending Machine** and save a copy under a different name.

Throw In Something New

What would happen if you put something other than these three coins into the slot? Think about the settings on the three regions. Make your prediction now!

Okay, let's see if you are correct. Under the **Edit** menu, choose **Insert Picture From Library**. Choose the **Money** category, and insert **nickel face**. Then drag the nickel into the slot and let it drop. Was your prediction correct? What setting(s) caused that result?

Sale! Today Only!

Don't delete that nickel yet! Let's pretend the junk food store is having a sale, and today jelly beans are half price, only one nickel for a box. Can you change settings in the **Vending Machine** so that it will sell you a box of jelly beans when you put the nickel into the slot?

Hint: It takes only two changes to make it sell you the jelly beans, but if you are a purest you can make it perfect by also changing the price on the sign to $.05.

I'll put the solution on the next page, but try to figure it out and don't peek. When you have it changed, save the new version. Just think, you will know how to set it up with any type of money!

Super Challenge: No Answer Sheet

Can you make a version that sells healthier snacks? If you leave the prices alone, you should only have to change the sign and 3 hidden buttons. Clip art of the healthy snacks has to go in the buttons, but leave the old names. What about the spoken text? Give it a try!

Warning! Spoiler Ahead! Warning! Spoiler Ahead! Warning! Spoiler Ahead! Warning! Spoiler!

The key is to think about which part of the machinery does what. Product dispensing and sound effects are all handled by the hidden buttons. Coin detection is a match between settings in the coin and settings in its matching region. You want to make it detect a different coin, so you need to make changes in one region and in that nickel clip art you added.

The easy part: Open the **Properties** of the nickel and look under **Attributes** for its current **Singular Name**. The clip art's name is nickel face, so that is also its default **Singular Name**. Just for fun, delete the word face, so its **Singular Name** is just **nickel**. Caution: Be sure to delete the space between the words nickel and face. This thing is picky, picky, picky! Close **Properties**.

The not hard, but more complicated part: Under the **Edit** menu, choose **Select Object**, open the **drop-down menu** to the right and choose **Region Jelly Beans**. Let the menu close. You'll see a selection outline, but don't try to click in it. Instead, immediately open the **Edit** menu again and choose **Properties...** With all those regions and the **Shield** stacked up, that's the easiest and quickest way to open the **Properties** of **Region Jelly Beans**.

Click the **Answers** tab. In the slot next to **Singular Name**, **delete** the word **dime**, and type in **nickel**, <u>exactly</u> the way you typed it in for the nickel clip art's **Singular Name**. As I said, it's very picky! Close the **Properties** of **Region Jelly Beans** by clicking **OK**.

That's all! Drag the nickel and drop it into the slot. Did it sell you the Jelly Beans? Notice that it tidily put away the nickel, in the spot where it normally puts away the dime. If you slide the nickel over, delete the dime, put back the nickel and **save**, you just made a new version of **Vending Machine.** **Congratulations!**

Credits

The three snack choices are original art by Ann Brundige, using portions of the following photographs:

Gimbals-Jellybeans-Pile.jpg by Evan-Amos (2011) (CC 0) A pile of Gimball's Jelly Beans, similar in flavors to Jelly Belly. via Wikimedia Commons

A photo of spicy salsa pretzels in its packaging. by Londonsista (2010) (CC 0) via Wikimedia Commons

Sweets packaging made of PLA-Blend Bio-Flex.jpg by F. Kesselring, FKuR Willich (2009) (CC BY SA 3.0) via Wikimedia commons. Used to make a bag around the pretzels.

Chocolate Chip Cookie (2014) from pixabay marked CC0 Public Domain Free for commercial use

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thump2 by theshaggyfreak www.freesound.org/people/theshaggyfreak/sounds/274942/ (CC BY NC 3.0)