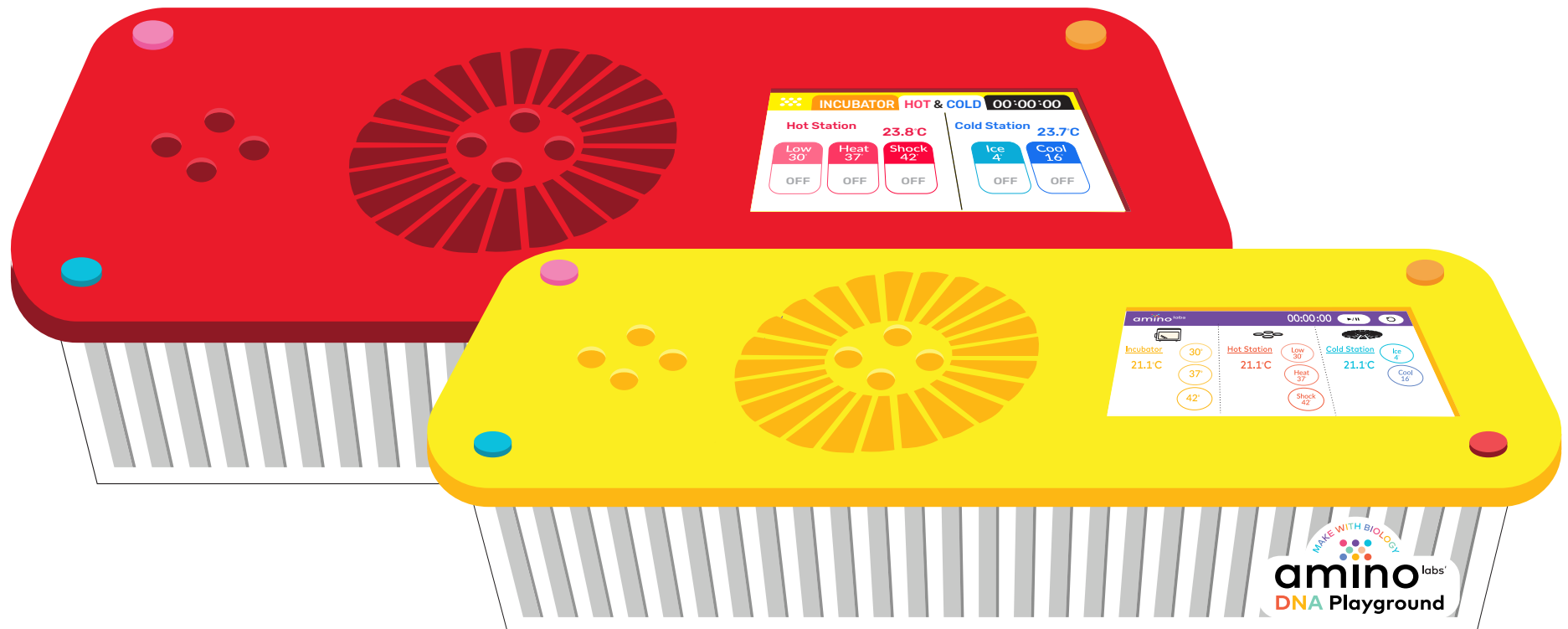


## Quick Start

# DNA Playground Minilab

## Guide



# Welcome to Friendly Biotechnology!

This Guide was created to help you get the most out of your DNA Playground Experience. **Even if you are familiar with genetic engineering, life science or other Amino Labs™ product, please take the necessary time to read through this quick guide.** This will ensure you practice safe science, setup, maintain and store your DNA Playground™ system the optimal way.

Amino Labs is very excited to welcome you to the world of the Biological Engineering with the DNA Playground™, Engineer-it Kit™ and the entire ecosystem of easy-to-use, easy-to-succeed at products!

<b>Safety notice</b>	<b>-3-</b>
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# Safe Science Practices

**Genetic engineering and life sciences are safe activities when you follow simple guidelines. Read on to ensure you adopt safe practices.**

The kit in your hands contains only non-pathogenic ingredients. These are part of the biosafety Risk Group 1 (RG1) (Biosafety Level 1). This is the most benign level and therefore the safest: with these kits, no special containment or training is required in North America. But you must follow these safety guidelines for your safety and the success of your experiment(s)!

**We recommend the system and kits for ages 12+, under adult supervision, and 14+ with or without supervision.**

We recommend that an adult empties the discard container. The cleaning instructions must be strictly followed for safety and experiment success. Make sure to store the kit per the instructions found in this booklet.

- **Do not eat or drink near your experiments.** Keep your experiment at least 10 feet from food, drinks, *etc.* Under no circumstances should you eat any of the kit's content.
- **Immunocompromised persons:** While the ingredients in these kits are non-pathogenic, some persons, such as immunocompromised persons, can be affected by large numbers of bacteria and should talk to their doctor before doing any experiment.
- **Wash your hands before and after** manipulating your experiment, or the hardware.
- **Wear gloves**, even when cleaning your station or handling the consumables (petri plates, loops, etc). This will protect

you from your experiment, and your experiment from you. Any latex, nitrile, or general purpose gloves you can find at the pharmacy will do. Also, after you put your gloves on, be aware of what you touch. **Try not to touch your face, scratch itches with your gloved fingers!**

- **Place your DNA playground on a stable work surface.** Keep it level at all times.
- **Clean up your station, spills and work surface before and after use.** Use a 10% solution of chlorinated bleach generously sprayed onto a paper towel and rub onto any contaminated surfaces. (Careful! This can discolor your clothes). A chlorinated spray cleaner also works.
- **Find a container to hold the inactivation bag where you will discard used items.** An old 1L yogurt container, large plastic cup or the like will do. Used items (in science, these are often called consumables) will be loops, tubes or used petri dish.
- **Avoid using Isopropyl alcohol on the hardware.** This can cause the plastic to become brittle and crack.
- **Eye-wear is not provided but can be worn.**

You can download a biosafety poster for your space from [www.amino.bio/biosafetyinaction](http://www.amino.bio/biosafetyinaction) and complete a short safety quiz at [www.amino.bio/biosafety-quiz](http://www.amino.bio/biosafety-quiz)

If you would like more safe science resources, including a fun video, go to <http://amino.bio/practicesafescience>

# Discover your DNA Playground™



Small/Home



Large / Classroom

The DNA Playground™ is an engaging science station that enables you to engineer bacteria and incubate your experiments or bioart. Small, contained and easy to use, it is a beginner scientist's must!

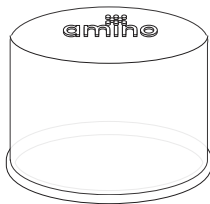
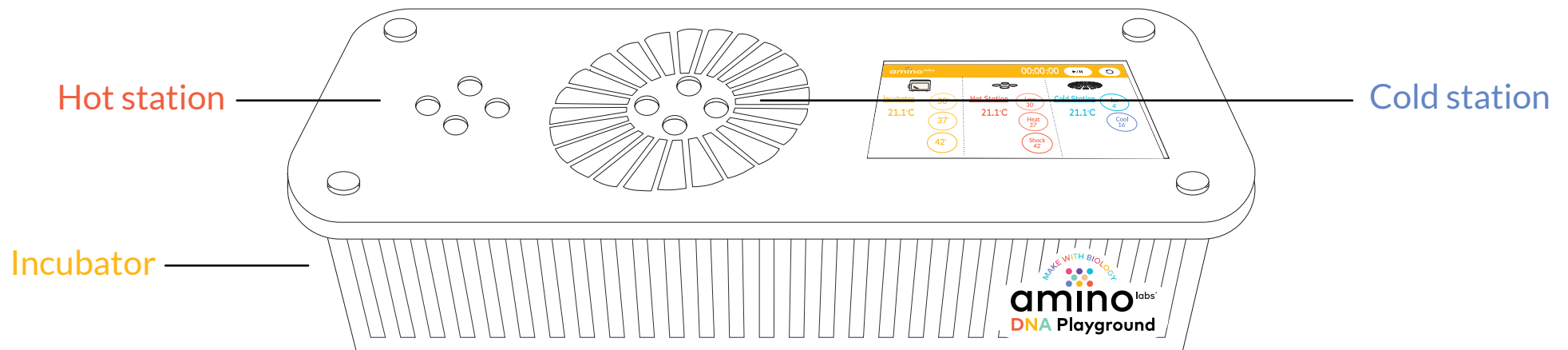
Use your DNA Playground at home or in schools as a fun alternative to traditional complex and expensive lab equipment. With a setup time of under 10 minutes, it allows you to get started with your genetic and biological experiments right away! The DNA Playground replaces the need for heated water baths, ice buckets and ice, incubator, timer and thermometers.

The DNA Playground is compatible with most bacteria transformation kits available on the market, including the Amino Labs Engineer-it kit and Genetic Engineering Hero Learning journey, of course. The following pages will introduce the various stations of your DNA Playground.

The DNA Playground™ is available in 2 sizes, in small (the original or home version) and in large (the classroom version). The small DNA Playground is great for home use when you are doing one experiment at a time. The DNA Playground large is designed for classrooms so that up to four groups of students can do their experiments on a single machine. Because of the higher petri dish incubating capacity (8), the DNA Playground Large is excellent for independent student research and science fair projects.



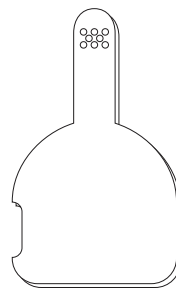
# Discover your DNA Playground™



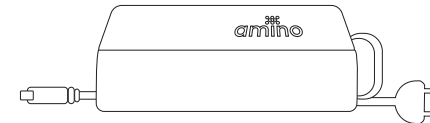
Incubator humidity chamber



Incubator Key

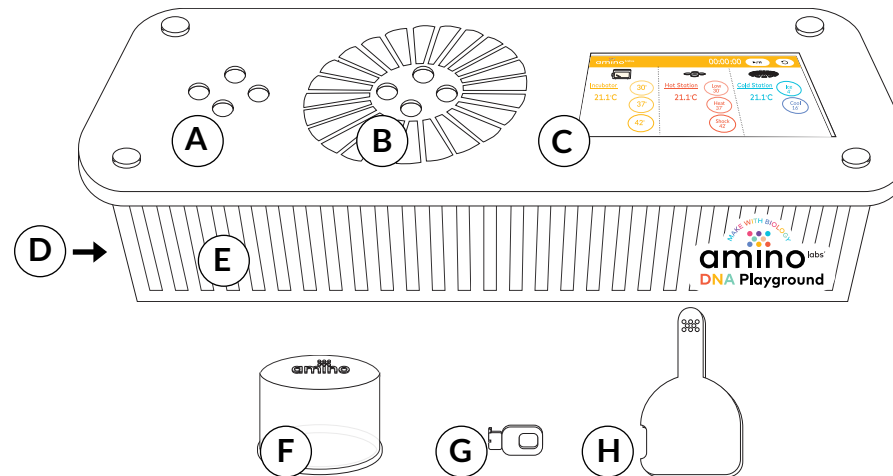


Incubator Paddle



12V Power supply

# DNA Playground Map



**A- Hot station** To genetically engineer, you need to use heat for several things: 1) to keep ingredients warm; 2) to heatshock bacteria to allow the DNA program to go through the cell membrane; 3) to recover them 4) to incubate them for optimal growth. The DNA Playground's hot station that allows you to heat up 4 tubes of reagents. Using the touchscreen, you can set the hot station to "Low" ~30°C, "Heat" ~37°C, and "Shock" ~42°C.

**B- Cold station** To transform bacteria you need to both keep certain ingredients "on ice" and to "ice" bacteria. We've replaced the need for ice in the DNA Playground with tube coolers that reach a freezing 1-6°C. The 16°C setting can be used for your advanced biology experiments.

**C- Touchscreen** The DNA Playground has a touchscreen that allows you to control the stations and let you know what's going on inside. This data will help you make the most out of your experiment.

**D- Incubator** To grow optimally, bacteria need contained environments with regulated temperature. This internal incubator regulates the temperature to 30°C, 37°C, or 42°C.

**E- Airflow vents** Keep these clear - they allow the cold and hot station to function properly.

**F- Humidity chamber** Keep your bacteria at the right moisture level with this humidity chamber. Slip them on top of your plate stack when incubating. One humidity chamber is in the DNA Playground small, and four humidity chambers are in the DNA Playground Large.

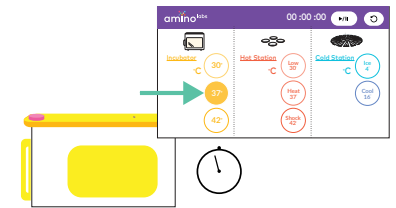
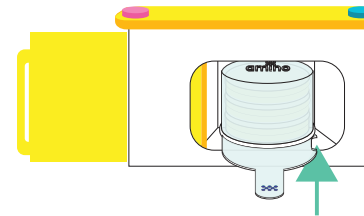
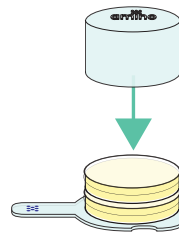
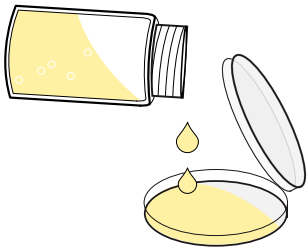
**G- Incubator key** You can lock the Incubator to keep your experiment safe!

**H- Incubator paddle** Use this paddle to take your petri dishes in and out of the incubator, like a pizza oven paddle!

## Using the incubator and accessories

The incubator controls the environment your cells will grow in, in a process called incubation. To grow optimal bacteria, the temperature and moisture level need to be regulated. For this, you will find 3 different temperature settings available via the touchscreen controls. The incubator also has a sensor to monitor the temperature, and you can read its output on screen.

You will also find humidity chamber(s) in your incubator - 1 in the small DNA Playground and 4 in the large DNA Playground. These humidity chambers are used to control the humidity and prevent agar from drying. Use them as follows :



1. Pour your plates according to the instruction manual. Let them solidify.

**Make sure that the bottom part of the dish is at least half full!**

2. Flip your plates upside down and stack up to two plates in a pile. Place the humidity chamber over, and place this stack on top of the incubator paddle.

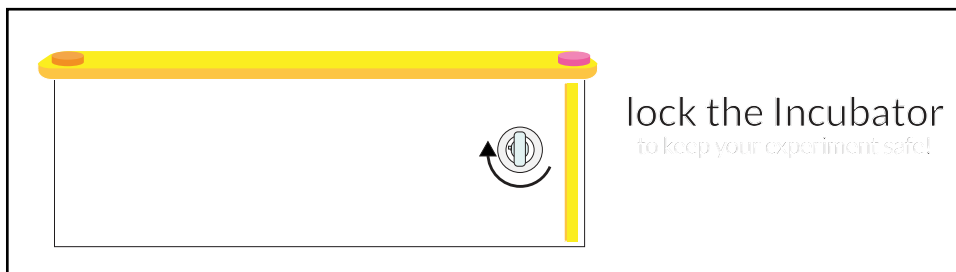
\*For easy lifting of the paddle with plates, it is easiest to place the paddle on the edge of your work area with the handle over the ledge.\*

3. Slide this in the incubator. Make sure the humidity chamber is fully over the plates and not lifted or caught. You want it to be flat on the incubator floor. For the classroom/large incubator, only put in as many humidity chambers as you need to cover your petri dish(es).

\*Remove the paddle by angling it upwards or by holding the humidity chamber in place and pulling out the paddle.\*

4. Close the incubator door, and lock it. Turn on the incubator using the touchscreen and turn on the timer. You are now incubating!

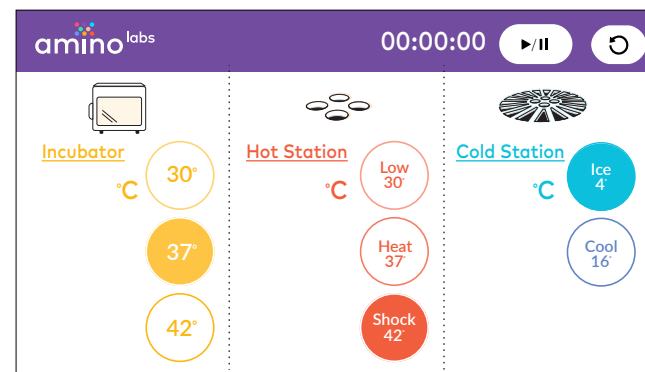
Tip: If you have experienced drying of plates when doing long incubations (48+ hours), it is recommended that you shuffle the order of the plates in the stack every 24 hours, and rotate them 180°.



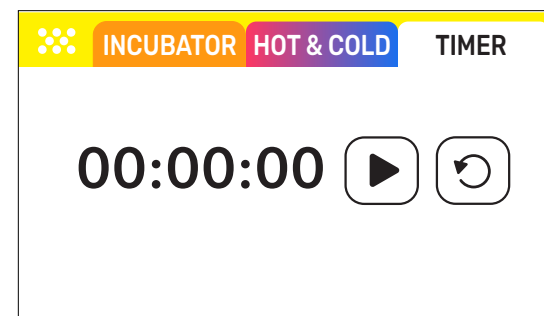
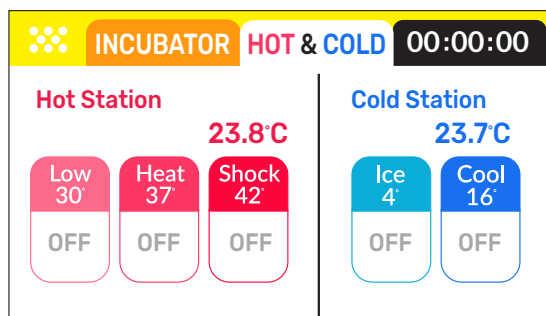
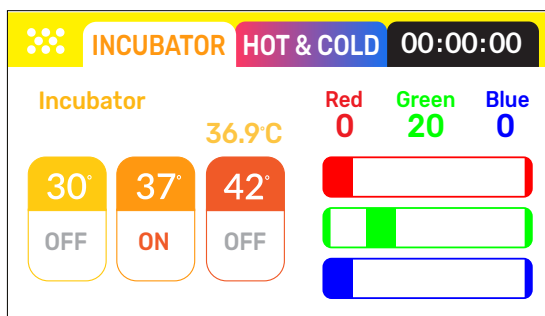
## Using the Touchscreen - DNA Playground Small / Home

The small DNA Playground's touchscreen controls the incubator, Hot station and Cold Station. It also lets you see the sensor value for the temperature on each station. The screen also has a timer at the top that allows you to time your experiment as needed.

On the screen, the left column controls the incubator: 30°C , 37°C, and 42°C. The middle column controls the Hot station: 30°C , 37°C, and 42°C. The right column activates the Cold Station which can be set to 4°C to replace ice and 16°C. Press each button with a longpress to activate it, and longpress it again to turn it off. If any sensor shows ERR go to the troubleshooting page of this manual.



## Using the Touchscreen - DNA Playground Large / Classroom



The DNA Playground Large has three screen tabs at the top of the touchscreen. These different tabs control the incubator, Hot station and Cold station. It also provides you the sensor values for the temperature on each station. It has a timer that you can see at the top of the screen, and is controlled on the third tab. Use a longpress on each button to activate it, and longpress it again to turn it off. It may take a second or two for status to update on screen - a bit longer than you are used to on a mobile device.

- The first tab controls the incubator temperature: 30°C , 37°C, and 42°C and the tri-color Red-Green-Blue light inside the incubator is controlled by a longpress on different areas of the sliders. If the sensor shows ERR go to the troubleshooting page of this manual.
- The second tab controls the the Hot station temperature: 30°C , 37°C, and 42°C on the left and the right column activates the Cold Station which can be set to 4°C to replace ice and 16°C. If any sensor shows ERR go to the troubleshooting page of this manual.
- The third tab controls the timer. You can see the timer count at the top from the other tabs but can only control it from the timer tab.

# Technical Specifications

## Physical Dimensions

### Small / Home

Dimensions: 13 x 5 x 4.5 in

Weight: 1.4 Kg

### Large / Classroom

Dimensions: 15 x 7 x 4.5 in

Weight: 2.1 Kg

## Operating environment

Temperature: 19 - 25 °C

Humidity: 30 - 80 %

Altitude: 3,000 m

## Power *\*GFCI outlet recommended\**

Voltage: 110-250V

Frequency: 50-60 Hz

Average power: 40 W

Peak power: 84 W

## Controls

Screen: 4.3 inch, capacitive

## LED Incubator light

### Large / Classroom

Tri-color Red-Green-Blue LED

## Temperature Stations

Cold Station: 4/16 °C

Hot Station: 30/37/42 °C

Incubator: 30/37/42 °C

## Real-time Sensor Accuracy

*Temperature sensors (3) :*

Cold Station +/- 0.1 C @ 1°C

Hot Station +/- 0.1 C @ 42°C

Incubator +/- 0.5 C @ 37°C

# Setting up your DNA Playground™

**Location /surface :** Setting up your DNA Playground™ is easy. Find a level, non-porous surface near an electrical outlet. Make sure the surface is bleach safe, and wipe it down with a standard chlorinated spray cleaner or wipes. A solution of 10% chlorinated bleach is also good. Set down your unit and make sure it is visibly level. Keep some working space around your unit so that you can work comfortably (2x1' at a minimum). In some instances, you will need to let your experiment incubate overnight or for multiple days and the unit must remain powered on the entire time; you can move it to an out-of-the-way location when incubating overnight. Plan ahead!

**Consumables Discard Container:** Find and place a container of about 500ml-1L to collect your experiment waste: used loops, ingredient tubes, contaminated wipes. We suggest an old yogurt container or similar. You can also use the inactivation bag we sent you to collect the waste as you go. The experiment manual explains how to safely inactivate and dispose of it all after your experiment.

**Powering up:** Connect the Power Supply provided and turn on your unit. The DNA Playground will cycle through its powering up routine for the first 5 seconds. **Make sure that each of the temperature sensors displays a value close to your room temperature after being on for 5-10 seconds. If they read Err, please visit the Troubleshooting section.** If the sensors are correct, you can now test each station. Depending on your current room temperature, the hot and cold stations achieve the set temperature between 1-8minutes, with the incubator taking up to 90 minutes, which is considered during the incubation timing. When the incubator is powered on you will hear the small incubator circulation fan running. You can open the incubator door and remove the humidity chamber to check whether the fan is spinning. Never touch the fan blades as this could hurt you, and damage the fan.

## Large / Classroom

When looking at the incubator fan, turn on the LED light using longpresses on the sliders on the screen to test them.

# Running an Experiment

## Experiments

Amino Lab's all-in-one kits make it easy to add a DNA program into living cells, grow and take care of those cells so that they can produce something for you. All ingredients in the kits are pre-measured and labeled for ease-of-use. The kits can be combined to get end-to-end biotechnology experiences. Find these, along with their instructions, at [amino.bio](https://amino.bio).

## Sensors

In the unlikely event the sensors show ERR, turn off your DNA Playground and go to the troubleshooting guide on the next page.

## Cold Station

**Cold Fan:** The fan of your cold station might have a built-in blue light that will appear as if from below the cold station. If your cold fan does have the built-in blue light, it will turn on automatically when you turn on the Cold Station. You might notice that the blue light will start pulsing once the cold station reaches the temperature you selected. This pulsing is normal! 😊

Some DNA Playgrounds' cold station do not have a built-in light. That's also normal!



## Maintenance

**Maintaining your system is easy:** simply make sure you clean the exterior of your station after use with your chlorinated spray solution, wiper or bleach 10% solution. Never use Isopropyl Alcohol (rubbing alcohol) on your DNA Playground. The chlorinated solution is great for getting rid of contaminants but can leave a film or streaks on your DNA Playground. You can do a final clean with a window cleaner to remove these. The touchscreen can be cleaned with phone/screen cleaning wipes.

Avoid performing science manipulations on top of your DNA Playground - the touchscreen should not become wet, and it is best to avoid dropping chemicals, bacteria and DNA on your DNA Playground in any case as they could contaminate future experiment if not properly cleaned.

Always verify that the sensors are accurately reading the room temperature before turning on stations. If something doesn't seem to be performing correctly, turn off/unplug the machine, and contact us [help@amino.bio](mailto:help@amino.bio).

## Troubleshooting

**If the screen freezes,** turn the DNA Playground™ off and on again. At the moment, it will not remember where you are in your procedures; make sure to turn on all the functionalities you need when restarting it (make a note before you turn it off!)

**In the unlikely event the sensors show ERR,** it means they are not working properly. This means that you should **not turn on the station in question as it could overheat and cause fire/melting/danger**. In this event, please contact us immediately, [help@amino.bio](mailto:help@amino.bio).

**If the hot or cold station do not reach the necessary temperature** but hovers above or below it, you may be in a room that is too cold, or too hot. Please move to a more suitable location between 19 - 25 °C.

If anything else causes you issues, please contact us : [help@amino.bio](mailto:help@amino.bio)



## More Information

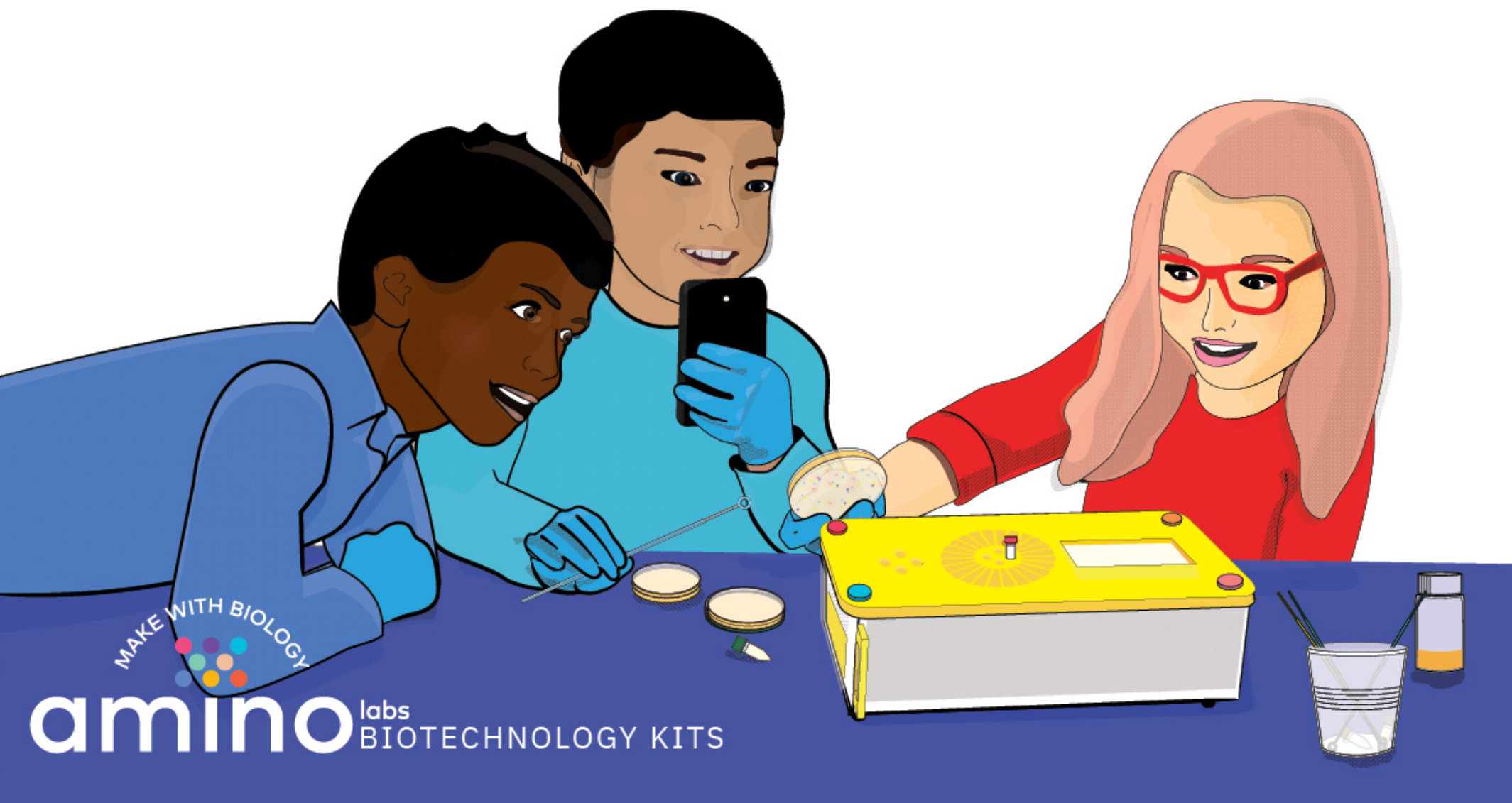


All Amino Labs products, from the Hardware to the DNA, are developed, designed, manufactured and packaged by us in our laboratory and workshop in Canada.

We'd love to hear your thoughts, feedback and suggestions so that we can continue to make our products better, and fitting to your needs. Answers to your questions and help are also just an email away:

Help and inquiries: [help@amino.bio](mailto:help@amino.bio)

Feedback, Suggestions, Comments: [info@amino.bio](mailto:info@amino.bio)



[www.amino.bio](http://www.amino.bio)