RULE 1: Additive Identity Property

Additive Identity Property	
Rule	$a + 0 = a$ $x + 0 = x$
Explanation	If we add 0 to any number, we will end up with the same number.
DragonBox^{EDU}	Zero is represented through the "the green vortex". When you click on this card, it will disappear from the board.
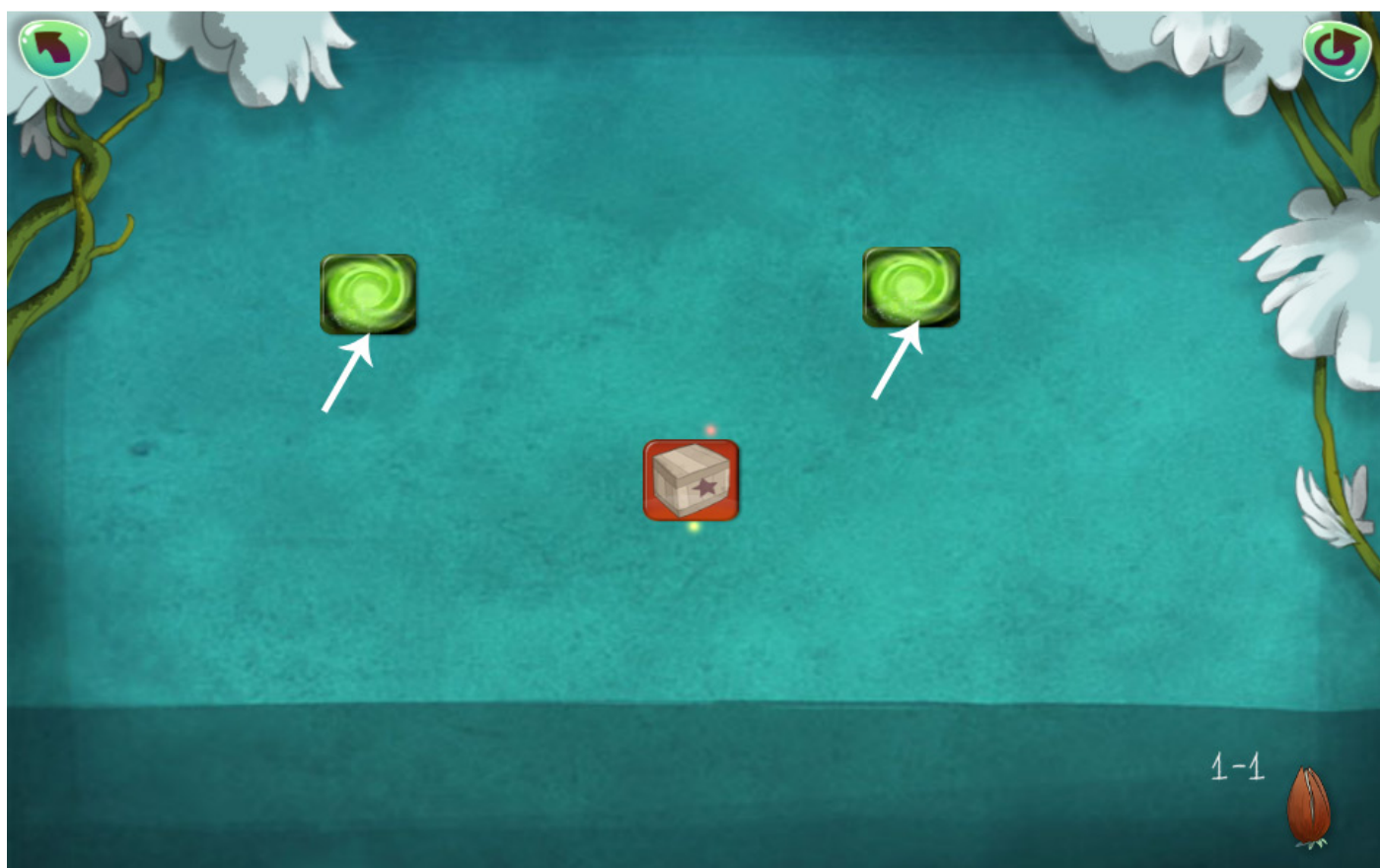
Example from side A, level 1-1: Here the player is presented with the goal of the game and rule 1. Click on the the green vortices to remove them from the board and get the box alone.
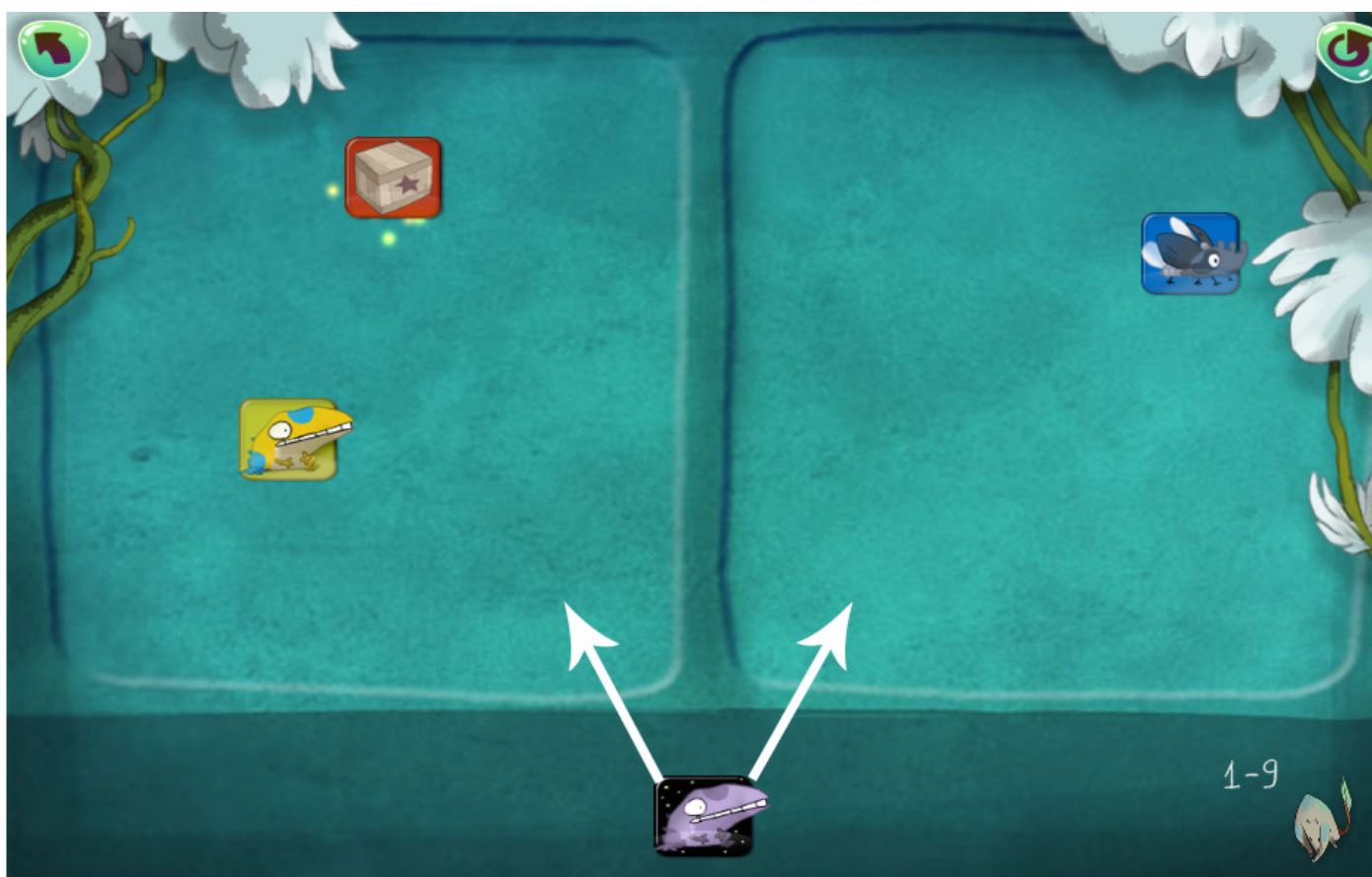
RULE 2: Additive Inverse Property

Additive Inverse Property	
Rule	a + (-a) = 0 x + (-x) = 0
Explanation	If we add a number by the opposite of itself, we will end up with 0.
DragonBox^{EDU}	Each card in the game has two sides, one light and one dark version. By dragging one on top of the other, we end up with a green vortex or ´0´. Later in the game, these cards are replaced with numbers or letters, for example ´2´ and ´-2´ og ´b´and ´-b´.
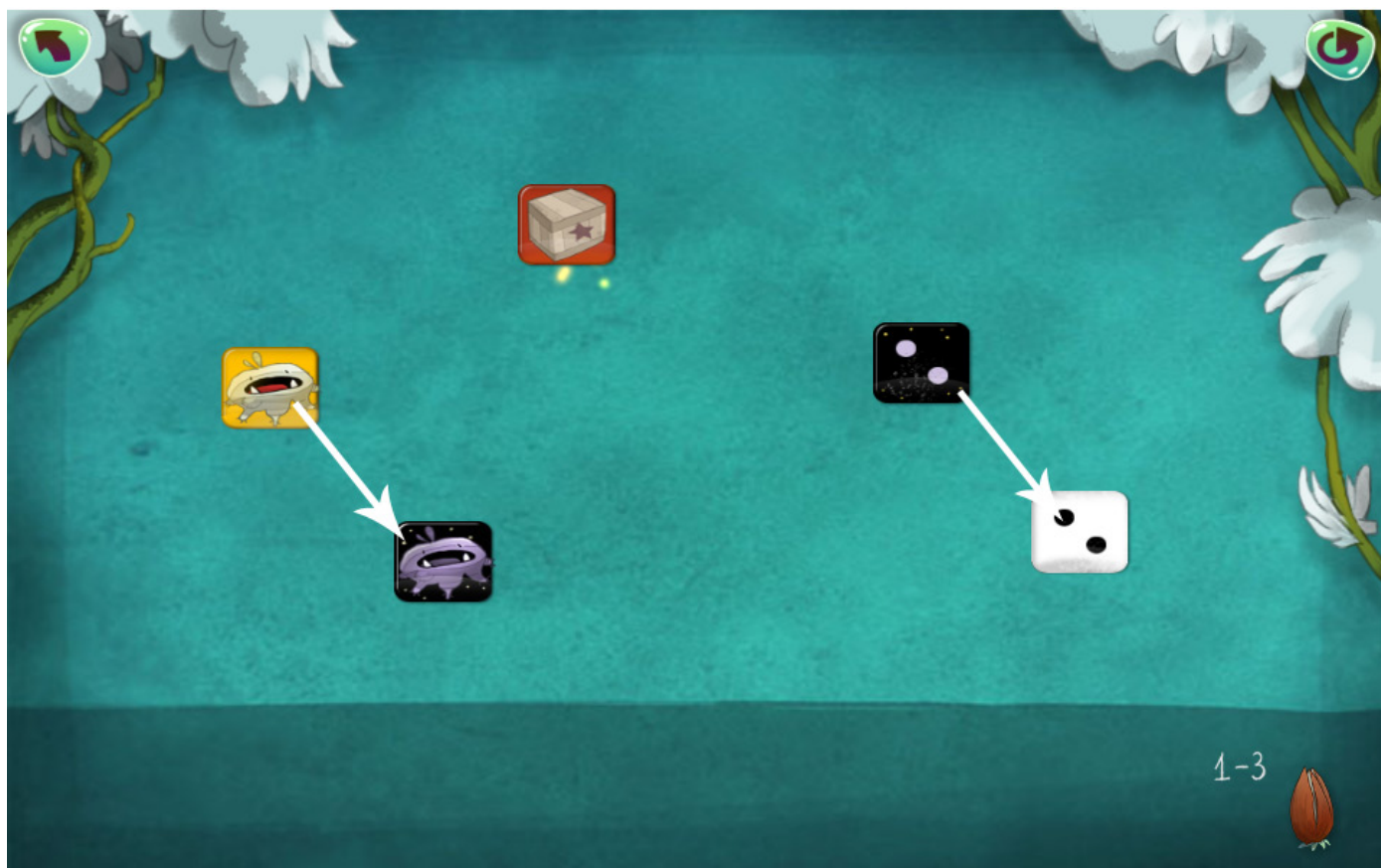
Example from side A, level 1-3: Rule 2 is presented. Drag the cards on top of each other to remove them from the board.

	Properties of Equality I
Rule	If a = b, then a + c = b + c where we add c to both sides of the equation
Explanation	If we add a number or letter on one side of the equation, we must do the same on the other side
DragonBox[EDU]	In the game, we can drag cards to both sides of the board and then continue to solve the equation by removing cards if possible

Example from side A, level 1-9: Rule 3 is presented. The card on the bottom is dragged to both sides of the board. It will then be possible to remove the card on the left, leaving the box alone on that side.

ULE 4: Multiplicative Inverse Property

Multiplicative Inverse Property	
Rule	$$a \cdot \frac{1}{a} = a$$ $$x \cdot \frac{1}{x} = 1$$
Explanation	**If we multiply a number by its reciprocal, we will end up with 1.**
DragonBox^EDU	**In the game, the player can drag the bottom card up over the top card when the cards are alike. The cards will then be replaced with a one-card.**
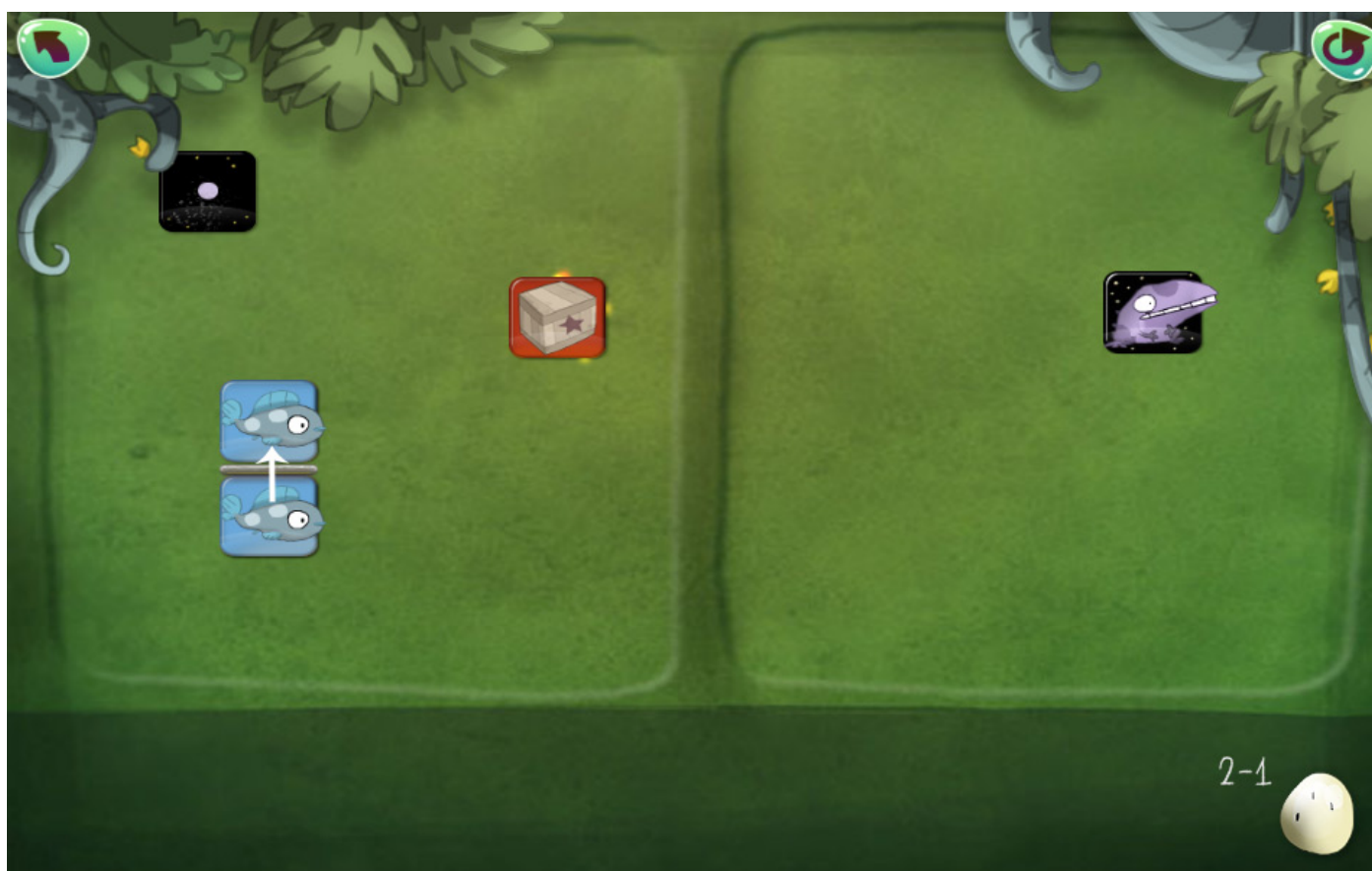
Example from side A, level 2-1: Rule 4 is presented. Drag the bottom card up over the top card when the cards are alike. The cards will then be replaced with a one-card. Dragging the one-cards on the left on top of each other, removes them from the board.

Multiplicative Identity Property	
Rule	$a \cdot 1 = a$ $x \cdot 1 = x$
Explanation	If we multiply 1 to any number, we will end up with the same number.
DragonBox^EDU	In the game, we can click on an one-card which is connected to another card, in order to collapse the expression into one element.
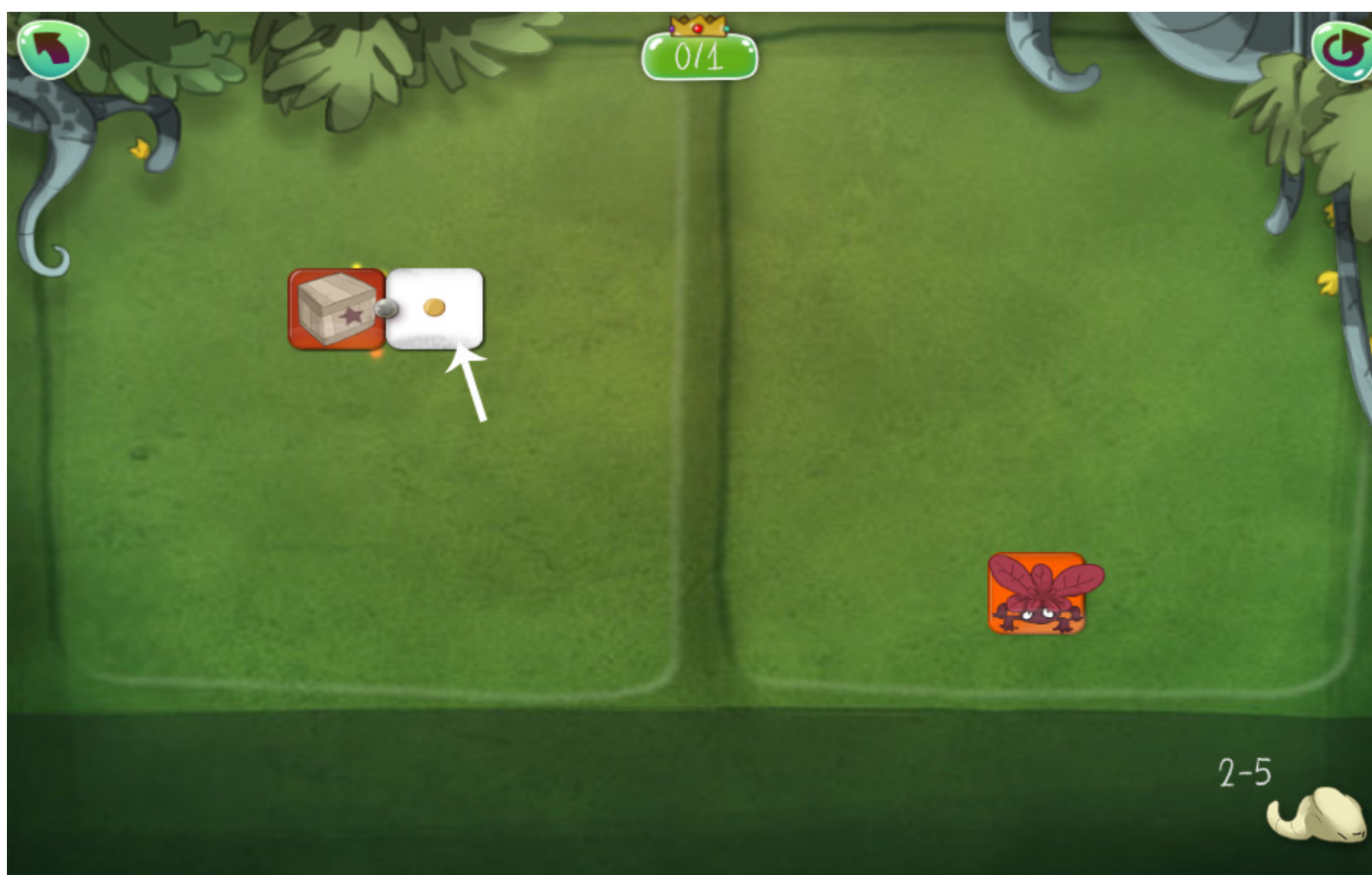
Example from side A, level 2-5: Rule 5 is presented. Click on the one-card to pull these two cards together. The box will then be left alone on one side of the board.

	Properties of Equality II
Rule	If $ac = bc$ and $c \neq 0$, then $a = b$ We divide both sides with c
Explanation	If we divide by a number or letter on one side of the equation, we must do the same on the other side
DragonBox^{EDU}	If we divide by a number or letter on one side of the equation, we must do the same on the other side. A card is dragged underneath the card you wish to divide and the game reminds the player to do the same on both sides of the equation.

Example from side A, level 2-11: Rule 6 is presented. The card is dragged underneath the card you wish to divide and the game reminds the player to do the same on both sides of the equation. On the left side, drag the bottom card up over the top card and the cards will then be replaced with a one-card. Click on the one-card to pull these two cards together.

	Properties of Equality III
Rule	If a = b, then ac = bc We multiply both sides by c
Explanation	If we multiply a number or letter on one side of the equation, we must do the same on the other side
DragonBox^EDU	If we multiply by a number or letter on one side of the equation, we must do the same on the other side. A card is dragged next to the card you wish to multiply and the game reminds the player to do the same on both sides of the equation.

Example from side A, level 3-7: Rule 7 is presented. The card is dragged next to the card you wish to multiply and the game reminds the player to do the same on both sides of the equation. On the left side, drag the bottom card up over the top card and the cards will then be replaced with a one-card. Click on the one-card to pull these two cards together.

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Shortcut	
Rule	**If x + a = c, then x = c + (-1) · a**
Explanation	**We can move an element from one side of the equation to the other. The number or letter will then change signs from + to - or from - to +.**
DragonBox^{EDU}	**We can move a card from one side of the equation to the other. The card will switch sides.**

Example from side A, level 3-1: Rule 8 is presented. The card on the right can be dragged to the other side of the board, leaving the box alone.

	Properties of Negation	
Rules	$(-1)a = -a$ $-(-a) = a$ $(-a)b = -(ab) = a(-b)$ $(-a)(-b) = ab$ $-(a + b) = (-a) + (-b)$	$(-1)1 = -1$ $-(-2) = 2$ $(-2)x = -(2x) = 2(-x)$ $(-2)(-x) = 2x$ $-(x + 2) = (-x) + (-2) = -x - 2$
Explanation	These rules describe the properties of negation.	
DragonBox^{EDU}	We can double-click a card to negate it. Any cards associated will change sides too. If the player double-clicks on a dark card associated with a dark one-card, both cards will switch to its opposite.	

Example from side A, level 5-1: If the player double-clicks on one of the dark cards, both cards will switch to its opposite. Click on the one-card to pull these two cards together.

Rules for fractions and signs	
Rules	$$-\frac{a}{b} = \frac{-a}{b} = \frac{a}{-b}$$ $$\frac{-a}{-b} = \frac{a}{b}$$
Explanation	The negative sign can go anywhere in the fraction and two negatives equal a positive
DragonBox^{EDU}	We can double-click a card in the fraction to negate it. Any cards associated will change sides too. If the player double-clicks on a dark card associated with a dark one-card, both cards will switch to its opposite.

Example from side A, level 5-3: We can double-click a card in the fraction to negate it. Any cards associated will change sides too. Drag the bottom cards up over the top cards and the cards will then be replaced with one-cards. Click on the one-cards to pull cards together.

Distributive Property I	
Rule	$a(b+c) = ab + ac$ $x(2 + 3y) = 2x + 3xy$
Explanation	When we are adding and multiplying with a parenthesis, we can distribute the multiplication through the addition.
DragonBox^{EDU}	When the bubbles (parenthesis) are soft, they can be popped (removed) by double-clicking. When the bubble is frosty, it cannot be removed. It is possible to multiply through the paranthesis by dragging the associated card to the top of the bubble, distributing the multiplication through the addition.
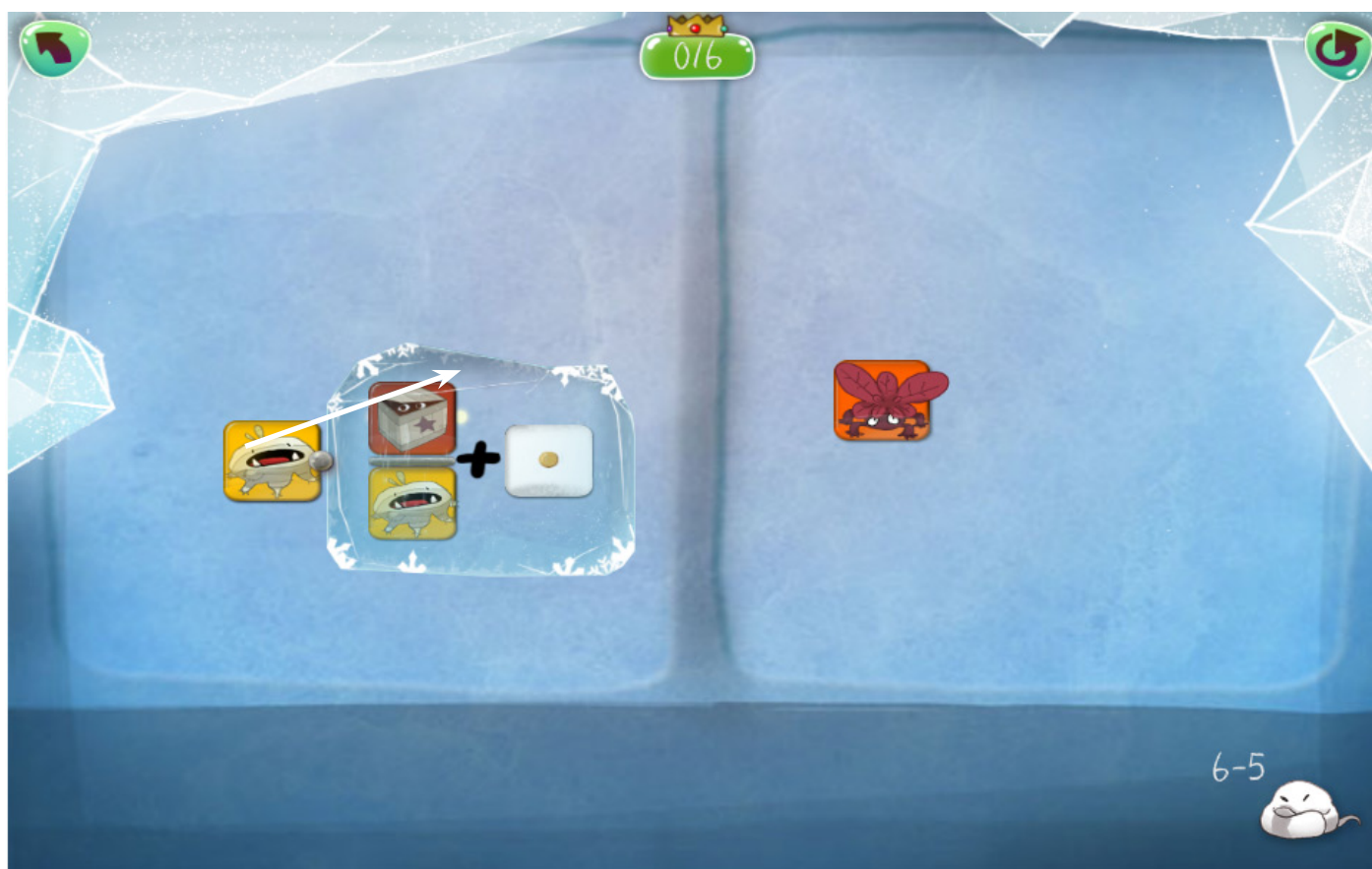
Example from side A, level 6-5: The yellow card is distributed through the addition by dragging it to the top of the bubble. Next, the expression within the bubble can be simplified and the bubble can be removed.

	Distributive Property II
Rule	$$\frac{(b+c)}{a} = \frac{b}{a} + \frac{c}{a}$$ $$\frac{(2+3y)}{x} = \frac{2}{x} + \frac{3y}{x}$$
Explanation	When we are adding and dividing with a parenthesis, we can distribute the division through the addition.
DragonBox^{EDU}	It is possible to distribute the division through the paranthesis by dragging the associated card to the bottom of the bubble, distributing the division through the addition.

Example from side A, level 6-7: The blue card can be distributed through the paranthesis by dragging the associated card to the bottom of the bubble, distributing the division through the addition.

Factoring property I	
Rule	$$ab + ac = a(b + c)$$ $$2x + 3xy = x(2 + 3y)$$
Explanation	We can insert a paranthesis and pull out factors that are common for all elements.
DragonBox[EDU]	We can insert a paranthesis and pull out factors that are common for all elements by dragging the factors to the top of the bubble.

Example from side A, level 7-1: In this parenthesis, the box is the common factor and can be pulled out of the bubble. The dices can be added to a value of ´5´. The bubble can be removed. Dividing by five, leaves the box alone on the left side.

Factoring property II	
Rule	$$\left(\frac{b}{a}+\frac{c}{a}\right)=\frac{(b+c)}{a}$$ $$\left(\frac{2}{x}+\frac{3y}{x}\right)=\frac{(2+3y)}{x}$$
Explanation	We can set a common denominator for elements in a parenthesis as a common denominator for the entire expression.
DragonBox[EDU]	We can pull out factors that are common denominators for all elements by dragging the factors to the bottom of the bubble.

Example from side A, level 7-10: ´3´is can be set as common denominator, and also the boxes are common factors that can be dragged out of the bubble too.

	Generating Equivalent Fractions
Rule	$$\frac{a}{b} = \frac{ac}{bc} \qquad c \neq 0$$
Explanation	**Multiplying the top and bottom by the same keeps the fraction the same value**
DragonBox^EDU	**If we wish to generate a fraction in the game equivalent to others, we can pull a card to one side to create a one-card. Next, the one-card is dragged underneath the associated card to create two empty card positions. By clicking on the denominator we want to have, we fill the empty card positions.**

Example from side A, level 7-14: We pull the box-card to one side to create a one-card. Next, the one-card is dragged underneath the box-card to create two empty card positions. By clicking on the denominator we want to have, in this case ´2´, we fill the empty card positions and we can continue solving the equation.

RULE 16: Add/Subtract with Like Denominators

Add/Subtract with Like Denominators	
Rule	$$\frac{a}{b} \pm \frac{c}{b} = \frac{a \pm c}{b}$$
Explanation	If the denominators are the same, add or subtract the top of the fraction
DragonBox^{EDU}	In the game, two fractions can be pulled on top of each other to calculate.

Example, level 7-15: The box to the right is made into a fraction with ´2´as the denominator. Drag the two fractsions on top of each other to calculate.

	Add/Subtract with Unlike Denominators
Rule	$$\frac{a}{b} \pm \frac{c}{d} = \frac{ad + bc}{bd}$$
Explanation	Find a common denominator by multiplying
DragonBox[EDU]	The card is dragged next to the card you wish to multiply to create a common denominator and the game reminds the player to do the same all places.
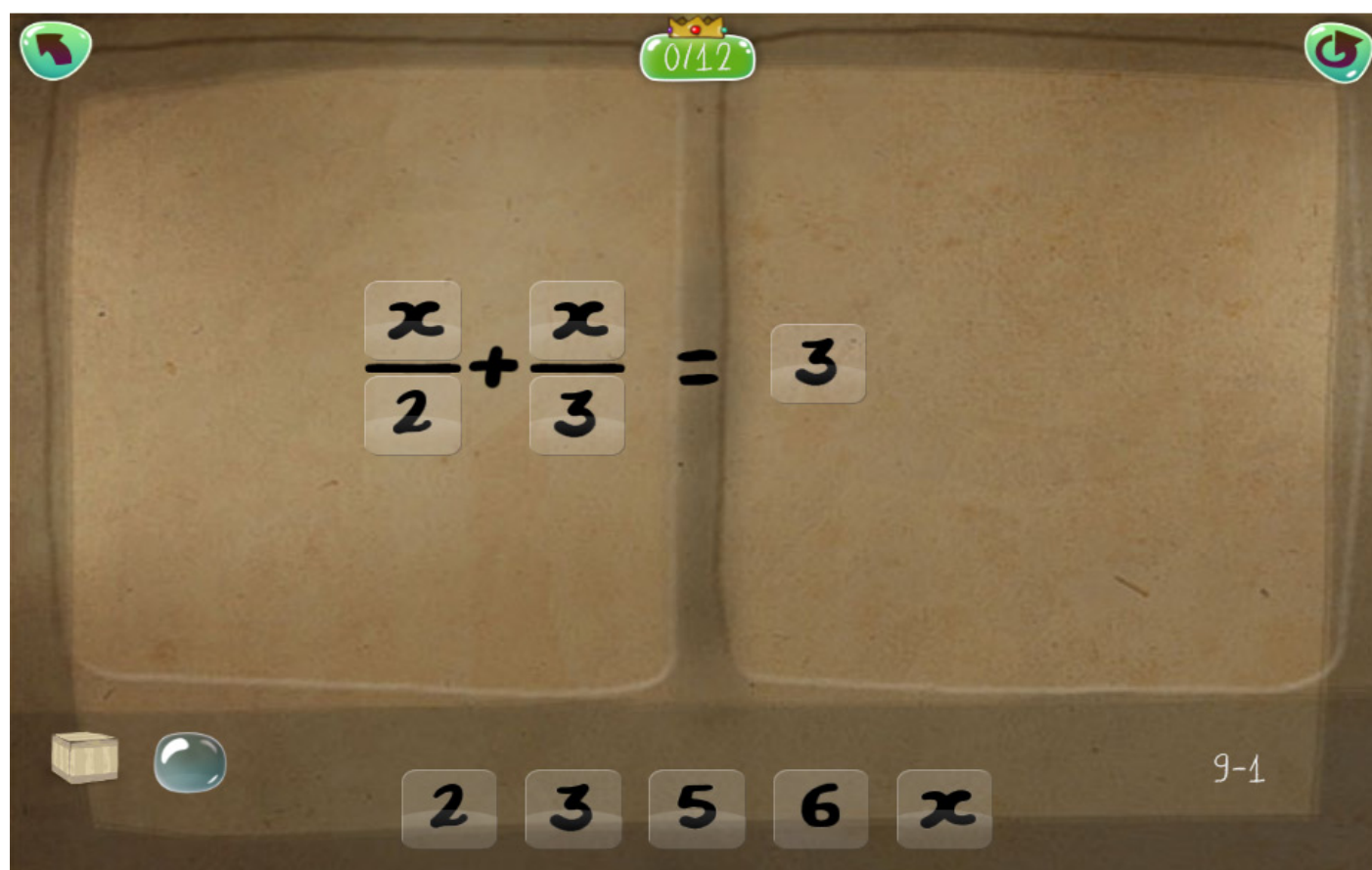
Example from side B, level 9-1: The cards are dragged next to the card you wish to multiply to create a common denominator and the game will remind you to do the same all places.

Multiply Fractions	
Rule	$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$
Explanation	**Top times the top and bottom times the bottom.**
DragonBox[EDU]	**In the game this will often be calculated for you.**

RULE 19: Creating a parameter/substitution

	Creating a parameter/substitution
Rule	$x \cdot (a + b) = c$ is equivalent to $x \cdot y = c$ and $y = (a + b)$
Explanation	Substitution is a method for expressing an element by inserting a variable.
DragonBoxEDU	In the game, an element can be isolated and collected by using the box in the bottom right corner.

Example from side A, level 9-1: The two cards in the denominator can be isolated and collected by using the box in the bottom right corner. Click the box first and then the two cards. Clicking on the box again collects the two cards. It is now possible to multiply the collected expression in order to simplify the fraction and solve the equation.

Commutative Property of Addition	
Rule	$a + b = b + a$ $x + 2 = 2 + x$
Explanation	We can add numbers in any order.
DragonBox^{EDU}	In the game, the elements can appear in any order.

Commutative Property of Multiplication	
Rule	$ab = ba$ $x \cdot 2 = 2x$
Explanation	**We can also multiply numbers in any order.**
DragonBoxEDU	**In the game, the elements can appear in any order.**

Associative Property of Addition	
Rule	(a + b) + c = a + (b + c) (x + 2) + 3y = x + (2 + 3y)
Explanation	We can group numbers in a sum any way we want and get the same answer.
DragonBox^{EDU}	In the game, we can create parenthesis by using bubbles.

Associative Property of Multiplication	
Rule	(ab)c = a(bc) (x ·2)3y = x(2 ·3y)
Explanation	We can group numbers in a product any way we want and get the same answer.
DragonBox^{EDU}	In the game, the elements can appear in any order. Two cards or more can be associated with each other to resemble factors.

Properties of Zero	
Rule	$a \pm 0 = a$ $a \cdot 0 = 0$ $\dfrac{0}{a} = 0$ $\dfrac{a}{0}$ is undefined
Explanation	0 added or subtracted to anything equals itself. 0 multiplied by anything equals 0. 0 divided by anything equals 0. Don´t forget that you can never divide by 0.
DragonBox[EDU]	Calculating with zero is used throughout the game. By clicking on a green vortex in the numerator or a vortex connected to another card (as a factor), the expression will disappear from the board.