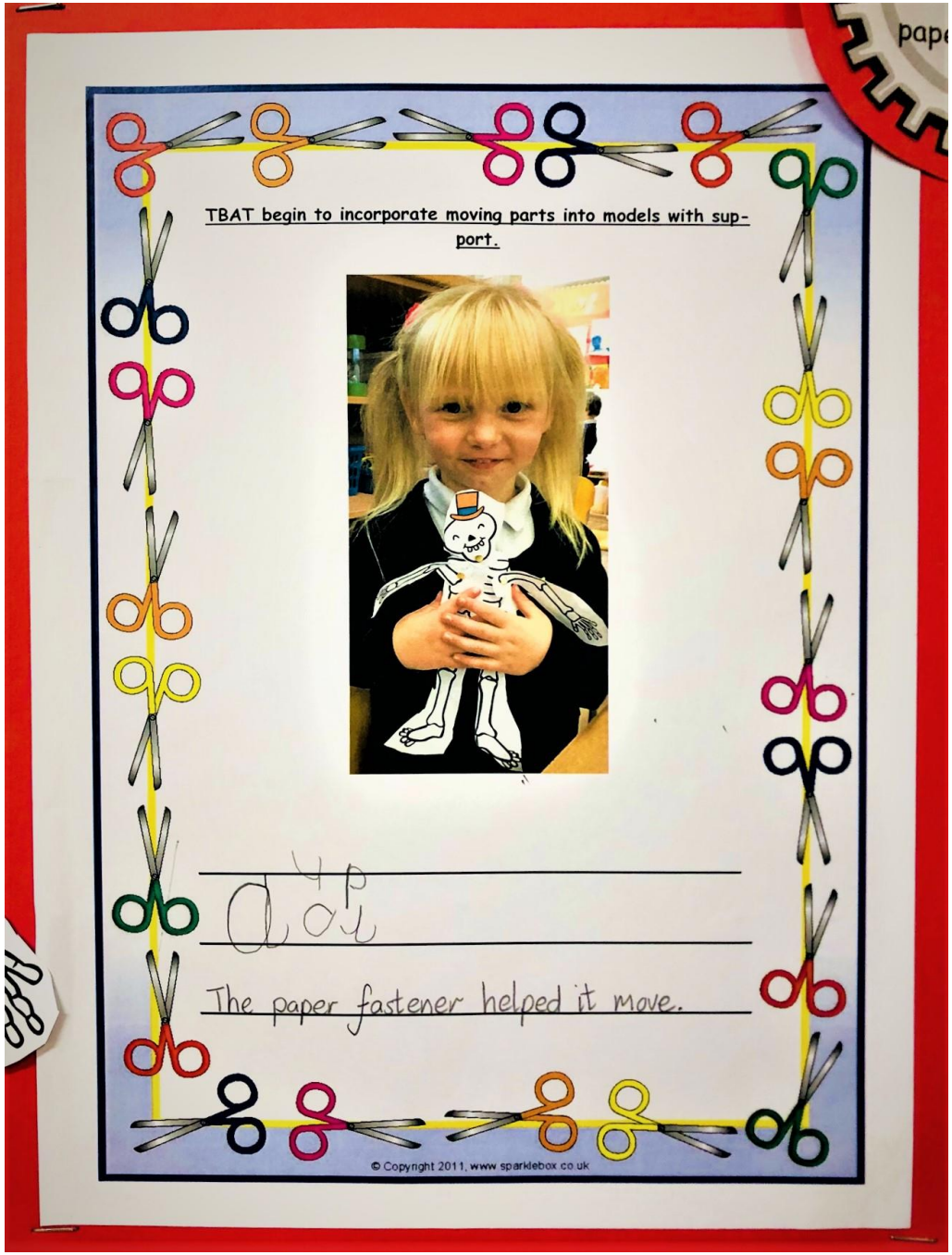
Design Technology

Curriculum Progression
Strand – Mechanics

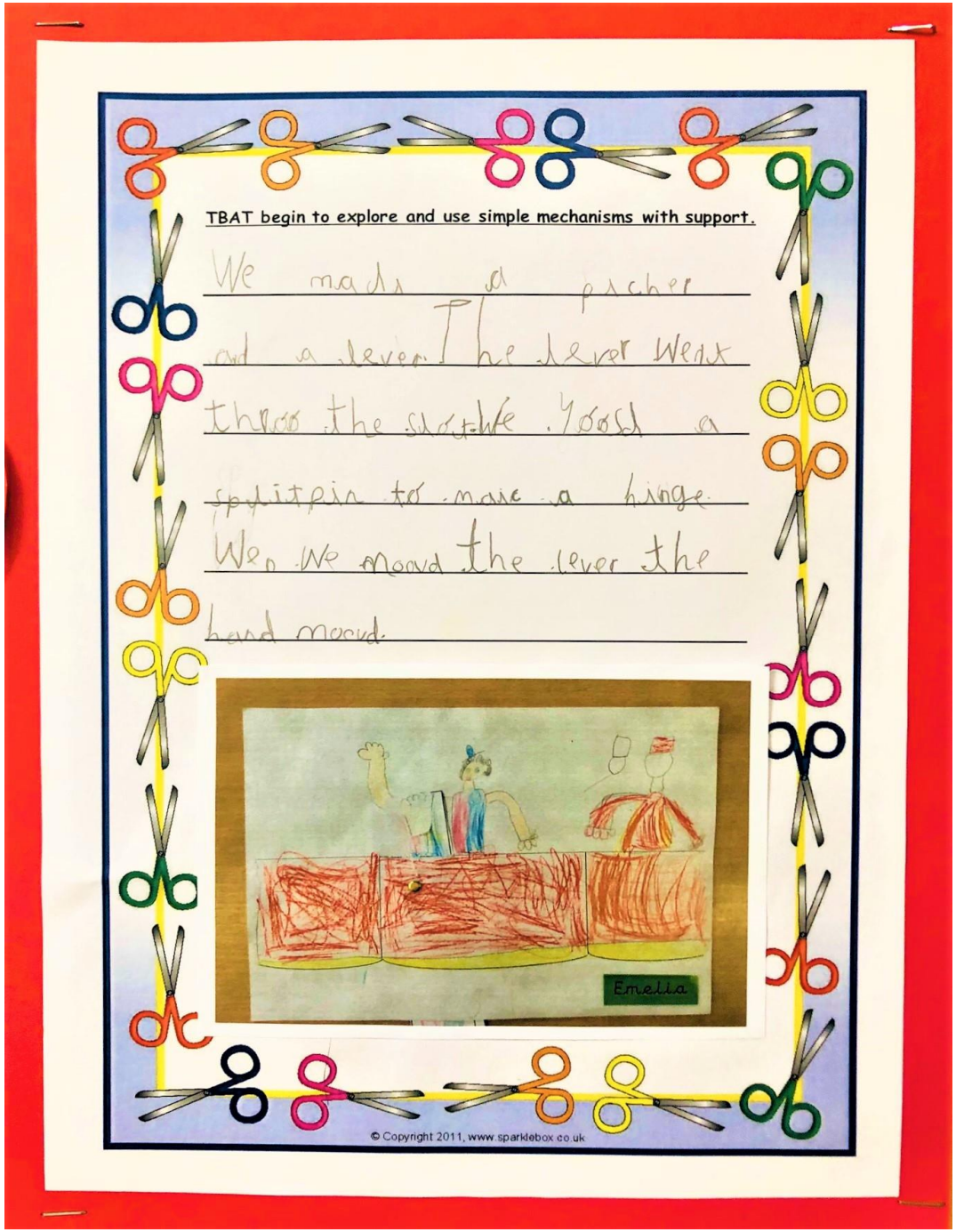


Foundation stage:

Children can begin to incorporate moving parts in to models with support.

Key Vocabulary

up, down, paper fastener

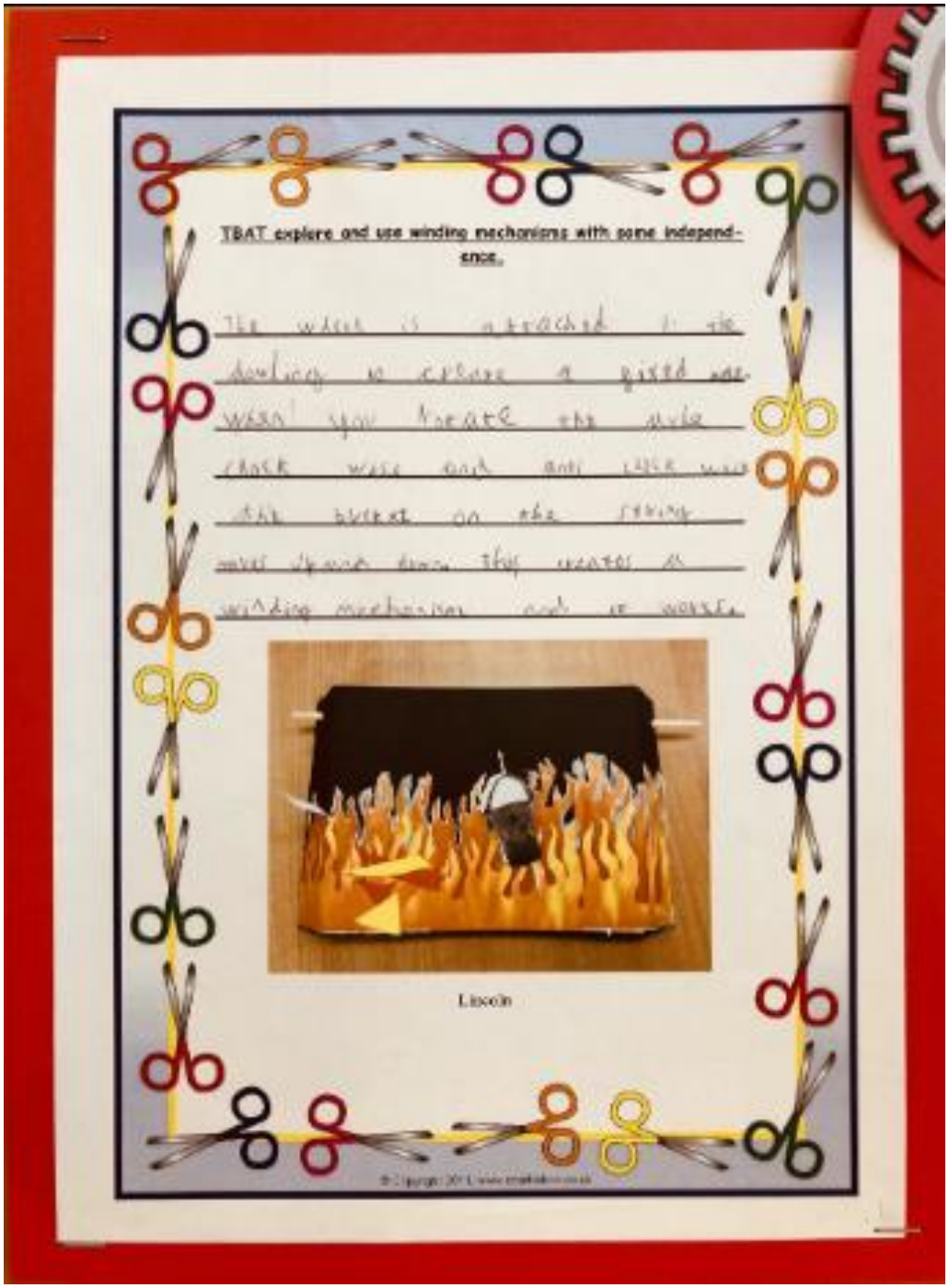


Y1:

Children can begin to explore and use simple mechanisms with support.

Key Vocabulary

lever, slot, hinge

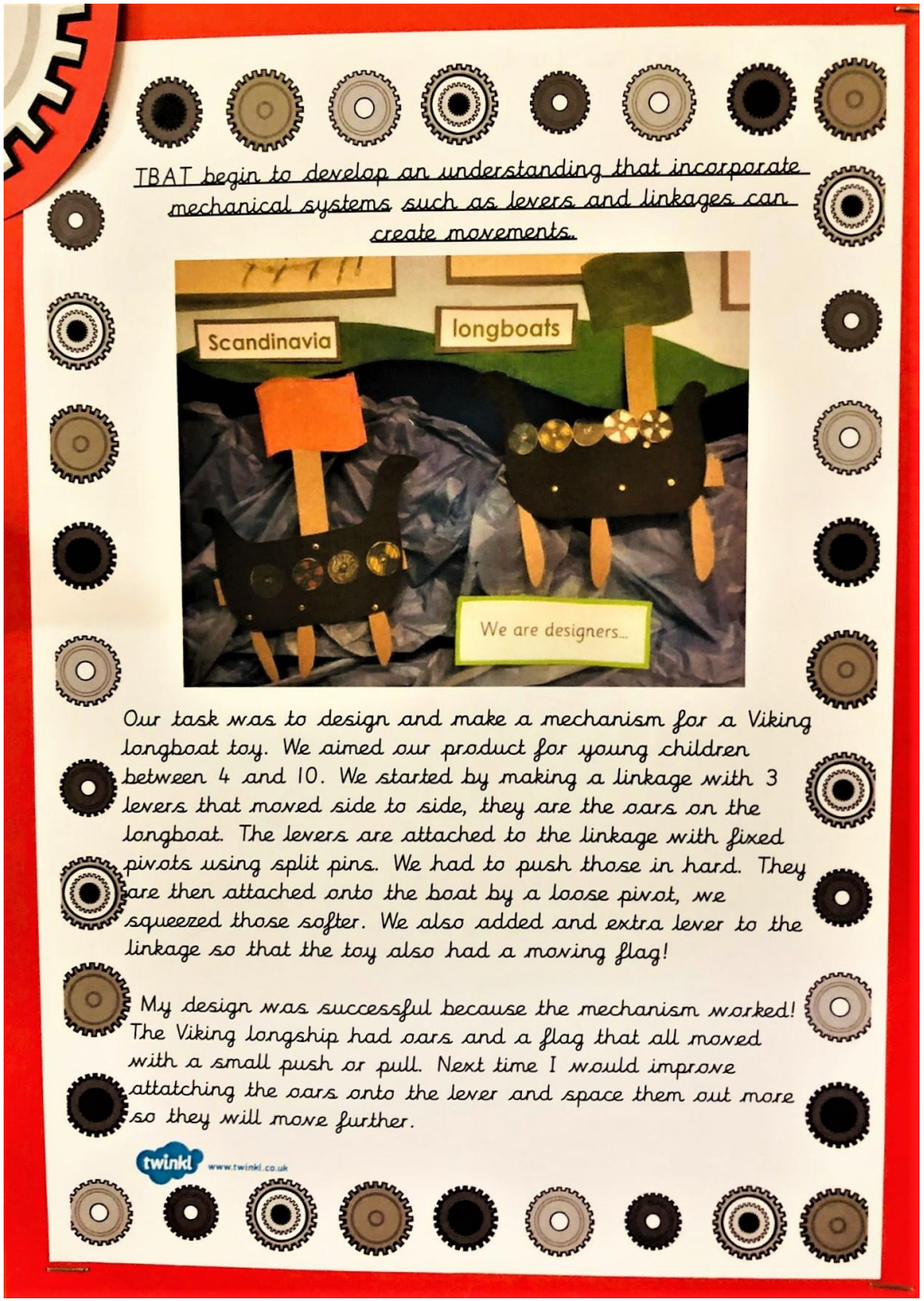


Y2:

Children can explore and use winding mechanisms with some independence.

Key Vocabulary

axle, wheel,
winding mechanism



Y3:

Children can begin to develop an understanding that mechanical systems such as levers and linkages can create movement.

Key Vocabulary

linkage, fixed pivot, loose pivot

Y4:

Children can produce models that incorporate mechanical systems such as levers, linkages or pneumatic systems to create movement with increasing independence.

Key Vocabulary

pneumatics, force

TBAT begin to understand how mechanical systems such as cams create movement.

I have made a cam toy that spins. The toy is an out of control fishing boat which is why it has no people on it and why I made it spin. I created the movement using a round cam, so it spins around when I turn the handle that appears from the side of the waves. The boat is a 2D drawing which has oars, a large sail and a fishing net that is floating around next to the boat because it fell off whilst the boat was spinning.

My cam uses a rotary movement. As I turn the wooden handle, the force rotates the cam, and this turns the follower above which was made from thick card. The dowel slider also spins, and this then turns the boat.

Next time, I would change the material of the cams to wood and make them sturdier. I would also use a stronger box to make the movement steady. I might use an oval cam to make a wave rise and fall (this would be called a reciprocal movement). The final thing I would like to change would be to make the sail more detailed and accurate to one of the original, real life Roman fishing boats.

Y5:

Children have an increasing understanding of how mechanical systems such as cams create movement.

Key Vocabulary

cam, rotary

TBAT develop a greater understanding of how cams, pulleys or gears create movement.

A pulley is a wheel with a groove on it and there is a belt around it. If the belt spins it will make the whole pulley spin. To spin the pulley attach the belt to a motor. A complete circuit and a pulley help things to move.

Gears are wheels with teeth on and if you put them together they will connect by the teeth. You can put a small one and a big one put together and the gears will still spin but at different speeds. The gears are used to control the speed.

We decided to use a pulley because we didn't want to control the speed. We just wanted it to spin like a fairground ride.

First we made a prototype because we wanted to see if we had to change something in our design. Also for when we did the real one we knew how to make it work. We needed to test it so we know what we are doing and to help us solve problems later.

This is an explanation of how my ride works:

My ride is connected to the pulley so it can rotate. To spin the pulley, you need a motor so we first made a circuit. Next, we built a strong structure out of carefully measured and sawed wood and a base. The axel in the middle of my ride is connected to the pulley and the motor by the wheel and belt. The circuit runs the whole thing when the switch is turned on and it is essential to have the motor. If I made the ride again, I would improve the design of the seats because they are a little high and struggle to hold heavy weight. We could have made some kind of seatbelt to secure the pretend passengers.

Jacob, Year 6

Y6:

Children develop a greater understanding of how cams, pulleys or gears create movement, evidencing a range of designing and making skills of a particularly high standard.

Key Vocabulary

pulley, gear, prototype

TBAT make quality products using innovative combinations of electronics and mechanics in product designs, evidencing a range of designing and making skills of a particularly high standard.

A pulley is a type of wheel which has grooves in it. You usually attach a belt (a band, chain or some string) around it. If you are using a mechanical system with electricity, you would attach the belt around the motor. Some examples of everyday things with pulleys are window blinds and lifts.

A gear is a wheel (with teeth around the circumference) that works with the others rotating. For example, if you had something that required gears, you would start the system and the driver would start then its teeth would then gradually start to turn the other. Some examples of everyday things with gears are cars, clocks and bikes.

We decided to use the pulley system for our rides. This was due to the fact that we weren't bothered about the speed it was more about the learning about the rotating mechanical system which our rides required.

First we made a prototype because we wanted to evaluate our work and if we made a mistake we could discover where we went wrong. This helped us with problem solving later on.

This is an explanation of how my ride works: Me and my team built a ferris wheel and we first had to make a complete circuit. The components were a switch, motor and battery. An axel made of wooden rod passed between two large wooden circles. To make it work, we attached our belt (elastic band) around the motor and wheel then this pulley helped the axis turn which rotated the ferris wheel.

We could improve our design by making the wooden rods a bit smaller. We found that they sometimes hit the decoration which prevented the pulley from turning successfully. It interrupted the mechanical system. One problem we faced was keeping the belt on the wheel and motor. We solved this by making the base more secure so the motor didn't slant. It's important the wheel and motor are correctly lined up. If we made the ride again, we would take more care to align the wood (which we first sawed) up with the mechanical system and the base. This would prevent unwanted slanting and would stop the wheel catching occasionally on the wooden frame where the wheel sits.

Emmeline, Year 6

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Mastery:

Children make quality products using innovative combinations of electronics and mechanics in product designs, evidencing a range of designing and making skills of a particularly high standard.

Key Vocabulary

pulley, gear, prototype, mechanical systems