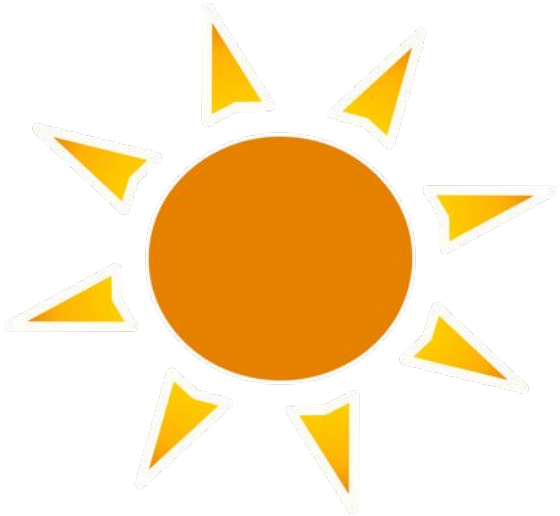
Night and Day

The Earth Spins

How do people around the world experience Day and Night?



Mini-lesson

The Sun's (apparent) movement

Mini-lesson

The Sun's (apparent) movement

Vocabulary

Match or define keywords in your workbook

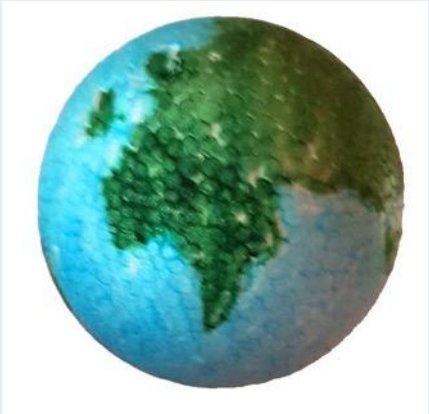
- Axis
- Tilt
- Sun
- Earth

Checks for understanding

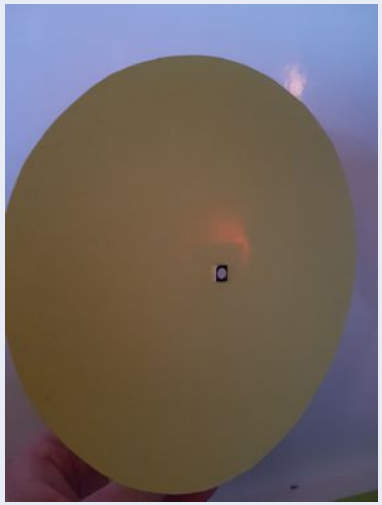
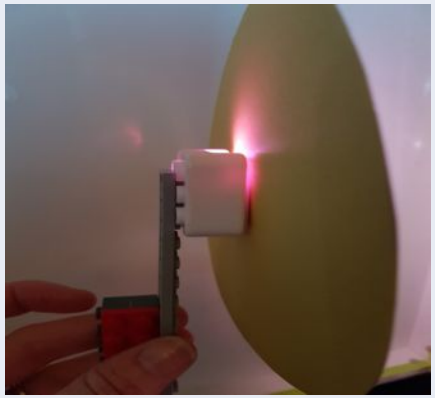
1. ***Which of these is correct?***
   A. *The Sun goes round the Earth*
   B. *The Earth spins on its axis as it goes round the Sun*
   C. *The Sun spins on its axis*

In your workbooks or with a partner, record, discuss, or share how the earth spins on its axis and orbits the Sun. Explain how Day and Night happen.

Worked Example

Step 1. Color a small styrofoam ball to represent the Earth.	
Step 2. Using a wooden stick or pencil - place the ball so that the Earth is on a stick.	

Worked Example

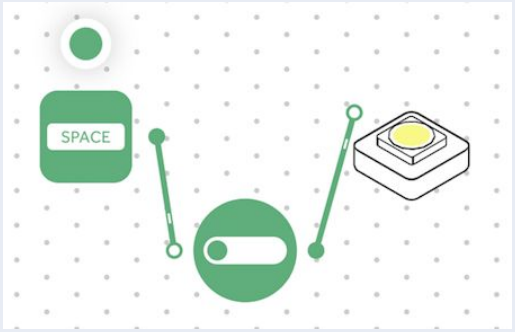
Step 3. Cut out a circle on yellow cardstock and pierce the middle. The RGB LED will be placed through the hole.	 
Step 4. Mount the RGB LED onto Lego to make the ‘sun’ free standing.	

Worked Example

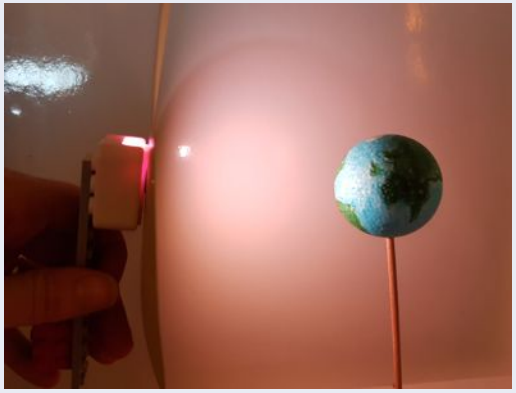
Step 5. Step 5. Turn on and pair:

- RGB LED Light

Drag and connect a Key Press block and a Toggle block to the RGB LED.



Step 6. Hold the ‘sun’ a hands-length away from the sphere. Activate the system!



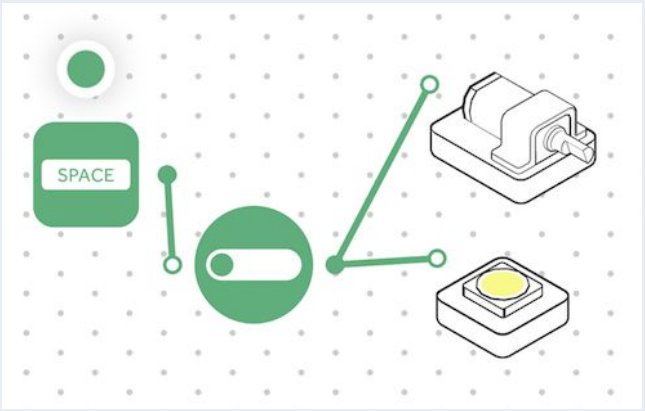
Challenge 1

Step 1. Mount the Earth on a motor

Step 2. Turn on and pair the DC Motor block. Drag the DC Motor block onto the Workspace. Open the motor Settings to make the motor as slow as possible without stopping.

Challenge 1

Step 3. Connect the Toggle block to the DC Motor block.



Step 4. Start the Motor and switch on the light.

Checks for understanding

1. The Motor imitates:

A. The orbit of the Earth around the Sun
B. The movement of the planets
C. The rotation of the earth on its axis

2. The Motor doesn't imitate:

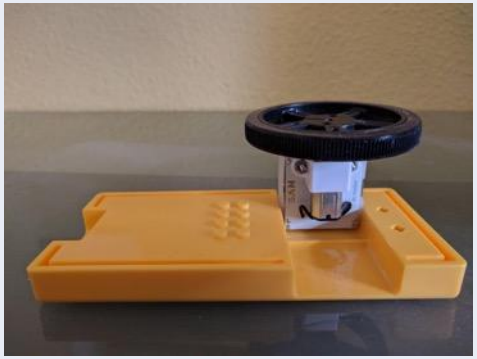
A. The orbit of the Earth around the Sun
B. The movement of the planets
C. The rotation of the Earth on its axis

Challenge 1- Debug it!

- **Is the motor too fast?**
- **Should the stick (axis) be vertical?**
- **Let's emulate Summer at the South Pole**

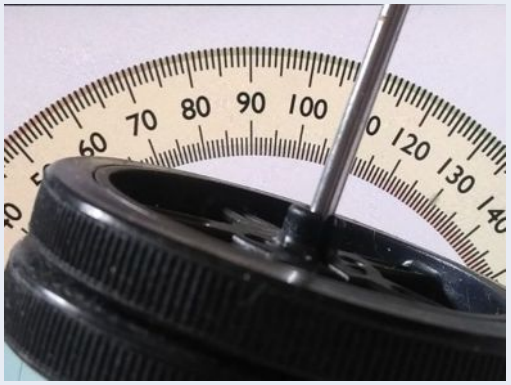
Step 1. Mount the Earth on the stick again	
Step 2. Mount a wheel on the stick	

Challenge 1- Debug it!

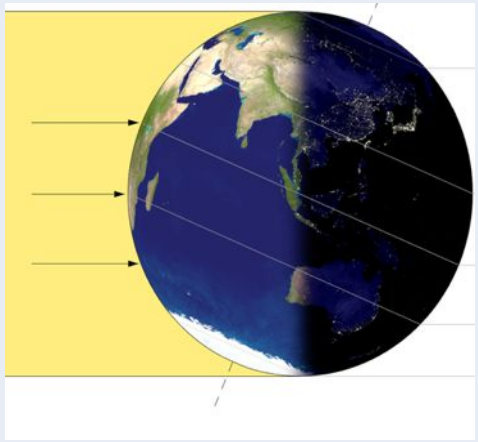
Step 3. Mount another wheel on the Motor.	
Step 4. Stick the two wheels together.	

Challenge 1- Debug it!

Step 5. The Earth isn't completely upright. Incline it to about 23°.



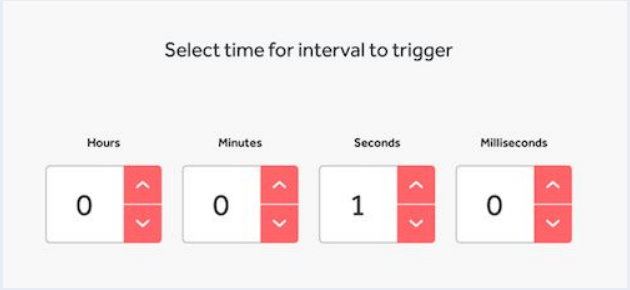
Step 6. Now you can see that the South pole never gets dark when you rotate the Earth.



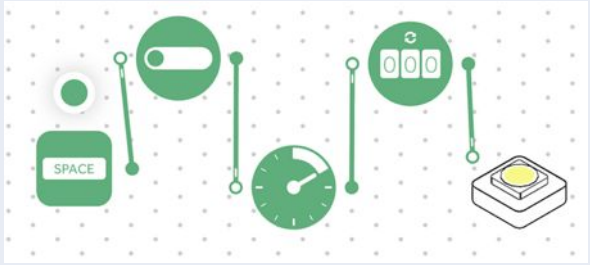
Challenge 2

Step 1. Go back to the solution to Challenge 1 and add an Interval block after the Toggle.

Step 2. Set the delay on the Interval block by selecting the settings and set it to 1 second.



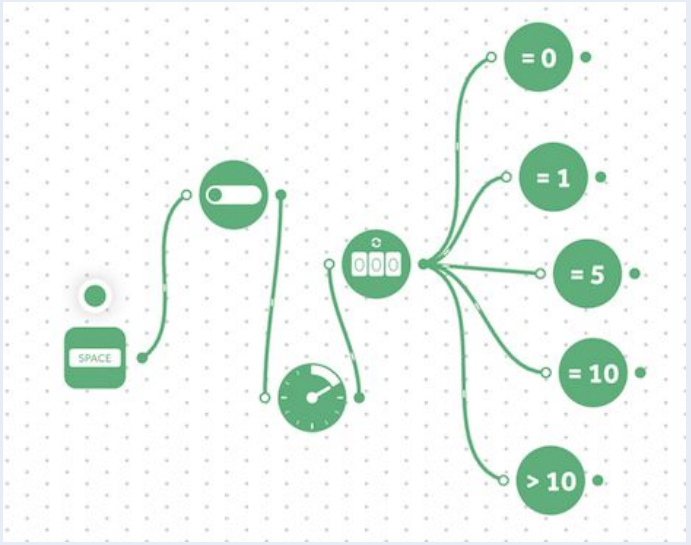
Step 3. Add a Counter block and connect it to the output of the Interval block.



Challenge 2

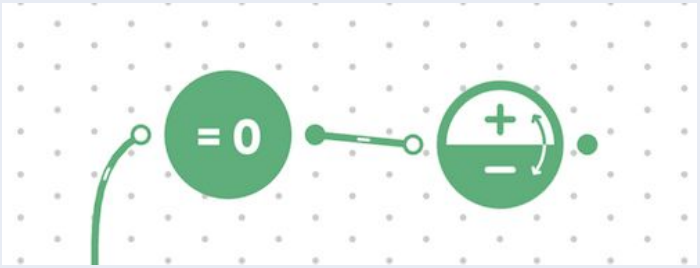
Step 4. Add 5 x Compare blocks and connect all of them to the output of the Counter block and set them to:

- = 0
- = 1
- = 5
- = 10
- > 10

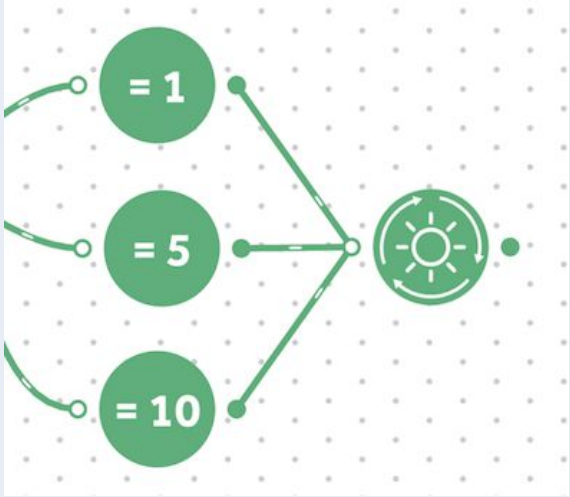


Challenge 2

Step 5. Add an Invert block and connect to the output of the Compare block with = 0 on.

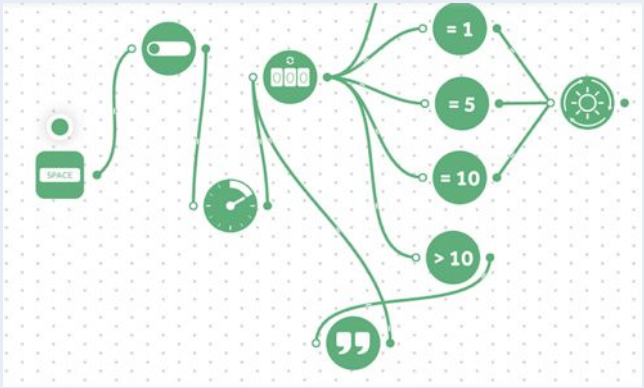


Step 6. Add a Cycle Brightness block and connect to the output of the Compare blocks. Set them to =1, =5, =10.



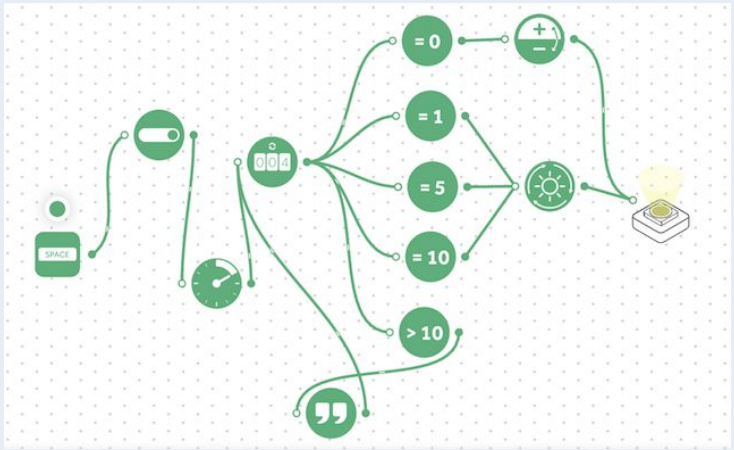
Challenge 2

Step 7. Add a Text block and connect the input to the output of the Compare block. Set the Compare block to ‘>10’ and the output of the Text block to the input of the Counter block. Set the text to ‘reset’ in the settings.



Challenge 2

Step 8. Connect the output of the Invert block to the Light. Connect the output of the Brightness block to the Light.



Step 9. Present your experiment!

Checks for understanding

1. ***If the North Pole never got dark… what might be happening?***
   A. *The orbit of the Earth around the Sun is such that the North pole is inclined towards the Sun.*
   B. *The speed of the Earth's rotation*
   C. *The position of Mercury*

Tidy Up/Exit Ticket

✓ **Today I learned….**